

Table of Contents

UAB.....	3	Award of Degree.....	12
Accreditation.....	3	Summary of Steps Toward the Doctoral Degree	12
Student Life.....	3	Facilities and Services.....	13
UAB Study Abroad.....	3	Lister Hill Library of the Health Sciences	13
Smolian International House.....	3	Mervyn H. Sterne Library.....	13
Oak Ridge Associated Universities.....	4	Libraries at Other Universities.....	13
Dauphin Island Sea Lab	4	Student Housing and Residential Life	13
Birmingham.....	4	Student Health and Insurance Programs	14
The Graduate School	4	Student Development.....	15
Graduate Council	5	Financial Information.....	15
Graduate Student Association.....	5	UAB Payment Policies	15
Industry Roundtable.....	5	Internal Payment Options	15
Graduate Student Research Day.....	5	External Payment Option.....	15
Application and Admission	5	Statement of Fees.....	15
Categories of Graduate Student	5	Delinquency Policy.....	15
Degree-Seeking Students	5	Tuition Adjustment Policies	15
Non-Degree-Seeking Students	5	Academic Common Market.....	16
Complete Application Package.....	5	Financial Aid	16
Admission Standards	6	Payment Due Dates.....	16
General Academic Requirements	6	Graduate Degree Programs	17
Graduate Credit.....	6	Program and Course Information.....	17
Requirements for Undergraduate Students	6	Online Catalog.....	17
Course Numbering System	7	Abbreviations	18
Time Limitations.....	7	Course Codes.....	18
Course Enrollment	7	Accounting (M.Ac.).....	19
Course Completion	7	Administration–Health Services (Ph.D.).....	21
Cumulative Credits and Grade Point Average (GPA).....	8	Anthropology (M.A.*)	24
Academic Performance	8	Art History (M.A.)	25
UAB Student Record Policy	8	Biochemistry (Ph.D.).....	27
Conduct and Appeal.....	8	Biology (Ph.D., M.S.)	29
Graduate School Deadlines	9	Biostatistics (Ph.D., M.S.).....	34
Requirements for the Master's Degree.....	9	Breast Cancer Training Program.....	39
Faculty Advisor.....	9	Business Administration (M.B.A.).....	40
Graduate Study Committee.....	9	Cell Biology (Ph.D.).....	43
Plan I or Plan II.....	9	Cellular and Molecular Biology.....	45
Transfer of Credit.....	9	Chemistry (Ph.D., M.S.)	48
Additional Program Requirements.....	10	Clinical Laboratory Sciences (M.S.C.L.S.)	51
Candidacy for Degree	10	Communication Studies.....	55
Application for Degree.....	10	Computer and Information Sciences (Ph.D., M.S.).....	55
Thesis	10	Coordinated Degrees	58
Final Examination	10	Criminal Justice (M.S.C.J.).....	59
Recommendation for Degree	10	Dentistry (M.S.).....	61
Award of Degree.....	11	Education.....	64
Summary of Steps Toward the Master's Degree	11	Education, Curriculum and Instruction (Ph.D., M.A., Ed.S., Ed.).....	64
Requirements for the Doctoral Degree.....	11		
General Statement.....	11		
Faculty Advisor.....	11		
Graduate Study Committee.....	11		
Registration Requirements	11		
Residence Requirement.....	11		
Foreign Language or Other Special Tools of Research... 11			
Comprehensive Examination	11		
Admission to Candidacy	12		
Application for Degree.....	12		
Dissertation	12		
Final Examination	12		
Recommendation for Degree	12		

Education, Human Studies	71	Physiology and Biophysics (Ph.D.)	176
Educational Leadership and Special Education	83	Psychology (Ph.D.)	179
Engineering, Biomedical (Ph.D., M.S.B.M.E.)	90	Public Administration (M.P.A.)	186
Engineering, Civil (M.S.C.E., Ph.D.*)	93	Public Health (Ph.D.)	189
Engineering, Computer (Ph.D.)	99	Sociology (M.A.) Medical Sociology (Ph.D.)	190
Engineering, Electrical (Ph.D.*, M.S.E.E.)	102	Speech and Hearing Sciences	193
Engineering, Environmental Health (Ph.D.)	106	Theatre	193
Engineering, Materials (Ph.D., M.S.Mt.E.)	108	Toxicology	193
Engineering, Mechanical (Ph.D.*, M.S.M.E.)	111	Vision Science (Ph.D., M.S.,)	195
English (M.A.)	114	Appendix I: Policies	198
Environmental Health Sciences (Ph.D.)	118	Appendix II: UAB Student Records Policy	198
Epidemiology (Ph.D.)	120	Appendix III: Non-Resident Tuition Policy	200
Foreign Languages	121	Appendix IV: Equal Opportunity Policy	201
Forensic Science (M.S.F.S.)	122	Appendix V: Policy Concerning the Maintenance of High Ethical Standards in Research and Other Scholarly Activities	202
Genomics and Pathobiology	125	Appendix VI: Graduate School Policy Concerning Student Participation in Proprietary Research	205
Gerontology	125	Appendix VII: Drug-Free Campus Policy For Students	205
Graduate School Professional Development Program..	127	Appendix VIII: Immunization Policy	209
Health Administration (M.S.H.A.)	128	Appendix IX: Computer Software Copying And Use Policy	210
Health Informatics (M.S.H.I.)	130	Appendix X: Graduate Council	212
History (M.A.)	133	Appendix XI: Ownership of Intellectual Property Rights	212
Integrative Biomedical Sciences Program	135	Appendix XII: Sexual Harassment Policy	212
Linguistics	136	Appendix XIII: Policy Concerning Employee Falsification Of UAB Records And Documents	213
Materials Science (Ph.D.)	136	Appendix XIV: Health Care Policy For International Students And Scholars	213
Mathematics, Applied (Ph.D.)	139	Appendix XV: Policy Concerning AIDS and HIV Infection	214
Mathematics (M.S.)	141		
Medical Genetics (Ph.D.)	143		
Microbiology (Ph.D.)	145		
Music	148		
Neurobiology (Ph.D.)	148		
Neuroscience	150		
Nurse Anesthesia (M.N.A.)	152		
Nursing (Ph.D., M.S.N.)	153		
Nutrition Sciences (Ph.D.), Clinical Nutrition (M.S.) ..	156		
Occupational Therapy (M.S.)*	159		
Oral Biology (M.S.)	163		
Pathology (Ph.D.)	164		
Pharmacology & Toxicology (Ph.D.)	167		
Philosophy	169		
Physical Therapy (M.S.)	169		
Physics (Ph.D., M.S.)	173		

The University of Alabama at Birmingham is a comprehensive urban institution in Alabama's major city. With a student enrollment exceeding 15,000 and faculty and staff numbering more than 16,400, UAB has become a nationally and internationally respected center for educational, research, and service programs. Our campus encompasses a 75-block area on Birmingham's Southside, offering all of the advantages of a university within a city.

The university is composed of 12 schools, as well as hospitals and clinics housing internationally renowned patient-care programs. UAB includes the Schools of Arts and Humanities, Business, Dentistry, Education, Engineering, Health Related Professions, Medicine, Natural Sciences and Mathematics, Nursing, Optometry, Public Health, and Social and Behavioral Sciences. The Graduate School administers Ph.D. and many other advanced degree programs in these areas.

UAB attracted \$325 million in active grants and contracts in fiscal year 2001, ranking it among the top institutions in the country in this respect (19th in NIH support). For graduate students, this funding status means availability of financial support, access to well-equipped research laboratories, adequate supplies, and interaction with faculty members who have earned research support based on the favorable judgment of their colleagues nationwide.

Accreditation

The University of Alabama at Birmingham is accredited by the Commission on Colleges of the Southern Association of Colleges and Schools to award degrees at the bachelor's, master's, specialist, and doctoral levels. Individual schools and programs are also accredited by regional and national professional organizations.

Student Life

Campus life at UAB is characterized by the bustle and diversity of the university's urban setting. More than 3,700 UAB graduate students take advantage of a wide variety of cultural and recreational opportunities on and off campus, and numerous student organizations and associations invite participation.

UAB's Hill University Center serves as a hub for campus life, providing under one roof a full-service cafeteria, a large bookstore, an auditorium, meeting rooms, lounges, and other recreational areas. The UAB Arena seats more than 8,000 for concerts, sports events, graduation exercises, and other special events.

The Alys Robinson Stephens Performing Arts Center houses a 1,400-seat concert hall and the 400-seat Morris K. Sirote Theater. Both of these facilities have outstanding acoustics, technical capability, and comfort, and each hosts a wide variety of student and professional performances. The Alys Stephens Center also has a 175-seat recital hall, an experimental ("black box") theater, an arts computing facility, practice rooms, faculty offices, and other instructional space. The center is home to the Alabama Symphony Orchestra and hosts a wide variety of cultural events throughout the year.

Ten musical performing groups (Blazer Band, Chamber Singers, Concert Choir, Gospel Choir, Jazz Ensemble, Marching Blazers, Computer Music Ensemble, Opera Workshop, Percussion Ensemble, and Wind Ensemble) provide enrichment and performing opportunities. A major campus theater offers several productions each year (free to students); there

are several small performing groups on campus, as well as a UAB-affiliated community theater. Dance groups offer opportunities in ballet and jazz. Artwork is continuously exhibited in the Visual Arts Gallery and several other galleries on campus.

Student publications include a campus-wide newspaper, *The Kaleidoscope*, published weekly; a literary magazine, *Aura*; and a nonfiction magazine, *Phoenix*.

University programs include a lecture series, an acclaimed film series (showing films several times a month, including popular, foreign, and classic films), a progressive and diverse concert series, and an assortment of special events, seminars, dances, and other activities. Many of these programs and activities are free to students with valid ID cards.

UAB's intercollegiate sports program includes baseball, football, rifle, softball, synchronized swimming, track, and volleyball, as well as men's and women's teams for basketball, golf, soccer, and tennis. Many of our teams have won conference championships.

Recreational facilities on campus include a large well-equipped gym (free to students with valid IDs) with an indoor pool, full-length basketball courts, racquetball/handball courts, a squash court, a weight room, an indoor track, a gymnastics room, and a dance room. Adjacent to the gym are two softball fields, and two football fields with goals for soccer; a baseball field and a number of tennis courts are nearby. An active intramural sports program attracts the participation of many graduate students.

UAB Study Abroad

UAB Study Abroad offers opportunities for international study either through UAB or non-UAB programs that are available to UAB students and others. All eligibility requirements pertaining to credits and approval can be discussed with the Study Abroad Coordinator. The UAB programs have been designed to take into consideration various academic disciplines and their complementary courses abroad and are offered in partnership with UAB academic departments. This collaborative effort facilitates, promotes, and strengthens international education and understanding. Study abroad options include work/study abroad, internships; direct enrollment, short-term, semester, and full-year exchanges; and opportunities in cross-cultural training, service, and international health research. Application and enrollment circumstances and deadlines vary according to the program. Contact the Study Abroad Coordinator for further information concerning various programs, references for peer consultation and academic advising, and financial aid applicability and contacts.

Smolian International House

The Bertha and Joseph Smolian International House at 1600 10th Avenue South offers a variety of services and activities for international students and scholars and their families. The I-House, as it is known, provides a central focal point for programs and activities designed to foster a free exchange of information and international understanding. In this one place, members of the university community and the global community share a sense of unity. The facility includes temporary lodging for foreign nationals, meeting space for groups with an international purpose, two kitchens, a library, lounge (with satellite television), and other amenities.

The I-House hosts a number of special annual events, including the Fall Barbecue, International Festival, and

Thanksgiving Dinner. Various regularly scheduled programs include conversational English classes, Friendship Partners, the International Women's Group, and cultural evenings. For additional information or a schedule of activities, call 205-934-1205 or visit the International Scholar and Student Services web site (www.uab.edu/iss).

Oak Ridge Associated Universities

Since 1971, students and faculty of the University of Alabama at Birmingham have benefited from its membership in Oak Ridge Associated Universities (ORAU). ORAU is a consortium of 85 colleges and universities and a contractor for the U.S. Department of Energy (DOE) located in Oak Ridge, Tennessee. ORAU works with its member institutions to help their students and faculty gain access to federal research facilities throughout the country; to keep its members informed about opportunities for fellowship, scholarship, and research appointments; and to organize research alliances among its members.

Through the Oak Ridge Institute for Science and Education (the DOE facility that ORAU operates), undergraduates, graduates, postgraduates, and faculty enjoy access to a multitude of opportunities for study and research. A comprehensive listing of these programs and other opportunities, their disciplines, and details on locations and benefits can be found in the *ORISE Catalog of Education and Training Programs*, which is available at www.orau.gov.

Dauphin Island Sea Lab

As a member of Alabama's Marine Environmental Sciences Consortium, UAB offers students and faculty access to the courses and facilities of the Dauphin Island Sea Lab, located in Mobile Bay on Alabama's Gulf Coast. For programs and contacts, visit their web site (www.disl.org).

Birmingham

Birmingham is a dynamic, progressive urban center of great natural beauty. Almost a million people live in the metropolitan area, which includes parts of five counties in north-central Alabama. Because of its rapid growth in the late 19th and early 20th centuries, Birmingham has an international flavor and ethnic diversity that are unusual in the South. This diversity has been enhanced in the last three decades by the phenomenal growth of UAB.

Health care and education have replaced other types of industry as Birmingham's economic base, and UAB is now the city's leading employer. Birmingham's economy is fully diversified, with rapid growth in service, financial, insurance and real estate, wholesale trade, construction, and research fields. Construction is thriving in Birmingham, with rapid suburban growth and massive revitalization and renovation of historic structures downtown. Despite the city's rapid growth, the American Chamber of Commerce rates the cost of living in Birmingham lower than in most metropolitan areas.

In addition to UAB and the University of Alabama School of Medicine, educational opportunities in the area include six other universities and colleges, seven community/junior colleges, five degree-granting technical schools, three law schools, and other specialized schools. The Birmingham area has over 1,300 houses of worship, representing virtually all denominations. School systems cover 5 county and 13 major

city public school systems and over 50 private and denominational schools. Medical services are provided by 11 full-service hospitals.

Located in the Sun Belt, Birmingham enjoys an average year-round temperature of 62°F, experiences approximately 117 days with rainfall each year and, in an average year, gets 2.1 inches of snowfall. The first freeze is usually in November, with the last frost in March.

Birmingham offers its residents and visitors many opportunities for both excitement and relaxation. Ongoing events take place at more than 40 movie screens, 5 community theaters, and numerous concert venues, including Oak Mountain Amphitheatre and Five Points Music Hall. In addition, a host of nightclubs and restaurants feature live entertainment.

The Birmingham Museum of Art, with a permanent collection of over 1,700 works, is the largest of the area's museums. Red Mountain Museum, Birmingham Botanical Gardens, and facilities at Oak Mountain State Park serve as avenues into the wonders of natural history. For those with specialized interests, the city offers the McWane Center and IM-AX Dome Theatre, Barber Vintage Motorsports Museum, the Alabama Sports Hall of Fame, the Jazz Hall of Fame, the Southern Museum of Flight, and many others. Much of Birmingham's "fame" comes from the racial tension that characterized the city in the 1950s and 1960s. That tension has been extensively documented and is now available as an interactive walk-through history at the Birmingham Civil Rights Institute, located in the heart of the Birmingham Civil Rights District, which centers on the historic 16th Street Baptist Church.

Special events include the Birmingham International Festival of the Arts, which salutes art and craft from a different country each year; City Stages, a world-class musical festival held in the heart of downtown each May; and Doo Dah Day, a whimsical parade of pets that marches through the numerous parks on Highland Avenue.

For people and families who are attracted to the outdoors, Alabama offers 24 state parks. Oak Mountain State Park, located in the Birmingham area, is the largest (9,940 acres). Dozens of smaller city parks offer further opportunities for hiking, biking, swimming, rappelling, and other sports as well as quiet places for outdoor reading, studying, and picnicking. Visionland, Alabama's Theme Park, thrills visitors with roller coasters, water rides, and other amusements. The Robert Trent Jones Golf Trail takes in the Oxmoor Valley Golf Club; this and other world-class courses make golf a popular pastime for residents and tourists alike. Less than one day's drive away, the mountains of middle Tennessee and the renowned "sugar beaches" of the Gulf of Mexico showcase the natural beauty of the southeastern United States.

Much of information in this section was drawn from the Birmingham Area Chamber of Commerce (www.birminghamchamber.com).

The Graduate School

More than 52 years have passed since the first Ph.D. degree was earned on the Birmingham campus. Currently, the Graduate School administers doctoral programs in 33 areas and master's level programs in 44 areas, with additional programs planned for future implementation. A particular strength of the school is its many programs that unite different disciplines and cross departmental and school lines.

Graduate Council

The Graduate Council has developed policies and procedures to ensure that high standards for graduate study are maintained at UAB. These policies and procedures, available at the Graduate School's web site, are the joint responsibility of the Graduate Council and the dean of the Graduate School.

The Graduate Council, through consultation with the dean, is responsible for developing academic requirements and describing these requirements through appropriate policies. The dean, through consultation with the Graduate Council, is responsible for developing procedures that effectively enforce academic requirements and implement policies.

The Graduate Council, through its Advisory Committee, annually reviews academic requirements, policies, procedures, and Graduate School activities and recommends appropriate changes. Changes in academic requirements and related policies require a majority vote of the Graduate Council.

Graduate Student Association

UAB graduate students are represented by the Graduate Student Association (GSA), which works closely with the Graduate School and other offices of the university administration in formulating policy and meeting student needs. All graduate students are automatically members of the GSA, and the GSA Senate is composed of student representatives from the various graduate programs. The GSA provides partial funding for graduate student travel to academic meetings and for thesis and dissertation preparation. The organization cosponsors a variety of services and activities, including the Honors Convocation, Graduate Student Research Day, Graduate Student Orientation, and the GSA Emergency Loan Fund. The GSA office is located in Room 440C of the Hill University Center (telephone 205-934-4717). Information on travel grants and interlibrary loans may be picked up in the Graduate School office, Room 511 of the Hill University Center (telephone 205-934-8227), or at the GSA web site (www.uab.edu/gsa).

Industry Roundtable

The UAB Industry Roundtable, sponsored by the UAB Graduate School, is a student-initiated and student-run informal discussion group open to all graduate students and dedicated to fostering a greater awareness of career opportunities outside academia.

Its goals are to provide a forum for networking with industry representatives; establish an interface between academia and industry; introduce students to the process of making industry contacts; encourage students to comment, ask questions, and seek advice from nonacademics; stimulate students to begin career development early in their educational experience; and provide information to students about alternative career opportunities. The web site (www.uab.edu/roundtable) has more information.

Graduate Student Research Day

Graduate Student Research Day is an annual competition in which graduate students present their original research in an open forum. Deadlines for Research Day are announced in the fall semester and are available at the Graduate School's web site. Awards are presented at a luncheon ceremony each spring semester.

Application and Admission

The Graduate School welcomes applications from all qualified individuals who wish to pursue graduate study at UAB.

Categories of Graduate Student

Two broad categories of graduate students are recognized: degree-seeking graduate students and non-degree-seeking graduate students.

Degree-Seeking Students

Degree-seeking graduate students are those accepted into a specific graduate program to work toward a specific advanced degree. In addition to the completed application form, the application procedure includes the submission of official transcripts, standardized test scores, and letters of recommendation. Each application is reviewed by the graduate program faculty, who make an admissions recommendation to the Graduate School dean or a representative of the graduate dean.

Non-Degree-Seeking Students

The nondegree category serves students who do not wish to pursue a graduate degree at UAB, as well as those who wish to begin graduate study before being admitted to a degree program. Not all graduate courses are open to non-degree-seeking graduate students. Although there is no limitation on the amount of credit that may be earned as a non-degree-seeking student, should a student later wish to pursue an advanced degree at UAB, the credit earned while in non-degree-seeking status is not automatically acceptable toward the degree. **In no case can more than 12 semester hours earned as a nondegree graduate student be applied toward a degree.**

Because of U.S. immigration requirements, international applicants (i.e., those who are neither U.S. citizens nor permanent residents) cannot normally be considered for the nondegree category unless already residing in the United States. Immigration laws should be consulted to determine eligibility of students.

Complete Application Package

The completed application package includes (1) the completed application form; (2) a check for the appropriate processing fee (stated on the form); (3) two copies of official transcripts¹ from all colleges or universities attended (the applicant must arrange for these to be sent directly to the Graduate School Office); (4) official copies of the applicant's scores on the Graduate Record Examination (GRE) General Test², (5) three evaluations, preferably on the Graduate School Eval-

¹ Official transcripts are those issued by the registrar or responsible head of the institution at which the work was attempted or completed and sent by mail directly to the Graduate School by that official. In those rare instances in which international applicants are unable to provide official transcripts, certain certified documents may be acceptable.

² GRE scores must be sent directly from the testing agency to the Graduate School. (Some UAB graduate programs require, or are willing to accept, other recognized national tests. Specific program requirements are outlined in the online program descriptions.) Although ETS retains scores up to five years, some programs will not accept scores more than two years old.

uation Form³; (6) (for international applicants from non-English-speaking countries only) official copies of the applicant's scores on the Test of English as a Foreign Language (TOEFL) and the Test of Written English (TWE; see individual program sections for minimum score requirements).

Application packages, in general, will not be considered until the package is complete. To allow time for the application review process, all documents must be received in the Graduate School office at least six weeks before the beginning of the term in which the applicant wishes to begin the graduate program. Some graduate programs admit only at certain times of the year and have specific application deadlines. These deadlines are indicated in the online program descriptions.

Admission Standards

Admission is competitive and is based on an estimate of the ability of the applicant to complete the degree program successfully and on the appropriateness of the program to the applicant's career goals. The Graduate School and its programs accept the most qualified students who apply. Most programs can accommodate only a limited number of students; therefore, some qualified applicants may be denied admission.

Master's Degree Programs

Although each graduate program sets its own minimum standards for admission, the Graduate School has established guidelines for admission to master's degree programs. These guidelines are (1) a B average (computed overall, or alternatively computed over the last 60 semester hours of earned credit) in undergraduate work, (2) evidence of a bachelor's degree from a regionally accredited university or college in the United States, (3) a score of at least 500 on each section of the Graduate Record Examination General Test (some programs require or accept other national tests), and (4) previous academic work appropriate to the academic area to which application is being made.

Doctoral Degree Programs

Although each graduate program sets its own minimum standards for admission, the Graduate School has established guidelines for admission to doctoral degree programs. These guidelines are (1) a B average (computed overall, or alternatively computed over the last 60 semester hours of earned credit) in undergraduate or subsequent graduate work, (2) evidence of a bachelor's degree from a regionally accredited university or college in the United States, (3) a score of at least 550 on each section of the Graduate Record Examination General Test (some programs require or accept other national tests), and (4) previous academic work appropriate to the academic area to which application is being made. Note that some programs also require a master's degree before admission to the doctoral program. Because of guidelines set by external accreditation authorities, the requirements for application and admission to certain graduate programs may differ from the above, particularly in the standard test required. These variations are detailed in the online program descriptions.

Admission on Probation

Students not meeting all program admission criteria may be admitted on probation upon recommendation by the graduate program director and approval by the Graduate School dean.

Re-admission

The records of in a year will be removed from the UAB computerized registration system. Such students must apply for re-admission before they may register again. Degree-seeking students who (1) have been absent one year but have registered for and passed at least one course at UAB within the last five years and (2) have not attended any other university or college in the interim and (3) wish to return to the graduate program to which they were earlier admitted may complete the Application for Re-admission to a Graduate Degree Program and pay the required processing fee. These re-admitted students must meet the degree requirements operative at the time of re-admission. Students who wish to return to the nondegree category after an absence of one or more years must submit a new nondegree application form, together with the required processing fee.

Admission of Students Previously Dismissed

When any individual applies to a graduate program, a major part of the admissions decision involves an estimate, based on the applicant's academic history, of whether the applicant can perform satisfactorily at the graduate level. To be re-admitted, applicants who have previously been dismissed from the Graduate School must present convincing evidence to the faculty and the Graduate School dean that a substantial improvement has occurred so that it is probable that the applicant can now perform at the required level in graduate work.

After a student has been dismissed from the UAB Graduate School, no new application for admission (either as a degree-seeking student or as a nondegree student) will be considered until at least two semesters have passed.

Faculty

To maintain university accountability, UAB faculty and staff who wish to take occasional graduate courses must register for these courses after admission to the Graduate School on the non-degree-seeking basis. Admission of a UAB faculty member as a degree-seeking graduate student requires the concurrence of the applicant's department chair and dean(s), as well as the approvals required for other applicants to the same program.

General Academic Requirements

Unless otherwise stated, the policies in this section apply to both degree-seeking and non-degree-seeking graduate students.

Graduate Credit

For purposes of academic accounting, credits expressed in "semester hours" are assigned to each course. The guideline for lecture courses is that one semester hour of credit is awarded for 13-15 contact hours. Laboratory credit is assigned on the basis of one semester hour of credit for approximately 30 hours of work in the laboratory.

Requirements for Undergraduate Students

UAB undergraduate students may be allowed to enroll in a graduate course with the approval of their advisor, the instructor, their undergraduate program director, and the graduate program director. The Undergraduate Student Request for Enrollment in Graduate Level Coursework form can be obtained from the Graduate School, Room 511 Hill University Center, or online. Credits earned by undergraduate students

³ Evaluation forms are not required for the business programs.

may be applied to either an undergraduate degree or a graduate degree, but not both. If the student is subsequently admitted to the Graduate School, use of this credit toward a graduate degree requires the approval of the graduate program director and the Graduate School dean.

Course Numbering System

The scholastic level of UAB courses is indicated by the century number. Courses numbered 500 and above are graduate and postbaccalaureate courses. Courses numbered 500-599 are available to upper-level undergraduate and beginning graduate students. Courses numbered 600 and above are for graduate students. Those numbered 600-699 are intended primarily for students at the master's level, with 698 reserved for nonthesis research and 699 reserved for thesis research. Courses numbered 700-799 are primarily for students at the doctoral level, except in the School of Education where the numbers from 700-740 are reserved for courses leading to the degree of Educational Specialist (Ed.S.). The number 798 is reserved for nondissertation research and 799 for dissertation research. Seminars, practica, individual studies and projects, internships, and residencies will generally carry numbers in the upper range of these centuries.

Time Limitations

Doctoral students are generally expected to complete all degree requirements with 7 years of matriculation. One extension of this time limit can be requested when mitigating circumstances preclude completion of requirements within 7 years. The recommendation for an extension should include a plan and timeline for completion. Such requests require the approval of the student's dissertation committee and graduate program director and must be presented in writing to the dean of the Graduate School for consideration and approval. Courses taken more than 7 years before graduation may not be applied toward a degree without the approval of the graduate program director and graduate dean.

Course Enrollment

Registration

Students must register for all work to be taken for graduate credit. To be classified as "full time," a graduate student must register for at least 9 semester hours of work each semester. The university publishes the UAB Class Schedule three times per year, approximately 2 weeks before the beginning of registration for the approaching semester. The class schedule lists the courses and other work to be offered and gives full details on prerequisites, registration dates, and procedures, including required signatures.

Adding or Changing Courses

Adding or changing courses after registration is possible each semester until the date specified in the UAB Class Schedule. Procedures are also specified in that publication. A processing fee is charged for registration changes.

Withdrawal from Courses

Graduate students are expected to complete courses for which they have registered, unless unusual circumstances require withdrawal. The procedures for withdrawal are specified in the UAB Class Schedule. Mere cessation of class attendance does not constitute withdrawal, either academically or for tuition charges. Withdrawal from a graduate class requires

permission of the instructor and the graduate program director. A grade of *W* will be entered on the transcript. Withdrawal is not possible after the last day of classes. A processing fee is charged for registration changes.

Credit by Examination

Students may not earn "credit by examination" at the graduate level.

Audits

Graduate students may audit courses available for graduate credit with the permission of the instructor and payment of appropriate fees; this approval must be secured before registration. Courses taken for audit credit are not counted toward the hours required for full-time status. Provided the instructor's requirements are met, the course will appear on the transcript with the notation *AU*.

Course Completion

Grading System

The grade of *A* is used to indicate superior performance, *B* for adequate performance, and *C* for performance only minimally adequate for a graduate student. Any graduate student completing a course at the 500 level or above with a performance below the *C* level will receive a grade of *F*, because the Graduate School does not use the grade of *D*.

Grades in Pass/Not Pass Courses

With the approval of the graduate program director, a course may be designated as a "pass/not pass course." The grade of *P* (passing) signifies satisfactory work. The grade of *NP* (not passing) indicates unsatisfactory work, without a penalty being assessed with respect to the grade point average (GPA).

Temporary Grade Notations

Temporary notations used by the Graduate School are *N* for "no grade reported," and *I* for "incomplete" coursework.

If there is a special circumstance in which an instructor does not submit a grade at the end of a semester, a temporary grade of *N* will be recorded. If no permanent grade has been reported by the end of the following semester, an *F* will automatically be entered in the student's academic record.

The temporary notation of *I* may be reported at the discretion of the instructor to indicate that the student has performed satisfactorily in the course but, due to unforeseen circumstances, has been unable to finish all course requirements. An *I* is never given to enable a student to raise a deficient grade. This notation should not be used unless there is reasonable certainty that the requirements will be completed during the following semester, because at the end of that semester the *I* automatically changes to an *F*. In highly unusual circumstances, the student may request an extension of the time to complete the requirements. This request must be submitted in writing in advance of the time when the grade automatically changes to an *F* because the approval of the instructor, graduate program director, and Graduate School dean are all required.

Cumulative Credits and Grade Point Average (GPA)

Semester Hours Earned

The student's "semester hours earned" are increased by (1) earning a grade of *C* or better in a course for which the student was registered on a regular ("letter grade") basis or (2) obtaining a *P* grade in a course taken on a pass/not pass basis.

Semester Hours Attempted

The student's "semester hours attempted" are increased by receiving a grade of *A*, *B*, *C*, or *F* in a course for which the student was registered on a regular basis.

Quality Points

Four quality points are awarded for each semester hour in which an *A* is earned, three quality points are awarded for each semester hour in which a *B* is earned, and two quality points are awarded for each semester hour in which a *C* is earned. No quality points are added for other grades.

GPA

The GPA is determined by dividing the total quality points awarded by the semester hours attempted.

Repeated Courses

Graduate students may be allowed to repeat courses for graduate credit with the permission of the graduate advisor and graduate program director. All courses taken and all grades earned are permanently recorded on the student's transcript. The first time a student repeats a course, he or she receives the grade earned. If a course is taken three or more times, all grades after the first are averaged. The Graduate School Records Office must be notified of the repeat at the time of registration. (The calculation using the repeat grade is not automatic.) Note: Many graduate programs also base retention decisions on programmatic guidelines and not on GPA.

Academic Performance

Good Academic Standing

For a student to maintain good academic standing in the Graduate School, a GPA of at least 3.0 (*B* average) and overall satisfactory performance on pass/not pass courses are required. Satisfactory performance on pass/not pass courses is defined as earning at least as many hours of *P* grades as hours of *NP* grades.

Academic Probation and Dismissal

Students who are admitted on probation must demonstrate their ability to perform at the level required for graduation by establishing good academic standing at the end of the semester when their graduate semester hours attempted equals or first exceeds 12. Students who do not accomplish this level of performance will be dismissed from the UAB Graduate School.

A degree-seeking or non-degree-seeking graduate student who has been in good academic standing but who, at the end of any semester, fails to meet the criteria to continue in good academic standing will be placed on probation. Such a student must re-establish good academic standing within the next two semesters of graduate study undertaken. Students who do not accomplish this level of performance will be dismissed from the UAB Graduate School.

The rules stated above govern university probation and dismissal, administered by the Graduate School. Individual

graduate programs may establish and administer program probation and dismissal governed by more stringent requirements. In general, a student's retention in a specific graduate program is contingent on the faculty's belief that the student is likely to complete the program successfully. If the faculty ceases to hold this belief, the student may be dismissed from the program.

UAB Student Record Policy

Federal law guarantees students certain rights with respect to their educational records. It is the student's responsibility to become familiar with the university's stated policies on these rights (i.e., Appendix II: UAB Student Records Policy).

Conduct and Appeal

Academic Conduct

The University of Alabama at Birmingham expects all members of its academic community to function according to the highest ethical and professional standards. Students, faculty, and administration of the institution must be involved to insure this quality of academic conduct.

Academic misconduct undermines the purpose of education. Such behavior is a serious violation of the trust that must exist among faculty and students for a university to nurture intellectual growth and development. Academic misconduct can generally be defined as all acts of dishonesty in an academic or related matter. Academic dishonesty includes, but is not limited to, the following categories of behavior:

ABETTING: helping another student commit an act of academic dishonesty. Allowing others to copy your quiz answers, or use your work as their own are examples of abetting.

CHEATING: use or attempted use of unauthorized materials, information, study aids, the answers of others, or computer-related information.

PLAGIARISM: claiming as your own the ideas, words, data, computer programs, creative compositions, artwork, etc., done by someone else. Examples include improper citation of referenced works, use of commercially available scholarly papers, failure to cite sources, copying other's ideas.

FABRICATION: presenting as genuine falsified data, citations, or quotations.

MISREPRESENTATION: falsification, alteration or misstatement of the contents of documents, academic work or other materials related to academic matters, including representing work substantially done for one class as work done for another without receiving prior approval from the instructor. Misrepresentation also includes misrepresenting schedules, prerequisites, transcripts, or other academic records.

A student who commits an act of academic misconduct will be given the grade of *F* in the course in which the misconduct occurred. The program in which the student is housed may expel the student from the university on the first offense. Students should consult the policies of their graduate program to determine if expulsion can occur with a first offense. If, as determined by the records of the Graduate School, the act of

academic misconduct is a second offense, the student will be expelled from the university. The transcript of a student expelled for committing academic misconduct will bear the statement "Expelled for Academic Misconduct."

When an instructor sees cause to charge a student with academic misconduct, the instructor will communicate the charge to the department chair/program director appropriate to the course, who will notify the student of the charge and provide the student with an opportunity to respond. If, at that time, the student cannot refute the charge effectively, the department chair/program director will expeditiously notify the student and the director of the student's program in writing, of the administrative action to be taken. The notice shall also inform the student of the right to appeal and the steps involved in that process. Copies of the letter with appropriate documentation will be sent to the graduate dean, who will maintain records of all proceedings. If the department chair/program director is the instructor who charges the student with academic misconduct, then another faculty member from the department or program, appointed by the graduate dean will review the charge and take appropriate actions.

If the charge is not resolved to the student's or faculty member's satisfaction within a school, either party may request an appeal by the Graduate School Appeals Board. The decision of the Graduate Appeals Board is final.

Academic misconduct that involves possible criminal action will be referred to other appropriate offices within the institution. Students and faculty should also consult the university's policy on scientific misconduct for discussion of standards and policies that apply to research and research courses.

Nonacademic Conduct

The university is a community of scholars and learners; therefore, all participants are expected to maintain conduct that (1) facilitates the institution's pursuit of its educational objectives, (2) exhibits a regard for the rights of other members of the academic community, and (3) provides safety for property and persons. Through appropriate "due process" procedures, disciplinary action will be taken in response to conduct that violates these principles. A more detailed description of nonacademic misconduct can be found in the student handbook, *Direction*. It is the student's responsibility to be fully aware of the policies and procedures described in *Direction*. The vice president for student affairs has the responsibility for coordinating policies and procedures regarding students' non-academic misconduct.

Graduate School Deadlines

All Graduate School deadlines, as indicated on the calendar or in explanation of policies and procedures, unless otherwise stated, are final by 5:00 p.m. on the date specified, by which time all transactions must be completed and documents received in the Graduate School. Transactions and documents requiring the action or approval of graduate advisors, committee members, instructors, department chairmen, academic deans, or others prior to receipt by the Graduate School should be initiated by the appropriate person (student, instructor, graduate advisor, or other) sufficiently in advance of the Graduate School deadline for the required actions to be taken and approvals made or declined before the deadline.

Requirements for the Master's Degree

Faculty Advisor

Immediately after a degree-seeking student enters the UAB Graduate School, a member of the faculty of the graduate program to which the student has been admitted should be assigned to serve as the student's advisor. The assignment may be a temporary arrangement. The student and the advisor should confer about courses and any special work to be taken on the basis of the student's previous experience and the requirements of the graduate program.

Graduate Study Committee

As soon as possible, a specific plan of study should be developed. Traditionally, graduate study is highly flexible and individualized, and a graduate study committee is appointed, chaired by the student's advisor, to guide the student toward the degree. (Some graduate programs do not always use a graduate study committee, particularly where flexibility in the course of study is limited by accreditation and other external constraints.) The committee should consist of at least three Graduate School faculty members, one of whom should be from outside the student's graduate specialization and each of whom should be able to bring some relevant insight and expertise to the student.

Recommendations for graduate study committee membership are submitted by the advisor and the student to the graduate program director. The graduate program director submits these recommendations to the Graduate School dean, who is an *ex officio* member of all graduate study committees, for approval.

Plan I or Plan II

The Graduate School recognizes two principal paths, known as Plan I and Plan II, that lead to the master's degree. One or the other of these plans may be appropriate in particular circumstances, and in some programs a choice is available. The graduate study committee conducts the final thesis examination for Plan I candidates and determines the scope, content, and form of the final master's comprehensive examination for thesis-substitute and Plan II candidates.

Plan I requires the completion, in good academic standing, of at least 24 semester hours of appropriate graduate work and 6 semester hours of thesis research, with the presentation of an acceptable thesis embodying the results of original research work.

Plan II may not require research and does not require a formal thesis, but a minimum of 30 semester hours of appropriate graduate work must be completed in good academic standing. Although thesis research is not required as part of a Plan II course of study, the student is often expected to gain insight into the techniques of posing and solving problems and to use these insights to prepare a written report.

Where both Plan I and Plan II are available within one graduate program, an early and meaningful choice should be made by the student, in close consultation with the advisor. A change in choice of plans requires the approval of the program director and the Graduate School dean.

Transfer of Credit

Previously earned graduate credit that has not been applied toward another degree (either at UAB or elsewhere) is

eligible for transfer into the student's current degree program. (Ordinarily, no more than 12 semester hours of transfer credit can be applied to a degree program.) All transfers must be initiated by the student and require the approval of the graduate program director and the Graduate School dean. Transfer of Credit Forms are available in the Graduate School, Room 511 Hill University Center, and online. An application for transfer of credit will not be considered until the student has completed at least 9 semester hours of graduate credit in the current UAB program and is in good academic standing. Once transfer credit has been accepted, it will be included in the calculation of the GPA in the student's current UAB program.

Graduate credit earned with a grade of *B* or above by a graduate student in another accredited graduate school may be considered for transfer. In programs offered jointly by UAB and other universities, all graduate credits earned in the program at a cooperating university are eligible for transfer to UAB. If a student earns credit in one UAB graduate program and is later admitted to another program, unused credits from the previous program are eligible for consideration for transfer into the current program.

Additional Program Requirements

In consultation with the faculty, the director of each graduate program will specify any additional requirements, such as a reading knowledge of a foreign language or a working knowledge of statistics, that are considered essential to mastery of the academic discipline. Such requirements become conditions for the completion of the degree. The program may also adopt a system of examinations that the student must pass at various points in the program.

Candidacy for Degree

Admission to candidacy is a formal step recommended by the student's graduate study committee and approved by the graduate program director and the Graduate School dean, acknowledging that the student has been performing well and is likely to complete the degree. For Plan I students, admission should occur when the student has obtained an adequate background (although not all coursework need be complete) and has provided the committee with an acceptable proposal for thesis research. Students must be in good academic standing to be eligible for admission to candidacy, and admission must take place no later than one semester before the expected graduation. Students must be admitted to candidacy before they can register for thesis research hours (i.e., courses numbered 699).

Application for Degree

Each candidate for a master's degree must signify the intention to complete the requirements by a particular graduation date by submitting a completed Application for Degree Form. Because this form is used to check completion of requirements, order the diploma, and enter the student in the commencement program, the form must be received in the Graduate School Records Office no later than 3 weeks into the semester of expected graduation. See deadline dates (later in this booklet). Students must be registered for at least 3 semester hours of graduate work in the semester they plan to graduate.

Thesis

The thesis required under Plan I should present the results of the candidate's original research and the interpretation of those results. The document should also demonstrate the candidate's acquaintance with the literature of the field and with the proper selection and execution of research methodology. The physical form of the thesis must comply with the regulations stated in the booklet *Theses and Dissertations: A Guide to Preparation*, which is published by the Graduate School and is available online.

Within 10 days after the public defense, students should meet with Graduate School staff to review style and format requirements. The Graduate School has the responsibility for ensuring that the final version of the thesis meets the standards required of a permanent, published document. Thus, after the student successfully passes the final examination (and at least 20 days before the expected graduation), the candidate must submit to the Graduate School one error-free, unbound copy of the thesis that meets the minimum acceptance requirements of the Graduate School. This copy will be examined carefully, and the Graduate School reserves the right to require changes to bring the document up to the standards of the chosen style guide and those stated in *Theses and Dissertations: A Guide to Preparation*. After making these final changes, the candidate must submit to the Graduate School two typed (or otherwise reproduced) copies of the thesis on white, 25% cotton, acid-free, watermarked paper. These copies must be received no later than 10 days after the return of the unbound thesis copy to the student. The Graduate School will have the two bound copies of the final version of the thesis placed in the appropriate UAB library.

Students should attend the free seminar titled "Staying Afloat While Preparing a Thesis or Dissertation," which is offered each semester by the Graduate School Professional Development Program. Additional assistance is available for students registered in GRD 704 (offered every semester by the Professional Development Program).

Final Examination

Under Plan I, the final examination should take the form of a presentation and defense of the thesis, followed by an examination of the candidate's comprehensive knowledge of the field. Plan I examinations must be scheduled through the Graduate School. The meeting must be appropriately announced in the UAB Reporter, must be open to all interested parties, and must take place at least 30 days before the expected date of graduation. Plan I candidates must be registered for at least 3 semester hours of graduate work in the semester during which degree requirements are completed.

When Plan II is followed, the final examination should take the form of a comprehensive survey of the candidate's activities in the graduate program. (A Plan II final examination is not used in some graduate programs.)

Recommendation for Degree

The candidate will be recommended for the master's degree to the Graduate School dean by the graduate study committee or by the student's advisor and the graduate program director. This recommendation must be received no later than 20 days before the end of the semester in which the candidate is expected to complete all degree requirements. The recommendation will be based on evaluation of all work performed,

the final examination, and the thesis if Plan I was followed. The recommendation will automatically be nullified if (1) the remaining courses needed for the degree are not passed, (2) the candidate fails to maintain good academic standing, (3) the candidate fails to remove all temporary grades from the transcript, or (4) the Plan I candidate fails to complete the thesis.

Award of Degree

Upon approval by the Graduate School dean and payment of any outstanding financial obligations to the university, the student will be awarded the degree. Master's students are generally expected to complete all degree requirements with 7 years of matriculation.

Summary of Steps Toward the Master's Degree

- Admission to master's degree program
- Selection of faculty advisor
- Maintenance of good standing
- Appointment of graduate study committee
- Admission to candidacy—at least one semester before graduation is expected
- Application for degree—no later than 3 weeks into the semester graduation is expected
- Production of preliminary version of thesis (Plan I only)
- Final examination (includes defense of thesis for Plan I only)
- One copy of defended committee-approved version of thesis to Graduate School office (Plan I only)—no later than 20 days before expected graduation
- Two copies of final version of thesis on white, 25% cotton, acid-free, watermarked paper to Graduate School office (Plan I only)—no later than 10 days after the return of the unbound thesis
- Conferring of degree

NOTICE: Students who fail to submit a completed thesis within one semester following the final examination will be charged a degree completion fee each semester.

Requirements for the Doctoral Degree

General Statement

The doctoral degree is granted in recognition of (1) scholarly proficiency and (2) distinctive achievement in a specific field of an academic discipline. The first component is demonstrated by successful completion of advanced coursework (of both a didactic and an unstructured nature) and by adequate performance on the comprehensive examination. Traditionally, the student demonstrates the second component by independently performing original research. In certain doctoral programs, a major project undertaking may be acceptable even though it may not be of a traditional research nature. However, in all instances a dissertation is required, presenting the results of the student's independent study.

Faculty Advisor

Immediately after a degree-seeking student enters the UAB Graduate School, a member of the faculty of the graduate program to which the student has been admitted should be assigned to serve as the student's advisor. This assignment

may be a temporary arrangement. The student and the advisor should confer about the initial courses and any special work to be taken on the basis of the student's previous experience and the requirements of the graduate program.

Graduate Study Committee

As soon as possible, a graduate study committee should be formed to guide the student in a program of courses, seminars, and independent study designed to meet the student's needs and to satisfy program and Graduate School requirements. This committee should consist of at least five graduate faculty members, two of whom should be from outside the student's graduate specialization and each of whom should be able to bring some relevant insight and expertise to guide the student. Recommendations for graduate study committee members are submitted by the advisor and the student to the program director, who subsequently submits these recommendations to the Graduate School dean. Graduate study committee appointments are made by the Graduate School dean, who is an *ex officio* member of all graduate study committees.

Registration Requirements

Because the doctoral degree is earned on the basis of satisfactory completion of the comprehensive examination and the dissertation, the Graduate School does not specify any minimum number of courses or semester hours that must be completed for awarding of the degree. Courses taken at other institutions and in other degree programs may be used to satisfy program requirements upon approval of the graduate study committee and the graduate program director. Doctoral students are expected to be registered for credit hours each semester.

Residence Requirement

The usual minimal period in which the doctoral degree can be earned is 3 academic years of full-time study, or longer if the student has periods of part-time enrollment. The nature of doctoral study requires the closest contact between the student and the faculty of the graduate program, and the individual investigation or other special work leading to the dissertation must be done directly under the guidance and supervision of a regular member of the UAB graduate faculty. Therefore, doctoral students must be involved full time in doctoral study for at least one academic year (two semesters).

Foreign Language or Other Special Tools of Research

In consultation with the faculty, the director of each graduate program will specify any additional requirements, such as a reading knowledge of a foreign language or a working knowledge of statistics, that are considered essential to mastery of the academic discipline. Such requirements become conditions for the completion of the degree.

Comprehensive Examination

The scholarly proficiency of a doctoral student in the chosen field of study must be evaluated by comprehensive examination. The conduct of these examinations is the responsibility of the graduate program in which the student is enrolled and may consist of either individual examinations in several appropriate areas or a single combined examination. When both written and oral examinations are given, the written should

precede the oral so that there is an opportunity for the student to clarify any misunderstanding of the written questions.

Students must be registered for at least 3 semester hours of graduate work during the semester in which the comprehensive examination is taken.

Admission to Candidacy

When the student has passed the comprehensive examination, satisfied any program requirements for foreign language proficiency or special tools of research, and presented to the graduate study committee an acceptable proposal for research or special study, the committee will recommend to the Graduate School dean that the student be admitted to candidacy. A student must be in good academic standing to be admitted to candidacy. Admission to candidacy must take place at least two semesters before the expected completion of the doctoral program. Students must be admitted to candidacy before they can register for dissertation research hours (i.e., 799).

Admission to candidacy is an important step forward in the student's pursuit of the doctorate. By this step, the graduate committee indicates its confidence that the student is capable of completing the proposed research project and the doctoral program.

Application for Degree

Each candidate for a doctoral degree must signify the intention to complete the requirements by a particular graduation date by submitting a completed Application for Degree Form. Because this form is used to check requirements, order the diploma, and enter the student on the commencement program, it must be received in the Graduate School Records Office no later than 3 weeks into the expected semester of graduation.

Dissertation

The results of the candidate's individual inquiry must be presented in a written dissertation comprising a genuine contribution to knowledge in the particular academic field. The document should also demonstrate the candidate's acquaintance with the literature of the field and the proper selection and execution of research methodology. The physical form of the dissertation must comply with the regulations stated in the booklet *Theses and Dissertations: A Guide to Preparation*, which is published by the Graduate School and available online.

Within 10 days after the public defense, students should meet with Graduate School staff to review style and format requirements. The Graduate School has the responsibility for ensuring that the final version of the dissertation meets the standards required of a permanent published document. Thus, after the student successfully passes the final examination (and at least 20 days before the expected graduation), the candidate must submit to the Graduate School one error-free, unbound copy of the dissertation. This copy will be examined carefully, and the Graduate School reserves the right to require changes to bring the document up to the standards of the chosen style guide and those stated in *Theses and Dissertations: A Guide to Preparation*. After making these final changes, the candidate must submit to the Graduate School two typed (or otherwise reproduced) copies of the dissertation on white, 25% cotton, acid-free, watermarked paper. These copies must be received no later than 10 days after the return of the finalized unbound dissertation copy to the student.

The microfilm and copyright contract form and the Survey of Earned Doctorates form must also be submitted. All of these materials must be received no later than 10 days after the return of the finalized unbound dissertation copy to the student. The Graduate School will have the two bound copies of the final version of the dissertation placed in the appropriate UAB library.

Students should attend the free seminar titled "Staying Afloat While Preparing a Thesis or Dissertation," which is offered each semester by the Graduate School Professional Development Program. Additional assistance is available for students registered in GRD 704 (offered every semester by the Graduate School Professional Development Program).

Final Examination

The final examination should take the form of a presentation and defense of the dissertation, followed by an examination of the candidate's comprehensive knowledge of the field. This examination must be scheduled through the Graduate School to allow attendance of the dean. The meeting must be open to all interested parties, publicized on the UAB campus, published in the UAB Reporter, and must take place at least 30 days before the expected date of graduation. Candidates must be registered for at least 3 semester hours of graduate work during the semester in which the final examination is taken.

Recommendation for Degree

The candidate will be recommended for the doctoral degree to the Graduate School dean by the graduate study committee and the graduate program director. This recommendation must be received no later than 20 days before the end of the semester in which the candidate is expected to complete all degree requirements. Candidates must be in a good academic standing to graduate, with no temporary grades for courses required for the degree on their transcripts.

Award of Degree

Upon approval by the Graduate School dean and payment of any outstanding financial obligations to the university, the student will be awarded the degree. Doctoral students are generally expected to complete all degree requirements with 7 years of matriculation.

Summary of Steps Toward the Doctoral Degree

- Admission to doctoral degree program
- Selection of faculty advisor
- Maintenance of good standing
- Appointment of graduate study committee
- Passing of comprehensive examination
- Admission to candidacy—no later than two semesters before expected graduation
- Application for degree—no later than 3 weeks into the expected semester of graduation
- Production of preliminary version of dissertation
- Final examination—no later than 30 days before expected graduation
- One copy of defended committee-approved version of thesis to Graduate School Office—no later than 20 days before expected graduation
- Two copies of final version of dissertation on white, 25% cotton, acid-free, watermarked paper to Graduate School

- Conferring of degree

NOTICE: Students who fail to submit a completed dissertation within one semester following the final examination will be charged a degree completion fee each semester.

Facilities and Services

Lister Hill Library of the Health Sciences

The Lister Hill Library of the Health Sciences, established in 1945, is the largest biomedical library in Alabama and one of the leading such libraries in the South. It serves as a resource library in the National Network of Libraries of Medicine for the Southeast/Atlantic Region. Its collections span 7 centuries of knowledge, from 10,000 volumes of rare historical books to over 2,600 current journals and the latest interactive laser disks. Books, bound journals, microforms, and other media total approximately 325,000 volumes relating to medicine, dentistry, nursing, optometry, allied health sciences, public health, and the basic biomedical sciences.

The library offers accommodations for reading, studying, and viewing audiovisuals. Other services offered include information services, interlibrary loans, photocopying, orientations, online computer searches by librarians, and on-campus document delivery by fax or on foot. IBM and Macintosh computers are located in the library's microcomputer laboratory for word processing, spreadsheets, and graphics. The library operates The Learning Center, an area with state-of-the-art interactive workstations for the creation and use of computer-assisted instructional programs; an electronic classroom for teaching; database searching; Internet classes; electronically wired study carrels for use by individuals; and other electronic access methods.

The staff offers frequent classes on information retrieval and management, access to the Internet, and searching techniques for numerous online and CD-ROM databases.

Reynolds Historical Library

The Reynolds Historical Library was a gift of Dr. Lawrence Reynolds, a distinguished radiologist and editor. The collection includes ivory anatomical manikins, original manuscripts, and rare medical and scientific books.

Alabama Museum of the Health Sciences

The museum contains memorabilia from Alabama physicians, dentists, nurses, and optometrists, which present a history of the health sciences in Alabama since the time Alabama became a state.

Lister Hill Library at the West Pavilion

The Lister Hill Library maintains a small collection in the University Hospital West Pavilion to serve the clinical staff of the hospital. It includes 250 textbooks and 100 current subscriptions of the most frequently used journals. Photocopiers are available.

For more information about any of Lister Hill Library's services and facilities, please call 205-934-5460 (Administration) or 205-934-2230 (Information), or visit their web site (www.uab.edu/lister).

Mervyn H. Sterne Library

The Mervyn H. Sterne Library houses a collection of more than 950,000 items selected to support current teaching

and research at UAB. In addition to books and more than 2,500 periodicals, the collection consists of microforms and other print and nonprint materials. Access to the collection and other information resources is provided through an online public access catalog system. Users may access the system from the library or remotely. Study areas and photocopying machines are located throughout the library, which is located at 917 South 13th Street. Named in 1973 in memory of the late Birmingham philanthropist and civic leader Mervyn H. Sterne, the facility has seating space for about 1,000 students. More than 100 lockable study carrels are available for use by faculty and graduate students involved in writing projects.

Reference services are provided by subject specialist librarians and at information desks staffed to assist patrons in identifying and locating materials. Reference service also includes computerized database searching. Through the use of OCLC, the national bibliographic utility, the staff can locate, and in many cases borrow, materials from libraries across the country. The User Services Department, through its automated circulation system, tracks materials continuously and can determine the location or status of a book on request. The reserve desk circulates high-use materials identified by classroom instructors.

Education Technology Services

Educational Technology Services (ETS) is the media center of the Mervyn H. Sterne Library. Located in the Education Building, ETS houses and circulates some 11,813 nonprint items, including video and audio tapes, 16-mm films, recordings, filmstrips, and slide presentations, as well as equipment for using them, viewing rooms, and a listening room. Individual carrels are also available for groups or individuals to listen to or view nonprint media.

ETS also houses the Student Computing Center (SCC), which includes some 40 microcomputers, including Macintosh and IBM computers. Access to the SCC is available to anyone with a valid UAB ID card. Staff are available in the SCC to offer hardware assistance and limited software assistance.

Libraries at Other Universities

Through an interinstitutional borrowing agreement, UAB students and faculty may use library facilities at a number of other colleges and universities in the area. Access to the catalogs of university libraries in the state of Alabama is available through the Mervyn Sterne Library web site.

For more information about any of Mervyn H. Sterne Library's services and facilities, please call 205-934-6360 (Administration) or 205-934-6364 (Information), or visit the Sterne Library web site (www.mhsl.uab.edu).

Student Housing and Residential Life

Student Housing facilities include a traditional residence hall, apartment-style residence halls, suite-style residence halls, and townhouse apartments for families. Student Housing is centrally located on campus and is within walking distance of all classroom buildings, libraries, and the Medical Center.

Student Housing is limited to students who are admitted to UAB and who are in good standing. "Good Standing" means not on academic or disciplinary suspension. As an additional eligibility requirement, a student must be enrolled for eight credit hours as an undergraduate or five credit hours as a graduate each term. The summer term is treated under a separate contract. The student will be required to satisfy these eli-

gibility standards throughout the term of their Student Housing Contract and to inform the Department of Student Housing and Residential Life of any changes in his/her status, which may affect his/her eligibility.

Residence Life Coordinators and Resident Assistants (RAs) serve the residence halls. The Residential Life Program consists of recreational, educational, and social events based on the needs and interests of the residents. In addition to planning this program, trained staff members are available to answer questions or help residents with personal or academic problems.

Junior, senior, graduate, and professional students are eligible for single-occupancy apartments. Freshmen and sophomores must share an apartment with a roommate. Except for married students, only roommates of the same gender are permitted. Roommate requests must be mutual in order to be considered, and applications should be mailed at approximately the same time. Although every effort will be made to place applicants with the roommate of their choice, the Department of Student Housing and Residential Life cannot guarantee roommate requests and reserves the right to assign an applicant to any available space.

Current rental rates are available from the Department of Student Housing and Residential Life. Rates include utilities and cable television in all residence halls. Only water and cable television are furnished in the Garden Apartments. Telephone service is available through UAB Communications.

Since housing at UAB is limited, students should apply as early as possible, particularly if on-campus housing is desired for the fall semester. Application should be made to the Department of Student Housing and Residential Life, 1604 9th Avenue South, Birmingham, AL 35294-1230. Telephone 205-934-2092. Upon receipt of a completed Student Housing and Residential Life Application, a Student Housing Agreement, and a \$170 deposit (\$20 of which is a nonrefundable application fee), a room will be reserved.

Student Health and Insurance Programs

Student Health Service

A Student Health Service, currently supported by student fees at the semester rate of \$75 (subject to change) per individual, is mandatory for all graduate students registered for 9 or more hours per semester. (See Health Forms, Waivers, and Insurance Information, below.)

Participation is required for all international students and for all students in the Schools of Medicine, Dentistry, Nursing, Optometry, and Health Related Professions. To participate in the Student Health Service, students must have an acceptable hospitalization insurance program (see Hospital and Major Medical Insurance Programs, below).

Students in the Schools of Medicine, Dentistry, Nursing, Optometry, and Health Related Professions who are taking fewer than 9 hours per semester may participate in the Student Health Service and the hospital and major medical insurance programs described below. The Student Health Service is available to all graduate students with a completed health History and Physical Form and proof of hospital insurance.

Because preventive medicine is emphasized by the Student Health Service, information on medical matters of interest to students is offered. The service maintains a professional relationship with the student, and strictest confidentiality is

maintained. Students in need of counseling services should contact the Counseling and Wellness Center (205-934-5816).

Hospital and Major Medical Insurance Programs

Hospitalization and major medical insurance coverage is available at attractive rates to students enrolled in the Student Health Service. Spouses and children of eligible graduate students may also obtain coverage under this policy at a proportionate increase in premium.

Students who are already covered by hospitalization insurance that offers coverage equivalent to that in the UAB student hospitalization policy may sign a waiver to this effect and not be required to take the UAB policy. Failure to sign and file a waiver with the Student Health Service will result in automatic coverage with Student Health Service insurance, and the student will be billed.

Health Forms, Waivers, and Insurance Information.

All full-time degree-seeking graduate students are required to enroll in the Student Health Service (or sign a waiver with the Graduate School) and obtain major medical insurance coverage or to sign a waiver showing proof of insurance.

For all students who will be participating in the Student Health Service, the following health forms must be completed: (1) application for student insurance or waiver of insurance plan; and (2) medical history in which the student fills out pages 1, 2, and 4 and your physician fills out page 3. The completed form must be sent to Student Health Service.

For students in schools other than the Schools of Medicine, Dentistry, Nursing, Optometry, and Health Related Professions who choose not to participate, the Waiver of Student Health Service and the Health Insurance must be completed and returned to the Graduate School office before the student registers for courses.

THESE FORMS MUST BE IN THE APPROPRIATE OFFICE BEFORE THE STUDENT CAN REGISTER FOR CLASSES, NO LATER THAN THE FIRST WEEK OF CLASSES.

The Certificate of Immunization Form must be completed by all students and returned to the Graduate School office.

For additional information on UAB's Student Health Service and group hospital insurance plan, students should contact UAB Student Health Service, Suite 301, Community Health Service Building, 933 South 19th Street, Birmingham, Alabama 35294-2041 (telephone 205-975-7750, www.uab.edu/studenthealth).

Student Dental Health Program

The UAB Student Dental Health Program is supported by annual fees of \$102 (subject to change) per student.

Students enrolled full time in the undergraduate or graduate programs of the School of Dentistry, School of Medicine, School of Nursing, or School of Optometry are eligible. Also eligible are students enrolled in the Nurse Anesthesia Program, residents, interns, and fellows. This program is optional for students in the above-mentioned graduate programs and for residents, interns, and fellows; it is mandatory for students in the above-mentioned undergraduate programs.

Under this plan, students have the option of obtaining basic dental services either from their family dentists or from participating School of Dentistry faculty members. Services included in the program are periodic dental examinations, periodic radiographs, periodic prophylaxes and fluoride applications, restorations (excluding gold), root canal treatment (en-

dodontics), nonelective extractions, postoperative care, and dental health counseling. Other services may be provided at the discretion of the Student Dental Health Office (205-934-5234). Services not provided by the program are orthodontics, prosthodontics, crowns and bridges, surgical treatment of periodontal disease, complicated oral surgery, extraction of third molars, and treatment of a cosmetic nature.

Pre-existing conditions are not covered by this program. Participating students will be given an initial screening, at which time an assessment of the student's dental health will be made and an appropriate recommendation given.

Student Development

Student Development comprises TRIO Academic Services, Career Services, Disability Support Services, Veteran's Affairs, Testing Office, Counseling and Wellness Center, and the Women's Center. For more information, visit www.students.uab.edu

TRIO Academic Services offers services designed to assist eligible students. In Career Services, graduate students will find the Student Placement Office (part-time jobs), the Senior Placement Office (jobs after graduation), the Career Planning Office, and the Career Resource Library. These offices assist students with researching various career opportunities, writing résumés and cover letters, developing credentials files, and researching employers. Personnel in these offices conduct numerous free seminars each semester on a wide range of topics from study skills to job search techniques.

The UAB Disability Support Services, the Office of Veteran's Affairs, and Testing Office provide services to eligible graduate students as requested.

These offices are located in the Hill University Center. For more information, call 205-934-8170.

The Counseling and Wellness Center consists of personal counseling, a Campus Ministry Association, and an Alcohol and Drug Awareness function, and it provides programs on a wide range of wellness and related topics. For more information, call 205-934-5816.

The Women's Center provides assistance to women in a variety of ways, such as acting as a referral service for education or career opportunities, providing a resource library, implementing educational programming, and establishing a speakers bureau. For more information, call 205-934-6946.

The Counseling and Wellness Center and the Women's Center are located in the Holley-Mears building, Suite 150, 924 19th Street South.

Financial Information

UAB Payment Policies

Most universities require payment of tuition and fees at registration. UAB gives you this option but also offers alternatives.

Internal Payment Options

Payments can be made directly to UAB by cash, check, or credit cards (Visa, MasterCard, and Discover). Payment by mail should be directed to UAB Student Accounting Services; P.O. Box 1946; Birmingham, Alabama 35201-1946. Payments may be made in person in the Hill University Center, 1400 University Boulevard, in Room 322; in the student payment drop box located on the first floor of Hill University Center; or

by credit card through ACCESS at 205-930-0087, 5-9600 (on campus) or toll-free at 1-888-988-2567.

External Payment Option

UAB has arranged for our students to be eligible to use the financial planning experience and designated payment options offered through Academic Management Services (AMS). Each student can make prearranged plans with AMS to meet the published due dates for fall and spring semesters. The plans are based on 8 or 10 monthly advance payment schedules and provide an excellent way for students to establish a monthly budget for educational costs. For more information concerning the available plans, call an AMS education payment counselor at 800-635-0120 or browse their web site (www.amsweb.com).

Statement of Fees

A statement of fees is provided to each student at registration. Charges shown on that statement are based on the student's status and courses as of the date of registration. School, classification, or course changes made after registration may result in additional charges. Credit for financial aid, external payment plans, UAB Educational Assistance benefits, or payments to be billed to a third-party vendor may not be reflected on the Statement of Fees printed at registration. However, even if you do not receive a statement, you are still responsible for payment by the deadlines. For information or clarification concerning the amount due, please call Student Accounting Services at 205-934-3570 or 1-888-255-8734.

Delinquency Policy

If any student has an unpaid financial obligation to UAB, all grades will be withheld and no transcripts will be issued for that student. Such a student will not be permitted to register at UAB again and all services will be withheld until the obligation is paid in full, at which time withheld grades will be reinstated. A debt to UAB is, of course, legally enforceable. To be fair to the overwhelming majority of students who honor their commitment, UAB's policy is to pursue unpaid student debts vigorously by all legal means. (See the current class schedule for published delinquent fees.)—www.students.uab.edu

Tuition Adjustment Policies

If you withdraw from a course (using the appropriate procedures) prior to the close of business on the published date for Last Day to Drop Without Paying Tuition and Fees, you will owe no tuition for that course. However, if you are still registered for a course at the close of business on the Last Day to Drop Without Paying Tuition and Fees, you must pay full tuition and fees for that course, even if you withdraw later. No refunds can be made unless a licensed physician certifies that a condition, which arose after the last day to withdraw, was of sufficient duration and severity to make it impossible for you to continue in the course. Students suspended for disciplinary reasons are not eligible for refunds or cancellation of charges due.

Withdrawals and Refunds

Students who wish to withdraw from courses for which they are registered must use the official procedures specified in the UAB Class Schedule, published quarterly.

Mere failure to attend class does not constitute a drop or withdrawal. If the withdrawal form is received after the "Last Day to Withdraw Without Paying Full Tuition and Fees" (spe-

cified for each term in the UAB Class Schedule), full tuition and fees will be due for the courses from which the student withdraws.

Academic Common Market

The Academic Common Market is an interstate agreement among selected southern states for sharing academic programs at both the baccalaureate and graduate levels. Participating states are able to make arrangements for their residents who qualify for admission to enroll in specific programs in other states on an in-state tuition basis. Participating states are Arkansas, Delaware, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia.

If you are not an Alabama resident and you wish to enroll at UAB as an Academic Common Market student, you must be accepted for admission into a UAB program to which your state has obtained access for its residents through the Academic Common Market coordinator in your home state.

Certification of eligibility must be received by the Graduate School before the first day of class in the initial semester of registration to obtain in-state tuition status for the entire program; otherwise, in-state tuition status will be awarded beginning with the semester following receipt of this certification.

To obtain the name and address of a state coordinator, contact the Graduate School, Room 511, Hill University Center, 1400 University Boulevard, Birmingham, Alabama 35294-1150 (telephone 205-934-8227) or visit the Academic Common Market web site (www.cep.unt.edu/ACM.html).

Financial Aid

Assistantships and Fellowships

The Graduate School realizes that pursuit of an advanced degree may involve financial strain. In many programs, graduate student awards are available in limited number in the form of assistantships (service required) or fellowships (no service required.)

Applications for assistantships or fellowships should be submitted to the director of the graduate program in which the student is, or plans to be, enrolled. Applications for minority fellowships are available in the Graduate School Office. The Graduate School also assists students in preparation of applications for extramural fellowships.

The university's Financial Aid Office administers traditional loan, grant, and work-study programs, and students in certain graduate programs may participate in UAB's Cooperative Education Program, combining their studies with paid work experiences.

For information concerning these programs, contact the Office of Student Financial Aid, Room 317, Hill University Center, 1400 University Blvd, Birmingham, Alabama 35294-1150 205-934-8223, www.uab.edu/studentacct

Veterans

Any veteran who plans to enter UAB and who wishes to apply for financial assistance through the Department of Veterans Affairs should file an application with the UAB Office of Veterans Affairs. From six to eight weeks are required to secure proper processing of an application by the Department of Veterans Affairs.

For information, contact the UAB Department of Veterans Affairs, Room 516H, Hill University Center, 1400 Univer-

sity Boulevard, Birmingham, Alabama 35294-1150, telephone 205-934-8115, www.students.uab.edu

Payment Due Dates

For Fall semester of 2002, a minimum payment of 50% tuition and fees will be due 8/30/02, and the remaining balance will be due 10/02/02.

For Spring semester of 2003, a minimum payment of 50% tuition and fees will be due 1/15/03, and the remaining balance will be due 2/14/03.

Summer 2003 has multiple sessions and will have variable due dates; see the Summer UAB Class Schedule for dates. (Summer term is not included in external payment plans.)

Estimated Semester Fees⁴, 2002-2003

General Fees Paid by All "Resident"⁵

Graduate Students

Per semester hour

Graduate School Fees.....	\$ 123.00
School of Public Health	\$128.00
School of Nursing Fee	\$149.00
School of Health Related Professions	\$161.00

Student Service Fee⁶..... \$ 35.00

(plus \$7 per semester hour)

Building Fee, Academic Health

Center Students \$ 30.00

Building Fee, All Other

Students \$ 30.00

(plus \$3 per semester hour)

General Fees Paid by All "Nonresident"⁵

Graduate Students

Per semester hour

Graduate School Fees.....	\$ 277.00
School of Public Health	\$288.00
School of Nursing Fee	\$335.00
School of Health Related Professions	\$362.00

Student Service Fee⁶..... \$ 35.00

(plus \$7 per semester hour)

Building Fee, Academic Health

Center Students \$ 30.00

Building Fee, All Other

Students \$ 30.00

(plus \$3 per semester hour)

Special Fees, Paid Where Applicable⁷

Nondegree Application Fee \$ 30.00

Domestic Application Fee \$ 35.00

MAC, M.B.A. \$ 50.00

M.S.H.A. \$ 60.00

International Application Fee \$ 60.00

MAC, M.B.A. \$ 75.00

M.S.H.A. \$ 85.00

Readmission Application Fee \$ 30.00

⁴ This fee schedule is subject to change by the Board of Trustees at the beginning of any semester.

⁵ See Nonresident Tuition Policy for definition of residency.

⁶ Regular UAB employees are exempt from Student Service Fee.

⁷ For applicability of these fees, see the current UAB Class Schedule.

Student Health Service Fee (per semester plus initial processing fee).....	\$ 75.00
Annual Insurance Fee(student)	\$ 866.00
.....(spouse)	+\$1812.00
.....(each child)	+\$1284.00
Late Payment Fee ⁴	\$ 50.00
Late Registration Fee ⁴	\$ 25.00
Change of Course Fee ⁴	\$ 15.00
Withdrawal Fee ⁴ (for total withdrawal up until 8th calendar day of classes)	\$ 30.00
Reinstatement Fee ⁴ (for three hours or less)	\$ 50.00
(for over three hours)	\$150.00
Laboratory Fees	\$35.00–\$75.00
Learning Resources (per credit hour)	\$2.00–\$11.00
Recreational Center (per credit hour)	\$2.00
Returned Check Fee.....	\$ 20.00
Transcript Fee (except intercampus; official)	\$ 5.00
Transcript Fee (except intercampus; unofficial)	\$ 5.00
Degree Completion Fee ⁸	\$ 250.00
(per quarter)	
Diploma Fees	
Graduate Degree Fee	\$ 50.00
Reorder Diploma Fee.....	\$ 25.00
(if graduate requirements are not met after diploma has been ordered)	
Duplicate Diploma Fee	\$ 7.50
Thesis Binding Fee	\$ 25.00
(per copy)	
Dissertation Microfilming Fee	\$ 60.00
Optional Copyright Fee	\$ 45.00

Graduate Degree Programs

Program and Course Information

These program descriptions give details of degree requirements beyond the general statement in previous sections. Specific courses and faculty are also listed. The online (www.uab.edu/graduate/catalog) program descriptions are updated between printings of the catalog and are the definitive descriptions.

Where more than one number is shown for a course, the work extends beyond one term. Courses are for 3 semester hours credit unless otherwise noted. Courses marked with an asterisk may be repeated with stipulations.

The faculty rosters appearing in the online program descriptions contain alphabetical listings of graduate faculty members participating in each program; each name is followed by rank, title, and areas of special or research interest and activities. The general faculty listing that appears in the online catalog provides overall, university-wide information on graduate faculty members.

Concurrent and Combined Degree Programs

UAB offers students several opportunities to pursue two advanced degrees concurrently. The majority of these programs permit students to pursue both a research degree (such as the Ph.D. or M.S.) and a professional degree (such as the M.D., D.M.D., O.D., or M.P.H.) simultaneously. The Gradu-

ate School is eager to cooperate with all qualified students who wish to extend their professional capabilities into the area of independent scholarship, originality, and research that characterize graduate study.

A student already participating in one degree program but wishing to be enrolled in two programs concurrently should submit with application materials a written statement of support and approval from the director of the program of his or her original enrollment. Students not already enrolled at UAB should make their concurrent degree interest known on the application form.

Online Catalog

The list below contains graduate programs that are administered by the UAB Graduate School. Other advanced degrees, such as the MSN and DRPH are administered by other schools on campus, and interested students should consult the appropriate catalogs for further information.

Administration & Business

Accounting (M.Ac.)
Administration–Health Services (Ph.D.)
Business Administration (M.B.A.)
Health Administration (M.S.H.A.)
Health Informatics (M.S.H.I.)
Public Administration (M.P.A.)

Allied Health Sciences

Clinical Laboratory Sciences (M.S.C.L.S.)
Nurse Anesthesia (M.N.A.)
Nutrition, Clinical (M.S.)
Nutrition Sciences (Ph.D.)
Occupational Therapy (M.S.)
Physical Therapy (M.S.)

Basic Life and Biomedical Sciences

Biochemistry (Ph.D.)
Biology (Ph.D., M.S.)
Cell Biology (Ph.D.)
Medical Genetics (Ph.D.)
Microbiology (Ph.D.)
Neurobiology (Ph.D.)
Pathology (Ph.D.)
Pharmacology (Ph.D.)
Physiology and Biophysics (Ph.D.)
Vision Science (Ph.D., M.S.)

Clinical Sciences

Dentistry (M.S.)
Nursing (Ph.D., M.S.N.)
Oral Biology (M.S.)

Coordinated Degrees

M.D.-Ph.D.
M.S.-M.D. & Ph.D.-M.D.
O.D.-M.S. & O.D.-Ph.D.
M.D.-M.S.B.M.S.
M.B.A.-M.P.H.
M.S.H.A.-M.B.A.
M.P.A.-M.P.H.
M.P.A.-J.D.
Ph.D.-M.B.A.

Education

Education, Arts (M.A.Ed., 5th Year, Ed.S.)
Education, Counseling (M.A.C.N., Ed.S.)
Education, Early Childhood (Ph.D., M.A.Ed., Ed.S., 5th Year)
Education, Elementary (M.A.Ed., Ed.S., 5th Year)
Education, Health (M.A.Ed., Ed.S., 5th Year)
Education, High School (M.A.Ed., Ed.S., 5th Year)

⁸ This fee is assessed when a student fails to complete the thesis or dissertation by the deadline for the semester following the semester of the final defense.

Education, Physical (M.A.Ed., Ed.S., 5th Year)
 Education, Special (M.A.Ed., 5th Year)
 Educational Leadership (Ed.D., Ph.D., M.A.Ed., Ed.S.)
 Health Education/Health Promotion (Ph.D.)

Engineering

Biomedical Engineering (Ph.D., M.S.B.M.E.)
 Civil Engineering (Ph.D., M.S.C.E.)
 Computer Engineering (Ph.D.)
 Electrical Engineering (M.S.E.E.)
 Environmental Health Engineering (Ph.D.)
 Materials Engineering (Ph.D., M.S.Mt.E.)
 Mechanical Engineering (M.S.M.E.)

Physical & Mathematical Sciences

Chemistry (Ph.D., M.S.)
 Computer and Information Science (Ph.D., M.S.)
 Forensic Science (M.S.F.S.)
 Materials Science (Ph.D.)
 Mathematics (M.S.)
 Mathematics, Applied (Ph.D.)
 Physics (M.S., Ph.D.)

Public Health

Biostatistics (Ph.D., M.S.)
 Environmental Health Sciences (Ph.D.)
 Epidemiology (Ph.D.)
 Health Education/Health Promotion (Ph.D.)

Social Sciences, Art, & Humanities

Art History (M.A.)
 Criminal Justice (M.S.C.J.)
 English (M.A.)
 History (M.A.)
 Medical Sociology (Ph.D.)
 Psychology (Ph.D.)
 Behavioral Neuroscience
 Cognitive Science
 Developmental Psychology
 Medical Psychology

Ed: Early Childhood Education
 Ed: Education Psychology
 Ed: Educational Collaborative Teacher
 Ed: Educational Foundations
 Ed: Educational Leadership
 Ed: Educational Technology
 Ed: Elementary
 Ed: Elementary & Early Childhood Education
 Ed: English as a Second Language
 Ed: Exceptional Children and Youth
 Ed: Foreign Language
 Ed: Health Behavior
 Ed: Health Education
 Ed: High School
 Ed: Middle School
 Ed: Music Education
 Ed: Physical Education
 Ed: Reading
 Electrical and Computer Engineering
 English
 Environmental Health Sciences
 Epidemiology
 Forensic Science
 French
 German
 Gerontology
 Graduate School
 Health Administration
 Health Behavior
 Health Care Organization
 Health Informatics
 History
 Information Systems
 Integrative Biomedical Sciences
 Justice Science
 Legal Studies
 Management
 Marine Science
 Marketing
 Master of Business Administration
 Materials Science and Engineering
 Mathematics
 Mechanical Engineering
 Medical Genetics
 Microbiology
 Neurobiology
 Neuroscience
 Nurse Anesthesia
 Nursing
 Nutrition Sciences
 Occupational Therapy
 Oral Biology
 Pathology
 Pharmacology
 Philosophy
 Physical Therapy
 Physics
 Physiology and Biophysics
 Psychology
 Public Administration
 Quantitative Methods
 Sociology
 Spanish
 Speech and Hearing Sciences
 Toxicology
 Vision Science

ECE
 EPR
 ECT
 EDF
 EDL
 EDT
 ELE
 EEC
 EESL
 ECY
 EFL
 HB
 HE
 EHS
 EMS
 EMU
 PE
 EDR
 EE
 EH
 ENH
 EPI
 FS
 FR
 GN
 GER
 GRD
 HA
 HB
 HCO, HCOV
 HI
 HY
 IS
 IBS
 JS
 LS
 MG
 MESL
 MK
 MBA
 MSE
 MA
 ME
 MGE
 MIC
 NBL
 NEUR
 NA
 NUR
 NTR
 OT
 OB
 PAT
 PHR
 PHL
 PT, PTGR
 PH
 PHY
 PY
 MPA
 QM
 SOC
 SPA
 BIC
 TOX
 VIS

Abbreviations

Graduate Record Examination	GRE
Grade Point Average	GPA
Graduate Management Admission Test	GMAT
Medical College Admission Test	MCAT
Test of English as a Foreign Language	TOEFL
Test of Written English	TWE

Course Codes

Accounting	AC
Administration–Health Services	AH
Anthropology	ANTH
Art History	ARH
Biochemistry and Molecular Genetics	BMG
Biology	BY
Biomedical Engineering	BME
Biostatistics	BST
Cell Biology	CB
Cellular and Molecular Biology	CMB
Chemistry	CH
Civil Engineering	CE
Clinical Dentistry/Biomaterials	CD
Clinical Laboratory Sciences	CLS
Communication Management	CM
Computer and Information Sciences	CS
Criminal Justice	JS
Education	E
Ed: Arts Education	EDA
Ed: Counseling and Guidance	ECG
Ed: Curriculum	EDC

Accounting (M.Ac.)

Graduate program director: *Turpen*

Faculty

Nell Adkins, Assistant Professor (Accounting); Tax

Lowell S. Broom, Professor and Chair (Accounting); Auditing, Nonprofit Accounting

William D. Burg, Assistant Professor (Information Systems)

Fred C. Daniels, Adjunct Professor (Accounting); Tax

Cindy D. Edmonds, Associate Professor (Accounting); Financial Accounting, Managerial Accounting

Thomas P. Edmonds, Professor (Accounting); Managerial Accounting, Financial Accounting

L. Buky Folami, Assistant Professor (Accounting); Financial Accounting, Managerial Accounting

Michael K. McAlister, Professor (Information Systems)

Frank M. Messina, Associate Professor (Accounting); Accounting Information Systems, Tax

Donald R. Reeves, Adjunct Professor (Accounting); Managerial Accounting

Julio C. Rivera, Associate Professor (Information Systems)

Sanjay K. Singh, Associate Professor (Information Systems)

Deborah W. Tanju, Professor (Accounting); Financial Accounting, Internal Auditing

Murat N. Tanju, Professor (Accounting); Financial Accounting, Managerial Accounting

Bor-Yi Tsay, Professor (Accounting); Accounting Information Systems, Managerial Accounting

Richard A. Turpen, Associate Professor (Accounting); Auditing, Financial Accounting

Frank E. Watkins, Associate Professor (Accounting); Tax

Kathrine O. Wilburn, Adjunct Professor (Accounting); Legal Studies

Mission and Objective

The mission statement of the Department of Accounting and Information Systems is as follows: "The Department of Accounting and Information Systems is committed to providing a high-quality, practice-oriented educational experience to a largely urban population. The Department will offer, through its accounting programs, an educational foundation that will prepare students for professional careers in business and accounting or enable them to pursue graduate studies. The Department will contribute to the understanding and application of accounting and business knowledge through the scholarship activities of the faculty. The Department will maintain a continuing relationship with the professional community while supporting the internal activities of the University."

The objective of the Master of Accounting Program is to further develop in students the skills required for success in the accounting profession. Offered primarily in an evening format, it is designed for those individuals with a knowledge base in accounting and business who desire to broaden their communication, interpersonal, technological, and applied research skills. The Master of Accounting Program is accredited

by the AACSB International—The Association to Advance Collegiate Schools of Business (www.aacsb.edu).

Admission Requirements

Requirements for admission to the program include either of the following:

1. A bachelor's degree in accounting received from an institution accredited by AACSB International, or
2. A bachelor's degree received from an institution accredited by a regional accrediting association and the completion of course work equivalent to the accounting major.

All academic work must have been completed within the last ten years, although consideration may be given to significant postgraduate accounting experience if the academic work is not current. A "catalog match" evaluation report prepared by Educational Credential Evaluators, Inc. (ECE, www.ece.org) is required of applicants whose degrees are from foreign institutions. A satisfactory score on the GMAT administered by the Graduate Management Admission Council (www.gmac.org) is required of all applicants. In addition, a satisfactory score on the TOEFL (www.toefl.org) is required of those whose degrees are from foreign institutions. Test scores on these examinations may be no more than five years old. Adequate communication and computer skills are expected of all entrants.

Applicants meeting these requirements will be further evaluated on the basis of a formula that incorporates both the GMAT score and the undergraduate GPA. The strength of academic performance in previous accounting course work will be considered as a significant factor in the admission decision as well.

Admission to the program is competitive; the number of qualified applicants admitted may be limited when resource constraints and optimum enrollment considerations so dictate.

Program Description

The program consists of 30 semester hours of graduate credit in one of two concentrations: Accounting Practice or Information Systems. While completion of either will satisfy the academic provisions (i.e., the 150-hour requirement) of Alabama's Accountancy Laws, the former tends to be more directed toward preparing candidates for professional certification exams.

The Accounting Practice concentration provides students with the opportunity to expand their knowledge and understanding of the various disciplines within the profession through 24 hours of accounting-related course work. It also offers them the flexibility to tailor their graduate education to meet specific career goals and objectives by selecting 6 hours of specialized elective courses.

The Information Systems concentration provides students with the opportunity to develop their information technology skills and their awareness of the role information plays within an organization and its various accounting functions. Accordingly, the concentration includes 15 hours of course work in information systems and 15 hours of accounting courses.

Program Requirements

The Accounting Practice concentration consists of eight required courses and two electives:

Required courses

LS 557	Business Law for Accountants
AC 514	Fund Accounting
AC 552	Income Taxation II
AC 580	Advanced Financial Accounting
AC 601	Strategic Cost Management
AC 603	Advanced Accounting Information Systems
AC 606	Current Problems in Auditing
AC 620	Tax Planning and Research

Elective courses

AC 600	Financial Reporting Strategy
AC 621	Corporate Tax
AC 628	Taxation of Wealth Transfers
AC 633	Information Systems Auditing

Any 600-level MBA courses beyond the core

The Information Systems concentration consists of ten required courses:

AC 600	Financial Reporting Strategy
AC 601	Strategic Cost Management
AC 603	Advanced Accounting Information Systems
AC 606	Current Problems in Auditing
AC 633	Information Systems Auditing
MBA 611	Management Information Systems
IS 501	Database Management
IS 502	Telecommunications Management
IS 521	Systems Analysis
IS 522	Advanced Systems Analysis and Problem Solving

Students who have completed course work with content substantially equivalent to any of the required courses must consult with the Master of Accounting Program Director to determine suitable alternatives.

Uniform CPA Examination

The state of Alabama requires that applicants for the Uniform CPA Examination hold a baccalaureate degree from an accredited institution and possess a total of 150 semester hours of postsecondary education, including at least 33 semester hours of accounting in specified areas at the upper-division or graduate level. There are three ways that UAB students can meet these requirements:

(1) *By obtaining a Master of Accounting degree in either of the two concentrations described above.* Under the state's Accountancy Laws, those who hold graduate degrees from accounting programs accredited by AACSB International (as is UAB's) meet the academic requirements for taking the Uniform CPA Examination.

(2) *By obtaining a Master of Business Administration degree with an Accounting concentration.* Those who already hold an undergraduate accounting degree (or its equivalent) and who desire a graduate degree in business may establish their eligibility under the state's Accountancy Laws by completing as part of their M.B.A. requirements 12 semester hours of graduate accounting course work as determined by the Master of Accounting Program Director. Students interested in this option should contact the Admissions Counselor in the Graduate School of Management.

(3) *By obtaining an undergraduate accounting degree (or its equivalent) and completing certain additional course work as specified under the state's Accountancy Laws.* Students interested in this option should contact the undergraduate advisors' office in the School of Business for specific guidance. Those interested in this option who already hold degrees from

other institutions should also contact the undergraduate business advisors.

Other Professional Accounting Certifications

Other examinations leading to professional certification (CMA, CIA, etc.) generally do not require academic course work beyond the baccalaureate degree. Students interested in other accounting certifications should contact an undergraduate business advisor or any member of the accounting faculty for further information.

Additional Information

For detailed information contact the Graduate School of Management, School of Business, BEC 219, 1150 Tenth Avenue South, Birmingham, AL 35294-4460.

Telephone 205-934-8817

Fax 205-934-9200

E-mail raturpen@uab.edu for M.Ac. information or mlake@uab.edu for M.B.A. information

Web www.business.uab.edu

Course Descriptions

Unless otherwise noted, all courses are for 3 semester hours of credit. For M.B.A. courses, see M.B.A. information.

Legal Studies (LS)

557. Business Law for Accountants. The mechanics and application of the Uniform Commercial Code with emphasis on sales, commercial paper, and secured transactions; legal principles regarding trusts and estates, insurance, and business organization; and expanded treatment of the law of contracts.

Accounting (AC)

The general enrollment requirement for Master of Accounting courses is graduate standing and an undergraduate accounting major or its equivalent. Graduate accounting courses are not open to nondegree students.

514. Fund Accounting. Special features of budgetary and fund accounting as applied to municipalities, other governmental units, and to other nonprofit entities.

552. Income Taxation II. Basic concepts and law applicable to partnerships and corporations. Tax research techniques and tax planning concepts.

580. Advanced Financial Accounting. Business combinations, consolidated financial statements, multinational accounting, and partnerships.

600. Financial Reporting Strategy. Consideration of recent pronouncements of various authoritative bodies such as the FASB and SEC through research projects and case discussions.

601. Strategic Cost Management. Emphasis on theory and practice of cost accumulation and allocation.

603. Advanced Accounting Information Systems. Systems design and implementation; emphasis on information needs, reporting requirements, and internal control.

606. Current Problems in Auditing. Development of auditing to its present state; authoritative bodies influencing auditing; new developments.

620. Tax Planning and Research. Basic research tools in taxation; selected parts of Internal Revenue Code and Regulations; tax planning techniques.

621. Corporate Tax. Federal income taxation of corporations. Major topics include formation and liquidation, distribu-

tions, and Subchapter S corporations. Pre- or corequisite: AC 620.

628. Taxation of Wealth Transfers. Federal estate and gift taxation, planning for estate and gift taxes, and federal income taxation of estates and trusts. Prerequisite: AC 620.

633. Information Systems Auditing. Advanced study of selected topics in controlling and auditing information systems and other current auditing topics such as computer fraud, software tools and techniques used in auditing.

Information Systems (IS)

501. Database Management. Data models, database management systems, and physical database organization.

502. Telecommunications Management. Managerial and technical perspectives of transmitting information from one location to another by means of computer networks.

521. Systems Analysis. Analysis and design of information system applications in an organizational environment. Special emphasis on analysis tools and problem-solving skills.

522. Advanced Systems Analysis and Problem Solving. Focuses on the planning, decision making, tasks and requisite skills necessary for the design of information systems.

Administration–Health Services (Ph.D.)

Graduate program directors: *Hernandez and Key*

Faculty

Nell Adkins, Assistant Professor (Accounting); Corporate Taxation, Market Effects of Taxation, Mergers and Acquisitions, Valuation of Intangible Assets

Doug Ayers, Assistant Professor (Marketing); Business to Business Marketing, New Product Development

Eta Berner, Professor (Health Informatics); Evaluation of Clinical Decision Support Systems and Other Health Information Technologies

Ted Bos, Professor (Quantitative Methods); Economic Forecasting, International Business and Finance, Pacific Basin Financial Markets

Michael R. Bowers, Professor (Marketing); Services Marketing, Health Care Marketing, Personal Selling, Sales Management, New Product Development, Product and Quality Management

Janet M. Bronstein, Associate Professor (Health Care Organization and Policy); Public Health Policy, Social and Ethical Issues in Health Care, Medicaid

Lowell S. Broom, Professor (Accounting); Alternative Dispute Resolution, Professional Ethics, Fraud Detection and Deterrence

Jeffrey Burkhardt, Associate Professor (Health Services Administration); Health Care Finance, Applied Health Economics

Richard Burns, Associate Professor (Finance); Corporate Finance, Firm Valuation, Small Business Finance

Stuart A. Capper, Associate Professor (Health Care Organization and Policy); Public Health Policy and Strategic Management, Academic Health Center Management

Manabendra DasGupta, Associate Professor (Economics); Game Theory, Strategic Decision Making

W. Jack Duncan, University Scholar and Professor (Management, Health Care Organization and Policy); Admin-

istrative Theory, Strategic Management of Health Care Organizations, Organizational Internal Analysis

Cindy D. Edmonds, Associate Professor (Accounting); Financial and Managerial Accounting, Educational Delivery Issues

Thomas P. Edmonds, Professor (Accounting); Accounting Education and Instructional Development

Thomas A. Fetherston, Associate Professor (Finance); Investments, International Finance, Pacific Basin Financial Markets

David Fine, Professor (Health Services Administration); Applied Epidemiology in Health Administration; Health Care Systems; Health Administration Education

Peter M. Ginter, Professor (Health Care Organization and Policy, Management); Strategic Management of Health Care Organizations and Government Agencies, Macroenvironmental Analysis

David C. Grabowski, Assistant Professor (Health Care Organization and Policy); Financing and Delivery of Long-Term Care Services, Economics of Aging, Regulation and Health Care, Health Insurance

S. Robert Hernandez, Professor (Health Services Administration); Strategic Planning for Health Care Organizations, Health Care Organization Theory, Integrated Delivery Systems

Tee H. Hiett, Professor Emeritus (Health Services Administration); Health Care Computer Applications, Data Processing in Health Care

Vivian Ho, Associate Professor (Health Care Organization and Policy); Health Economics and Management, Aging, Applied Microeconomics, Cost Effectiveness, Health Care Technology

Robert E. Holmes, Professor (Management); Business Education and Reform, Entrepreneurship, Strategic Management

Howard W. Houser, Professor (Health Services Administration); History of Health Care Systems, General Administration, Comparative Health Systems

George Ignatin, Associate Professor (Economics); Microeconomics, Evaluation of Sports Gambling

Eric Jack, Assistant Professor (Operations Management); Project Management, Operations Planning and Management

Karen Kennedy, Assistant Professor (Marketing); Cognitive Research, Diversity, Services Marketing, Organizational Culture, Interpersonal Trust Development, Qualitative Research Methods

Susan Key, Associate Professor (Management); Business and Society, Ethics, Business Law, Business Policy and Strategy, International Policy

Joshua C. Klapow, Assistant Professor (Health Care Organization and Policy); Outcome Evaluation, Health Related Quality of Life, Health Care Delivery Systems, Behavioral Medicine, Chronic Illness, Provider Behavior

Seung-Dong Lee, Associate Professor (Economics); Microeconomics in Nonprofit Organizations, Econometric Studies in Health Care, International Economics

Warren S. Martin, Professor (Marketing); Survey Research, Marketing Strategy, Professional Sales Strategy, Decision Making

M. Khris McAlister, Professor (Accounting); Management Information Systems, Data Processing for Health Care Organizations

Gail W. McGee, Professor (Management); Organizational Behavior, Leadership in Teams, Personality, Job Stress, Organizational Commitment

Stephen Mennemeyer, Associate Professor (Health Care Organization and Policy); Health Economics, Competitive Bidding, Cost-Effectiveness, Outcomes Research

Frank M. Messina, Associate Professor (Accounting); Taxation, Fraud Detection and Deterrence, Professional Ethics

Michael A. Morrissey, Professor (Health Care Organization and Policy); Health Economics, Health Care Markets, Health Insurance, Managed Care

George M. Munchus, Professor (Management); Human Resources Management, Labor Relations, Arbitration and Mediation

Philip Musa, Assistant Professor (Information Systems); Knowledge Management; Systems Thinking

Lance Nail, Assistant Professor (Finance); Wealth and Value Creation, Mergers and Acquisitions

Steven J. O'Conner, Associate Professor (Health Services Administration); Health Care Policy and Management, Service Quality and Orientation, Stakeholder Analysis

Helmuth Orthner, Professor (Health Informatics); Next Generation Networks; Very High-Speed Communications Systems; Web-Based Informatics for Emergency Medical Care

Thomas L. Powers, Professor (Marketing); International Product Innovation, Marketing Strategy, Services Marketing, Industrial Marketing

Julio C. Rivera, Associate Professor (Information Systems); Telecommunications and Systems Analysis, Student and Faculty Computing Resources

Robert A. Scott, Associate Professor (Management); Selection Validation Research, Personnel Evaluation

John E. Sheridan, Professor (Management), Organizational Behavior, Culture, Leadership

Richard M. Shewchuk, Professor (Health Services Administration); Community-Based Intervention Development, Health and Long-Term Care Issues in Aging, Quantitative Methods

Sanjay Singh, Associate Professor (Management); Operations Management, Computer Applications

Jay Smith, Professor (Industrial Distribution); Transportation Policy, Cost Information Systems, Labor-Management Relations, Computer Decision-Making Systems

Robert E. Stanford, Professor (Economics); Operations Research, Quantitative Methods and Decision Technology in Health Service Organizations

John E. Swan, Professor Emeritus (Marketing); Consumer Attitudes and Complaining Behavior, Research Design

Deborah W. Tanju, Professor (Accounting); Internal Auditing, Financial Accounting

Murat H. Tanju, Professor (Accounting); Financial Accounting, Managerial Accounting

Bor-Yi Tsay, Professor (Accounting); Accounting Information Systems, Cost Management

Richard A. Turpen, Associate Professor (Accounting); Auditing, Financial Accounting, Professional Ethics

Robert Underwood, Assistant Professor (Marketing); Brand Image, Brand Equity, Quality of Life Marketing, International Marketing, Purchase Behavior

Joseph Van Matre, Professor (Economics); Total Quality Management, Health Care Quality Improvement, Statistics

Joe Walker, Associate Professor (Finance); Corporate Finance, Investments, Small Firm Finance

Frank E. Watkins, Associate Professor (Accounting); Tax and Business Law, Stockholder Basis in S Corporations, Capital Gains

Barbara Wech, Assistant Professor (Organizational Behavior); Teams, Organizational Commitment

Bradley K. Wilson, Assistant Professor (Economics); Consumption and Saving, Growth and Inflation, Applied Econometrics

Program Information

The Ph.D. program in Administration–Health Services is a degree program offered jointly and cooperatively by the Department of Health Services Administration in the School of Health Related Professions and the Graduate School of Management in the School of Business. Faculty associated with the School of Public Health, School of Medicine, Lister Hill Center for Health Policy, Center for Outcomes and Effectiveness Research and Education, and Center on Aging also contribute to student learning.

The Ph.D. program is for those who wish to pursue the conceptual, philosophical, and applied aspects of administrative processes in health services, health policy, and outcomes research in health care. It provides doctoral-level study and research in administration with specific application to health services.

The pedagogical focus is on developing a strong research orientation through course work, research seminars, and development of mentoring relationships. Students may choose a specialization in either strategic management or health services research. Students who are interested in pursuing academic careers are also afforded the opportunity to develop their teaching skills through course work and teaching opportunities. Job placement occurs in regional, national, and international markets. To date, over 50 graduates have taken positions in academic institutions as well as health service delivery, governmental, and consulting organizations.

Admission Requirements

An applicant should already possess a master's degree in a relevant discipline or have completed an undergraduate program with an outstanding record. The application deadline is April 15. Completed applications of well-qualified candidates received by February 15 may be considered for early admission. Although applications may be considered after April 15, admission and financial aid priority is given to those applicants whose materials are complete as of the deadline. Admission recommendations are made by the Admissions and Policy Committee after examination of the candidate's qualifications, which should include a minimum GRE General Test score of 1,100 (verbal plus quantitative) or a GMAT test score of 550. All applicants whose first language is not English are also required to submit a TOEFL score of 550 or above. Consideration will also be given to the quality of the applicant's academic record, previous research experience and productivity, and estimated research potential as indicated by references.

Various forms of financial aid are available to students. Departmental research assistantships are awarded on a competitive basis and carry an obligation of 20 hours of work per week. Assistantships are awarded to incoming students for a period of one year, and may be renewable for a second year

based on satisfactory work and academic progress, depending on the availability of funds. Some students are able to secure funding for additional years in the program through research assistant positions or other part-time jobs funded by faculty members' grants and contract activities. Other forms of financial assistance include minority fellowships offered through the UAB Graduate School, paid teaching opportunities in selected undergraduate programs, and federal student loans.

Prerequisites

Prerequisite requirements include one graduate-level statistics course with computer usage and one graduate-level course on the U.S. health care system. Incoming students who have not met these prerequisites during a master's program may take courses prior to entering the program or during their first year of study in the program.

Program of Study

The program of study consists of five components (1) courses in administration and health systems, (2) courses in research methodology and statistics, (3) specialization courses, (4) comprehensive examinations, and (5) the doctoral dissertation. Specializations are currently available in strategic management and health services research. Students must complete all coursework in the first three areas and pass a comprehensive examination in each before work can officially begin on the dissertation. The investigation and other special work leading to the dissertation must be performed directly under the guidance and supervision of a five-person committee of the UAB graduate faculty. The normal minimum period in which the doctoral degree can be earned is three to four years of full-time study.

Degree Completion

The granting of the Ph.D. degree is based on completion of all required coursework, residency requirements, comprehensive examinations, dissertation requirements, and the recommendation of the Administration–Health Services graduate program director and the dissertation committee.

Mission, Vision, and Values Statements

Because outstanding teaching and research are essential to the future of health care delivery in our nation and abroad, the Ph.D. program in Administration–Health Services provides doctoral-level training to individuals who will be our future health care leaders in academic and nonacademic research organizations.

We seek to recruit a diverse and talented group of national and international students who are attracted to careers in research and teaching. The educational experience in the Ph.D. program is characterized by exposure to the various disciplines relevant to health administration and policy from across the university, as well as one-on-one mentorship relationships with faculty. These experiences are expected to serve as a foundation for future research throughout the graduate careers.

Additional Information

For detailed information, contact Alice Adams, Assistant to the Directors, Administration–Health Services Program, UAB School of Health Related Professions, Webb Building, Room 503, 1675 University Boulevard, Birmingham, AL 35294-3361.

Telephone 205-934-1649
Fax 205-975-6608
E-mail phdha@uab.edu
Web www.hsa.uab.edu

Course Descriptions

Unless otherwise noted, all courses are for 3 semester hours of credit. Courses numbers preceded with an asterisk indicate courses that can be repeated for credit, with stated stipulations.

Administration–Health Services (AH)

700. Health Economics. Economic concepts and their relevance to health care industry; financing and delivery arrangements employed in the U.S. health care system; role of economic factors in the development of public policy and implications of changes in public policy.

701. Administrative Theory. Covers the history of administrative theory and management as well as recent contributions and current issues in administrative theory and management; focus is on understanding the evolution of management thought and research and on developing areas of research interest that will contribute to the field.

702. Growth and Development of the U.S. Health Care System. Historical development of U.S. health care system; implications for solutions of current problems.

703. Philosophy of Science. Systems of thought and activities in the theory-building process, deriving hypotheses from the literature, understanding scientific theory, philosophy of science; applications to health services administration.

704. Multivariate Analysis. Survey course on the application of multivariate statistical techniques; emphasis on application to health-related research questions and interpretation.

705. Health Care Finance. Financial management functions, third-party reimbursement, determination of costs and charges, analysis of financial positions, working capital management, budgeting, capital expenditure analysis, and case studies.

706. Strategic Management Theory and Research. Overview of current and historically important research in field of strategic management, including major streams of research, role of strategic management in management disciplines, relationships to other disciplines, and pedagogical approaches used in graduate and undergraduate strategy courses.

707. Research Methods. Issues of research design and research methods for organizational studies and health services research; integrates knowledge from quantitative courses with areas of research interest in students' chosen fields.

712. Research in Organizational Behavior. Examination of topics and empirical research in organizational behavior; emphasis on important issues in the field, including areas of controversy and contemporary interest.

714. Marketing Strategy and Research. Examination of development of marketing strategy and strategic management process; research topics and implications of literature are explored.

715. Research in Organizational Theory. Topics and research in organization and management theory applied to health services organizations, including organization-environment relations, population ecology, interorganization relations, and strategic alliances.

716. **Macroenvironmental Analysis.** Examination of research literature that addresses external and internal environmental factors affecting strategic management.

718. **Strategic Information Systems.** Examination of current research on role of information systems in strategic management.

*720. **Doctoral Seminar.** Presentations by faculty and Ph.D. candidates concerning current issues in particular areas of specialization. 1 hour.

722. **Regression Analysis.** Various approaches to regression analysis, including ordinary least squares and probability models such as logit and probit.

775. **Strategic Planning and Management in Health Services.** Assessment of strategic management literature applied to health services organizations; exploration of strategy formulation, strategic content, and implementation and evaluation topics for health care organizations.

*790. **Independent Study and Research.** 1-12 hours.

*798. **Nondissertation Research.** 1-6 hours.

*799. **Dissertation Research.** Prerequisite: Admission to candidacy. 1-6 hours.

Anthropology (M.A.*)

*Degree awarded by the University of Alabama, UAB's partner in the cooperative degree program

Graduate program director at UAB: *Hesse*

Faculty

Steven Becker, Assistant Professor (Environmental Health Sciences); Public Health

Ksenija Borojevic, Assistant Professor (Anthropology); Archaeology and Paleoethnobotany

Scott Brande, Associate Professor (Geology); Geoarchaeology

Loretta A. Cormier, Assistant Professor (Anthropology); Cultural Anthropology, Ecological, Ethnoprimateology, Lowland South America

Akhlaque Haque, Assistant Professor (Government and Public Services); Geographic Information System

Brian C. Hesse, Professor (Anthropology); Historical Archaeology, Old World Archaeology; Zooarchaeology, Middle East

Chris Kyle, Assistant Professor (Anthropology); Political Anthropology, Cultural Ecology, Social Organization, Latin America, Mesoamerica

Christopher C. Taylor, Associate Professor (Anthropology); Symbolic Anthropology, Medical Anthropology, Ethnohistory, Africa

Bruce P. Wheatley, Professor (Anthropology); Physical Anthropology, Primatology, Forensic Anthropology, Indonesia

Degree Requirements

The M.A. degree program includes the basic course requirements, a foreign language or research skill requirement, and fulfillment of either Plan I (Thesis) or Plan II (Nonthesis).

Basic Course Requirements

Four graduate core courses in anthropology are required: ANTH 605, 608, 609, and 610. In addition, two graduate courses will be registered for and completed at the University

of Alabama (Tuscaloosa). A reading knowledge of one foreign language or the equivalent in a research skill is required for graduation.

Plan I (Thesis): Students must complete 24 hours of graduate course work, 6 hours of thesis research, participate in an oral examination that will include discussion of the student's thesis proposal, and complete the thesis under the direction of a faculty committee.

Plan II (Nonthesis): Students must complete 30 hours of graduate course work, pass a comprehensive (four-field) written exam, submit a research paper completed as part of course work, and pass an oral examination.

Additional Information

For detailed information, contact Dr. Brian Hesse, Graduate Program Director, UAB Department of Anthropology, U 338, 1530 3rd Avenue South, Birmingham, Alabama 35294-3350.

Telephone 205-934-3508

E-mail bhesse@uab.edu

Web www.sbs.uab.edu/anthro.htm

Course Descriptions

For courses at the University of Alabama (Tuscaloosa), see the graduate catalog of that university.

Unless otherwise noted, all courses are for 3 semester hours of credit. Course numbers preceded with an asterisk indicate courses that can be repeated for credit, with stated stipulations.

Anthropology (ANTH)

600. **Medical Anthropology.** Seminar addressing health care systems and theories cross-culturally; including historical changes and examination of wide variety of simpler and more complex systems. (Taylor, Wheatley)

601. **Forensic Approaches to Osteology.** Applied human osteology, emphasizing ability to identify age, sex, and population type of skeletal material. Effects of disease and behavior on bones. (Wheatley)

602. **Classics in Anthropology.** Close reading of major classics in anthropological literature; to include one each from the four main subfields of anthropology.

603. **As Others See Us.** Jointly offered with American Studies and International Studies, this seminar surveys international perceptions of U.S. culture. (Hesse)

605. **Advanced Cultural Anthropology.** Critical review of theoretical approaches in cultural anthropology. (Taylor, Kyle)

606. **World Ethnography.** Kinship, economy, social control, religion, and ritual for peoples in North America, South America, Africa, or Asia. Focus on one area. (McKenna, Taylor)

607. **Social Structure.** Theoretical works in political anthropology, economic anthropology, or kinship. Emphasis varies according to instructor. (Kyle)

609. **Advanced Archaeological Anthropology.** Principal theoretical approaches in 19th- and 20th-century archaeology; historical, processual, and postprocessual. (Hesse)

610. **Advanced Physical Anthropology.** Human evolution, primatology, race, human genetics. Tasks performed by physical anthropologists. (Wheatley)

611. **Field Archaeology.** Archaeological field and laboratory techniques, including excavation, surveying, and artifact

analysis and description; general problems of archaeological interpretation. 1-6 hours. (Bergstresser, Hesse)

612. **Talking About Plants: Alabama Folk Botany.** Theory, methods, and techniques of ethnosience applied to local ethnographic field work in ethnobotany. (Cormier, Wapnish)

614. **Geoarchaeology.** Survey of geological methods as applied to archaeological questions. Practicum in geoarchaeological laboratory and analytic methods using samples from archaeological sites in Alabama and the Middle East. (Brandt)

615. **Ethnographic Field Methods.** Classroom instruction and practical experience in techniques of ethnographic fieldwork, including participant observation, household surveys, structured and unstructured interviewing, and genealogies. 3-6 hours.

616. **Guerrilla Filmmaking.** This course will teach anthropology students to document and analyze aspects of human social life using film and video. The camera can be a very effective ethnographic tool, but it is a transparent window into the world. Rather it is highly mediated and powerfully convincing. As in an essay writing course, students will develop an understanding of the visual syntax and narrative structure of successful ethnographic and documentary films through discussion and criticism in the classroom as through short film projects of their own. As the students begin to work on their own projects, some class time will be devoted to viewing and analyzing works in progress. (Cormier)

617. **Origins of Agriculture.** Survey of evidence for animal and plant domestication and reasons for spread of food production. (Borojevic)

625. **African American Archaeology.** African American archaeology is one of the better established research interests within U.S. historical archaeology. This course will examine the development of "the archaeology of the African diaspora" from its beginnings in the 1960s to the present day. Its principal focus will be the plantation of the Southern United States. The course will include an examination of history of the plantation economy as well as an exploration of issues currently of interest to archaeologists studying the archaeological record of African American life. (Bergstresser)

630. **Animal Bone Archaeology.** Introduction to methods and theories of zooarchaeological research. Practical experience in processing, identification, and interpretation of animal bone remains from archaeological sites. 3-6 hours. (Hesse)

631. **Palaeoethnobotany.** Survey of the plant-human relationships in the past and present. Practical field and laboratory experience in processing, identification, and interpretation of the plants from archaeological sites. (Borojevic)

635. **Ethnomedicine and Ethnopsychiatry.** Approaches and contributions of anthropology to study of health, sickness, and healing. Physical environment and human adaptations as key determinants of health systems; culturally defined concepts of sickness, health, and healing; healing as social, as well as physiological, activity. Topics may include life stages, medical knowledge among different human groups, impact of culture contact on medical systems, ecological balance and population control, cultural definitions and treatment of abnormal behavior, healers, health and supernatural, social roles of sick, and illness and social control. (Taylor)

650. **Nationalism, Ethnicity and Violence.** Social and cultural analysis of ethnicity and nationalist ideologies particu-

larly where these have led to violent confrontations within modern nation-states. Considers primordialist versus constructionist theories of difference; the varying weight to be attributed to political, historical and cultural factors in the study of nationalism; and the politics of culture vs. the culture of politics. (Taylor)

653. **Primateology.** Biology, behavior, and distribution of living nonhuman primates with emphasis on field studies of old-world monkeys and apes. (Wheatley)

655. **Archaeology of Alabama.** Archaeology of Alabama.

664. **Political Anthropology.** The comparative analysis of political structures and process throughout the world, focusing especially on non-Western forms; a survey of anthropological attempts to understand the complex interplay of culture and power in human societies. (McKenna)

669. **Surviving Development: The Case of Mexico.** Comparative and historical analysis of rural Mexican communities, emphasizing the impact of recent NAFTA-related economic policies and democratic political reforms. (Kyle)

675. **Human Adaptability.** Introduction to study of how humans adapt to their physical, biological, and social environment. Reviews ecological, demographic, nutritional, physiological and health-related concepts and considers applications to case studies. (Wheatley)

691. **Special Problems in Cultural Anthropology.** Supervised study of specified topic area; defined problem explored in depth. Topics determined by student and instructor interest in cultural anthropology. 2-6 hours.

692. **Special Problems in Archaeology.** Supervised study of specified topic area; defined problem explored in depth. Topics determined by student and instructor interest in archaeology. 2-6 hours.

693. **Special Problems in Linguistics.** Supervised study of specified topic area; defined problem explored in depth. Topics determined by student and instructor interest in linguistics. 2-6 hours.

694. **Special Problems in Physical Anthropology.** Supervised study of specified topic area; defined problem explored in depth. Topics determined by student and instructor interest in special topics in physical anthropology. 2-6 hours.

699. **Thesis Research.** Independent development of research project. Prerequisite: Admission to candidacy. 1-3 hours.

Art History (M.A.)

Graduate program director: *McIver*

UAB Faculty

Jessica Dallow, Assistant Professor (Art History); American Art; Nineteenth- and Twentieth-Century and Contemporary

Katherine McIver, Associate Professor (Art History); Renaissance Art, Baroque Art

Heather McPherson, Professor (Art History); Eighteenth-, Nineteenth- and Twentieth-Century and Contemporary Art

A program leading to the Master of Arts degree in art history is offered jointly by UAB and the University of Alabama (Tuscaloosa).

Tuscaloosa Faculty

Robert Mellown, Associate Professor (Art History); Nineteenth-Century American Art and Architecture

Mindy Nancarrow, Associate Professor (Art History); Baroque Art

Catherine Pagani, Associate Professor (Art History); Asian Art

Admission Requirements

Applicants may seek admission to either UAB or the University of Alabama (Tuscaloosa), but admission is upon recommendation of the joint art history faculty of the two institutions. For admission in good standing, applicants to UAB must meet Graduate School requirements for scholarship and GRE General Test scores. The applicant should have completed (with a B average) 24 semester hours in art history and related areas such as history, aesthetics, archaeology, and anthropology. With the concurrence of the joint faculty, this requirement may be reduced. It is desirable that an applicant be able to read a foreign language related to the proposed field of study. Students may apply for admission for either the fall or spring semester.

Degree Requirements

Courses

Students must complete 24 semester hours in art history; 6 of these hours may be taken in a related field with the concurrence of the joint faculty. Students must take courses in three of the following six general areas: Medieval Art, Renaissance Art, Baroque Art, Nineteenth-Century Art, Twentieth-Century Art, and Asian Art. A maximum of 3 semester hours of independent study will be permitted. Each student must take ARH 680 (Literature of Art). Each student must take at least 6 semester hours of coursework at the University of Alabama (Tuscaloosa).

Foreign Language Requirement

Each student must demonstrate a reading knowledge of French or German. This is tested by examination by the Department of Foreign Languages or by passing French 201 or 202 or German 201 or 202 with a grade of B or better. This requirement should be satisfied in or before the term in which the student has passed 15 semester hours of coursework. A reading knowledge of a second foreign language is strongly recommended.

Comprehensive Examination

For admission to candidacy, the student must pass a comprehensive examination prepared and graded by the joint art history faculty.

Thesis

The student must present a thesis under the direction of a member of the joint art history faculty. Each student will register for ARH 699 for 6 semester hours of credit.

Additional Information

For detailed information, contact Dr. Heather McPherson, Graduate Program Director, UAB Department of Art and Art History, Humanities Building, Room 113, 900 13th Street South, Birmingham, AL 35294-1260.

Telephone 205-934-4942

E-mail mciver@uab.edu

Course Descriptions

For courses at the University of Alabama (Tuscaloosa), see the graduate catalog of that university.

Unless otherwise noted, all courses are for 3 semester hours of credit. Course numbers preceded with an asterisk indicate courses that can be repeated for credit, with stated stipulations.

Art History (ARH)

A student may take any seminar twice for credit (see UAB Class Schedule for announcement of subjects). Prerequisite for admission to a seminar is permission of the instructor.

516. Gothic Architecture. Origins and development of Gothic style in architecture of Western Europe and British Isles.

519. Medieval Manuscript Painting. Hiberno Saxon to late Gothic, emphasizing function of image in books.

521. Renaissance Art in Italy: 1300-1490. Painting, sculpture, and architecture from major artistic centers of Siena, Florence, Venice, and Rome. (McIver)

522 Renaissance Art in Italy: 1490-1600. Painting, sculpture, and architecture from major artistic centers of Florence, Venice, Rome, and Milan. (McIver)

523. Study Abroad: Renaissance and Baroque Art in Italy: On-site study of architecture in Italy, 1300-1650. (McIver)

524. Renaissance Art in Northern Europe. Painting and sculpture in Holland, Belgium, France, and Germany, 1350-1550. (McIver)

530. Eighteenth-Century Art in Europe Visual culture in Eighteenth Century Britain and France including study of Eighteenth Century holdings in the Birmingham Museum of Art. (McPherson)

531. Northern Baroque Art. Painting and sculpture in Holland and Belgium, 1580-1700. (McIver)

535. Italian Baroque Art. Painting, sculpture, and architecture from major artistic centers of Rome, Florence, and Venice, 1500-1700. (McIver)

540. Nineteenth-Century Art I: Neoclassicism, Romanticism, and Realism. Painting, sculpture, and architecture in Europe, emphasizing France, 1860-1900. (McPherson)

541. Nineteenth-Century Art II: Impressionism, Post-Impressionism, and Symbolism. (McPherson)

560. Twentieth-Century Art to 1945. Painting, sculpture, and architecture in Europe and the United States, 1900-1945. (McPherson, Dallow)

564. Art Since 1945. Painting, sculpture, and architecture, primarily in the United States, 1945 to the present. (McPherson, Dallow)

567. Modern Architecture. Chiefly twentieth century, emphasizing the United States.

569. Architecture of Birmingham. Architectural history from founding in 1871 in relation to American architecture. Physical study of buildings and local archival research.

573. Japanese Prints and Printmakers. History of Japanese wood-block prints and printmakers, 17th-20th centuries.

574. Chinese Painting. Painting and painting theory through the eighteenth century.

575. Japanese Art. Art and culture of Neolithic era through 19th century.

576. **Oriental Ceramics.** History and connoisseurship of ceramics of China, Korea, and Japan using originals in Birmingham Museum of Art.

580. **Art Criticism.** Critical theory and contemporary issues focusing on art from 1960s to present. (McPherson, Dal-low)

*582. **Great Masters.** Lives and works of selected outstanding artists. May be repeated if focus is different.

585. **Museum Studies.** Museum operation; organization and preparation of exhibitions; cataloging objects in collection; experience with UAB Visual Arts Gallery and Birmingham Museum of Art.

*590. **Seminar Art History:** May be repeated if focus is different.

610. **Seminar:** Medieval Art.

620. **Seminar:** Renaissance Art. (McIver)

630. **Seminar:** Baroque and Rococo Art. (McPherson, McIver)

640. **Seminar:** Nineteenth-Century Art. (McPherson, Dal-low)

660. **Seminar:** Twentieth-Century Art. (McPherson, Dal-low)

670. **Seminar:** Asian Art.

680. **Literature of Art.** Principles and methodology of literature of art as described in writing of founders and chief makers; bibliographical research methods and mastery. (McPherson, McIver)

698. **Independent Study.**

*699. **Thesis Research.** Prerequisite: Admission to candidacy. 3 or 6 hours.

Art Studio

Although UAB does not offer a graduate degree in studio art, courses in this area are available to interested graduate students. For additional information, contact Janice Kluge, Interim Chair, UAB Department of Art and Art History, Humanities Building, Room 113, 900 13th Street South, Birmingham, AL 35294-1260 (telephone 205-934-4941).

Faculty

James R. Alexander, Professor (Art); Sculpture, Ceramic Sculpture

Bert Brouwer, Professor (Art); Painting, Drawing

Gary Chapman, Associate Professor (Art); Painting, Drawing

Derek Cracco, Assistant Professor (Art); Printmaking

Janice Kluge, Professor (Art); Drawing, Sculpture

Sonja O. Rieger, Professor (Art); Photography, Drawing

Marie Weaver, Associate Professor (Art); Graphic Design, Two-Dimensional Design

Erin Wright, Associate Professor (Art); Graphic Design

Biochemistry (Ph.D.)

Graduate program director: *Horabin*

Faculty

G. M. Anantharamaiah, Professor (Medicine); Apolipoprotein Structure and Function

John R. Baker, Professor Emeritus (Biochemistry and Molecular Genetics); Structural Functions of Connective Proteoglycans

Stephen Barnes, Professor (Pharmacology); Hormonal Regulation of Hepatic Bile Salts Sulfation

Scott Blume, Research Instructor (Medicine/Hematology Oncology); 5'-Untranslated RNA and Cell Proliferation/Survival

Thomas R. Broker, Professor (Biochemistry and Molecular Genetics); Human Papillomavirus, Transcription Regulation, DNA Triplexes, Epithelial Cells

Christie G. Brouillette, Research Associate Professor (Optometry); Mutagenesis, Protein Folding and Interactions, Membrane Protein Structure

Debasish Chattopadhyay, Assistant Professor (Medicine/Geographic); Nucleic Acid Related Enzymes

Herbert C. Cheung, Professor (Biochemistry and Molecular Genetics); Mechanism of Contraction, Fluorescence Spectroscopy, Proteins

Louise T. Chow, Professor (Biochemistry and Molecular Genetics); Human Papillomavirus, Genetics, Keratinocytes, DNA Replication, Electron Microscopy

Lawrence J. DeLucas, Professor (Optometry); Protein Crystal Growth

Peter J. Detloff, Associate Professor (Biochemistry and Molecular Genetics); Mouse Models of Human Genetic Diseases

Peter Emanuel, Associate Professor (Medicine/Hematology Oncology); Abnormal Signal Transduction in Leukemia Cells

Gabriel A. Elgavish, Professor (Biochemistry and Molecular Genetics); Paramagnetic Probes for NMR Investigation of Membrane Transport

Jeffrey A. Engler, Professor (Biochemistry and Molecular Genetics); Gene Cloning, DNA Sequencing, Virology

Bruce A. Freeman, Professor (Anesthesiology); Biochemical and Pharmacological Studies of Basic Metabolic, Toxic, and Disease States

Stephen L. Hajduk, Professor (Biochemistry and Molecular Genetics); Molecular Parasitology, Mitochondrial Biogenesis, Eukaryotic Gene Expression

Stephen C. Harvey, Professor (Biochemistry and Molecular Genetics); Dynamic Aspects of Macromolecular Structure and Computer Simulation of Intramolecular Motions

N. Patrick Higgins, Professor (Biochemistry and Molecular Genetics); DNA Topology, Genetic Transposition, DNA Enzymology

Jamila I. Horabin, Assistant Professor (Biochemistry and Molecular Genetics); Drosophila Sex Determination

Christopher A. Klug, Assistant Professor (Microbiology); Hematopoietic Stem Cell Development

N. Rama Krishna, Professor (Biochemistry and Molecular Genetics); NMR of Biomolecules, Molecular Endocrinology of Peptide Hormones

Ming Luo, Associate Professor (Microbiology); Viral Protein Structure

William A. May, Assistant Professor (Pediatrics); Oncogenic Mechanisms Resulting from the T(11:22) Chromosomal Translocation Seen in Ewing's Sarcoma and Neuroepithelioma

Richard Mayne, Professor (Cell Biology); Structure and Function of Extracellular Matrices, Biosynthesis and Structure of Collagens

Edward J. Miller, Professor Emeritus (Biochemistry and Molecular Genetics); Structure and Biosynthesis of the Animal Tissue Collagens

Sthanam Narayana, Assistant Professor (Optometry); Structure-Based Inhibitor Design for Human Complement-Activating Serine Proteases

Peter E. Prevelige, Jr., Assistant Professor (Microbiology); Viral Capsid Self-Assembly: Defining the Underlying Subunit-Subunit Interactions and Their Potential as Therapeutic Targets

Charles W. Prince, Professor (Nutrition Sciences); Bone Metabolism; Osteopontin Structure, Function and Regulation of Expression; Orthopedic/Dental Implant Biocompatibility

David G. Pritchard, Professor (Biochemistry and Molecular Genetics); Molecular Basis for the Pathogenicity of Gram-Positive Bacteria

Kenneth M. Pruitt, Professor Emeritus (Biochemistry and Molecular Genetics); Chemistry of Non-Immunoglobulin Defense Mechanisms

Lennart Roden, Professor (Biochemistry and Molecular Genetics); Structure, Biosynthesis, and Catabolism of Connective Tissue Polysaccharides

J. Michael Ruppert, Assistant Professor (Medicine); Oncogenes and Tumor Suppressor Genes Involved in Carcinoma of the Breast

Susan M. Lobo Ruppert, Assistant Professor (Biochemistry and Molecular Genetics); Fundamental Mechanisms of Transcription

Jere P. Segrest, Professor (Pathology); Plasma Lipoprotein Structure and Function

Theresa V. Strong, Assistant Professor (Medicine); Gene Therapy for Cancer and Inherited Disease

Kenneth B. Taylor, Professor Emeritus (Biochemistry and Molecular Genetics); Fermentation Technology

J. Anthony Thompson, Associate Professor (Surgery); Regulation of Eukaryotic Gene Expression

Tim M. Townes, Professor and Chair (Biochemistry and Molecular Genetics); Regulation of Gene Expression During Development

Patrick K. Umeda, Associate Professor (Medicine); Regulation of Contractile Protein Gene Expression

Mark R. Walter, Assistant Professor (Pharmacology); X-ray Crystallography; Molecular Recognition; Signal Transduction; Cytokine Structure and Function

Objective of the Graduate Program

The biochemistry graduate program's primary objective is to provide high-quality, multidisciplinary training leading to the Ph.D. degree. Students who complete this program are expected to make significant future contributions in research in the basic biomedical sciences and to teach future generations of competent and productive research scientists.

The program consists of a core curriculum that emphasizes (a) the multidisciplinary and quantitative aspects of modern biomedical sciences; (b) a diversity of laboratory research training experiences; and (c) the development of skills in reading, writing, and speaking. Advanced students take courses and tutorials in specialized areas of interest, participate in seminars, and have opportunities to gain teaching experience while satisfying other requirements for their doctoral programs.

Areas of specialization for Ph.D. dissertation research include general and intermediary metabolism; molecular biology; virology; medical genetics; physical biochemistry; endocrinology; biosynthesis, structure, and assembly of biological macromolecules, membranes, and organelles; developmental and molecular cell biology; host-parasite relationships and host defense; X-ray crystallography of proteins and nucleic acids; and connective tissue biochemistry.

Admission Requirements and Financial Aid

There are two avenues for entry into graduate study in the Department of Biochemistry and Molecular Genetics. The department participates in the multidisciplinary Cellular and Molecular Biology (CMB) Program, which is designed to provide a first-year curriculum to graduate students interested in the broad area of cellular and molecular biology. At the end of the first year, each CMB student chooses a mentor and elects to pursue a degree in biochemistry, in cell biology, in microbiology or in neurobiology. Alternatively, prospective students with a specific interest in biochemistry may choose to apply directly to faculty in the Department of Biochemistry and Molecular Genetics for admission to graduate study. The first-year curriculum provides students with a comprehensive experience in biochemistry, cell biology, microbiology, neurobiology, virology, and immunology.

The CMB admissions committee considers applications for admission to the Ph.D. program from prospective graduate students who present evidence of superior scholarship and who have completed courses in general, organic, and physical chemistry; mathematics, including calculus; and physics. Completion of courses in biology, including genetics and biochemistry, is also recommended. Students with M.S., M.D., D.D.S., and D.V.M. degrees are also encouraged to apply.

Admission criteria for the Ph.D. program are those of the Graduate School, plus a personal interview. Students accepted into the program during the last several years have had an average score of greater than 600 on the quantitative section of the GRE General Test and 1,200 on the combined verbal and quantitative sections. These students also have had average undergraduate GPAs of at least 3.0 on a 4.0 scale. All students accepted into the program are provided fellowships or traineeships. Fellows and trainees are required to undertake full-time studies and are not permitted to do any other remunerative work. Financial support will be continued for up to five years, provided that the student's performance is satisfactory. During the 2002-2003 academic year, entering students will be provided with stipends of over \$18,000 per year, single health coverage, and funds for tuition and fees. These amounts are reviewed yearly.

Additional Information

For detailed information, contact Dr. Jamila I. Horabin, Graduate Program Director, UAB Department of Biochemistry and Molecular Genetics, MCLM 558, 1918 University Blvd., Birmingham, Alabama 35294-0005.

Telephone 205-975-8156

E-mail jhorabin@uab.edu

Web www.uab.edu/biochem

Course Descriptions

Courses are for three semester hours of credit unless otherwise noted.

Cellular and Molecular Biology (CMB)

Request CMB information for complete course descriptions.

700. **Cellular and Molecular Biology I.** Biomolecules. 5 hours.

701. **Cellular and Molecular Biology II.** Genetics. 5 hours.

702. **Cellular and Molecular Biology III.** Cells. 5 hours.

703. **Cellular and Molecular Biology IV.** Signaling. 5 hours.

704. **Cellular and Molecular Biology V.** Virology and Immunology. 5 hours.

721-723. **Laboratory Research.** One quarter in each of three laboratories conducting research; 15-minute oral presentation on accomplishments each quarter. 5 hours each.

790-792. **Introduction to Seminar.** Skills necessary for reading and analysis of scientific literature and for giving oral presentations. 1 hour each.

Biochemistry and Molecular Genetics (BMG)

725-727. **Seminar.** 1 hour each.

731. **Advanced Eukaryotic Molecular Genetics.** The fundamentals of genetic principles and their application to model systems. Fall. (Horabin, Detloff, Ruppert)

734. **Protein Structure.** Emphasis on structural results derived from X-ray crystallographic analyses. Prerequisite: CMB 700:701 and permission of instructor. Spring. (DeLucas)

741. **Advanced Molecular Genetics.** Mechanisms of gene regulation and rearrangement in bacteria, yeast, and higher eukaryotes. Prerequisite: CMB 700-701 and permission of instructor. Fall. (Higgins)

742. **Biophysical Aspects of Molecular Structure and Function.** Major modern biophysical methods used in the elucidation of the structure-function relationship of biologically important macromolecules. Prerequisite: CMB 700-701 and permission of instructor. Fall. (Elgavish)

744. **Protein Spectrometry.** Prerequisite: Permission of instructor. Spring. (Barnes)

751. **Advanced Virology.** Advanced studies of selected aspects of virology. Prerequisite: CMB 702 or permission of the instructor. (Broker, Chow)

753. **Protein Crystallography.** Theoretical and experimental aspects of protein crystallography. Applications of X-ray diffraction techniques to studying three-dimensional structures of proteins. Prerequisite: CMB 700-701 or permission of instructor. (Narayana)

757. **Physical Biochemistry.** Physical methods for investigating structures of biological molecules. Prerequisite: Calculus and physical chemistry and permission of instructor. Spring. (Cheung)

758. **Structure of Nucleic Acids.** Fall. (Harvey)

759. **Macromolecular Modeling.** Basic principles of molecular modeling, hands-on experience in the use of at least one widely used commercial modeling package, and the strengths and limitations of modeling methodology. Prerequisite: Permission of instructor. Fall. (Harvey)

760. **Nuclear Magnetic Resonance.** Fall. (Krishna)

761. **Advanced Eukaryotic Molecular Biology.** (Townes)

762. **Human Biochemistry and Genetics.** General mammalian biochemistry for medical students and graduate students only. Prerequisite: Permission of instructor. Fall. 7 hours. (Engler)

771. **Dental Biochemistry.** Survey of human biochemistry, emphasis on areas of interest to dentists. Prerequisite: Permission of instructor. Fall. 9 hours. (E. Miller)

775. **Special Topics in Biochemistry.** 2 hours.

776-780. **Special Topics in Biochemistry.** 1-5 hours.

781-785. **Advanced Special Topics.** 1-5 hours.

786. **Journal Club in Free Radicals and Biology Oxidations.** 1 hour. (Freeman)

787A. **RNA Journal Club in Molecular Structure.** 1 hour. (Harvey)

787B. **Lipoprotein Journal Club.** 1 hour. (Harvey)

789. **Journal Club in Biological Crystallography.** 1 hour. (Walters)

790. **Journal Club in Developmental Biology.** 1 hour. (Mayne)

791. **Journal Club in Gene Therapy.** 1 hour. (Strong)

792. **Journal Club in Physical Biochemistry.** 1 hour. (Cheung)

795. **Journal Club in Molecular Biology.** 1 hour. (Higgins)

796. **Journal Club in Advanced Eukaryotic Molecular Biology.** 1 hour. (Townes)

798. **Doctoral-Level Nondissertation Research.** 1-14 hours.

799. **Doctoral-Level Dissertation Research.** Prerequisite: Admission to candidacy. 1-14 hours.

Biology (Ph.D., M.S.)

Graduate program director: *Watts*

Faculty

Charles D. Amsler, Associate Professor (Biology); Ecophysiology and Chemical Interactions

Robert A. Angus, Professor (Biology); Population Biology, Genetics of Fish, Environmental Biology

Richard B. Aronson, Adjunct Professor (DISL); Marine Communities and Dynamics

Samuel B. Barker, Professor Emeritus (Physiology & Biophysics); Endocrinology, Metabolism

Asim K. Bej, Associate Professor (Biology); Microbial Ecology, Molecular Genetics

Larry R. Boots, Adjunct Professor; Reproductive Endocrinology

George F. Crozier, Jr., Adjunct Professor (Biology); Physiology and Biochemistry of Marine Organisms

Jeannette E. Doeller, Research Associate Professor (Biology); Ecophysiology of Invertebrates

Joseph J. Gauthier, Associate Professor (Biology); Applied and Environmental Microbiology

Vithal K. Ghanta, Professor (Biology); Tumor Immunology, Aging and Immune System

Thomas S. Hopkins, Adjunct Professor (Biology); Marine Biology

David T. Jenkins, Associate Professor (Biology); Taxonomy, Nomenclature, and Cultural Studies of Basidiomycetes

Daniel D. Jones, Professor Emeritus (Biology); Microbial Ecology, Plant Physiology

David W. Kraus, Associate Professor (Biology); Comparative Invertebrate Physiology

Ken R. Marion, Professor (Biology); Population Dynamics, Reproductive Cycles, Environmental Cues for Reproduction

James B. McClintock, Professor (Biology); Invertebrate Reproduction, Ecology

Timothy R. Nagy, Associate Professor (Nutrition Sciences); Ecophysiology, Energetics, and Body Composition

W. Ann Reynolds, University Past-President, Professor (Biology); Diabetes, Primates, and Pregnancy

Robert W. Thacker, Assistant Professor (Biology); Community and Behavioral Ecology, Molecular Systematics

Trygve Tollefsbol, Assistant Professor (Biology); Developmental Biology and Molecular Biology of DNA Methylation

R. Douglas Watson, Professor (Biology); Endocrinology, Neuroendocrinology, Insect Development

Stephen A. Watts, Professor (Biology); Endocrinology, Physiology and Growth of Aquatic Organisms; Aquaculture

Jeffrey D. Wells, Assistant Professor (Justice Sciences); Forensic and Medical Entomology

Thane Wibbels, Associate Professor (Biology); Comparative Reproductive Physiology of Vertebrates

Program Information

Areas of Specialization

Graduate students in the M.S. and Ph.D. programs in biology may specialize in research activities at all levels of biological organization, with emphases on ecophysiology, cellular and molecular biology, endocrinology, and ecology of aquatic organisms, or on models related to human disease.

Admission

For admission in good standing, applicants must meet the following requirements, in addition to the Graduate School's standards: an undergraduate degree in a biological science, B-level scholarship in all biology courses, two semesters of organic chemistry, two semesters of physics, mathematics through calculus, and minimum combined verbal and quantitative score of 1150 on the GRE General Test, and a personal statement of career goals. The graduate program director in biology must approve admission on probation or with deficiencies in one of the above requirements. Three letters of evaluation from individuals who have a thorough knowledge of the applicant's academic abilities and potential are also required. Students may enter at the beginning of any semester.

Coursework, Thesis, and Dissertation

A dissertation embodying the results and analysis of an original experimental investigation is required for Ph.D. candidates. Students in the M.S. program may write a thesis based on a research project (Plan I) or, alternatively, may elect to submit a nonresearch project incorporating a review and analysis of one or more topics of current or historical interest in biology (Plan II).

Since scientific problems encountered today are multifaceted and require multidisciplinary approaches, students are expected to acquire a broad background in the physical and life sciences. Doctoral students must complete formal course work in or have equivalent training related to six of the following seven areas: ecology, physiology, cell biology, developmental biology, genetics, microbiology, and molecular biology. Master's students must have competency in five of these life-science areas. Each student is also expected to satis-

factorily complete a course or sequence in biometry and any advanced courses designated by the student's graduate study committee consistent with the chosen area of specialization.

Each student must also enroll in three seminar courses approved by his or her graduate study committee, and one of the seminars must be outside the student's primary area of specialization. Also, each student is required to demonstrate proficiency in teaching by delivering formal course lectures or by conducting instructional laboratories.

Examinations

To qualify for candidacy, a student in the master's program must satisfactorily complete either a written or an oral comprehensive examination. A doctoral student must take both written and oral comprehensive examinations. As part of a student's final defense of his or her dissertation, thesis or comprehensive review paper (Plan II), a public departmental seminar must be presented.

Class A Teaching Certification

Under the Alabama Department of Education's "Strengthened Subject Matter Option," students who complete requirements for the master's degree in biology can also receive class A teaching certification, providing that certain prerequisites and requirements are met. Complete details are available from the School of Education Certification Office, EB 100, 1530 3rd Avenue South, Birmingham, Alabama 35294-1250 (Telephone 205-934-5423).

Additional Information & Mailing Address

For detailed information contact Dr. Stephen A. Watts, Graduate Program Director, UAB Department of Biology, CH 375, 1530 3rd Avenue South, Birmingham, Alabama 35294-1170.

Telephone 205-934-8308

Fax 205.975.6097

E-mail sawatts@uab.edu,

Web www.uab.edu/uabbio

Physical Address

UAB Department of Biology, Campbell Hall, Room 109, 1300 University Blvd., Birmingham, Alabama 35294-1170

Course Descriptions

Unless otherwise noted, all courses are for 3 semester hours of credit. Course numbers preceded with an asterisk indicate courses that can be repeated for credit, with stated stipulations.

Biology (BY)

501. **Advanced Biology for Teachers I.** Basic genetic principles; recent research developments. Prerequisite: Permission of instructor.

502. **Advanced Biology for Teachers II.** Provides understanding of human structural and functional relationships essential in modern biology. Corequisite: BY 503.

503. **Advanced Biology for Teachers III.** Laboratory supplementing lecture (BY 502) through use of human specimens, models, and demonstrations. Corequisite: BY 502. 1 hour.

507. **Microbial Ecology.** Microorganisms in nature; interactions with each other and with environment. Independent project required. Prerequisite: BY 271.

511. **Molecular Genetics.** Prokaryotic and eukaryotic gene structure and function. Prerequisites: BY 271 and 330, and CH 232. Independent project required.

520. **General Endocrinology.** Principles of chemical communication in animals. Use of invertebrate and vertebrate systems. Prerequisite: BY 309 or permission of instructor.

531. **Advanced Recombinant DNA Technology.** Manipulation of genes and their regulations, and techniques used in recombinant DNA technology. Independent project required. Prerequisites: BY 311 and 330, and CH 233 and 461. Lectures and laboratories.

535. **Natural History of the Vertebrates.** Adaptations of vertebrates for survival in particular environments. Survey and classification of local vertebrates. Two lectures, one laboratory or field trip per week. Independent project required. 4 hours.

540. **Biology and Aging.** Current understanding of aging, measuring aging changes, theories of aging and aging changes in various human systems. Prerequisite: BY 103 or permission of instructor.

552. **Field Botany.** Principles and techniques of plant identification and classification; consideration of phylogenetic systems. Lecture and field trips. Independent project required. 4 hours.

560. **Advanced Invertebrate Zoology.** Selected topics. Lecture and student projects. Prerequisite: BY 255 or permission of instructor.

565. **Limnology.** Biology of freshwater and estuarine organisms. Lecture, laboratory, and field trips. Prerequisites: BY 104 and 370 or permission of instructor. 4 hours.

567. **Tropical Ecology.** An overview of the major tropical ecotypes with emphasis on ecology of terrestrial, aquatic, and marine tropical organisms. Prerequisite: BY 255 or 370 or permission of instructor. Major portion of course taught at a tropical field station in the Caribbean. Lectures, laboratory, and field trips. Library research paper required.

569. **Rain Forest Ecology.** Overview of physical and environmental factors that structure the rainforest, biodiversity of life, and interactions of its organisms. A survey of prominent biota will be conducted. Prerequisites: BY 255 or 256 or 370 and permission of instructor. Major portion of course taught in Costa Rica. Lectures and field trips. Library research paper required.

570. **Ecology.** Ecosystems and population biology. Lectures, laboratories, and field trips. Independent project required. Prerequisite: BY 255 or 256.

571. **Biochemical Adaptations to Environment.** Examination of physiological and biochemical adaptations of organisms to physical environment. Prerequisites: BY 309 and 330 and CH 460, or permission of instructor.

*595. **Special Topics in Biology I.** Lecture, laboratory, or both. 1-2 hours.

*596. **Special Topics in Biology II.** Lecture, laboratory, or both. 1-2 hours.

605. **Microbial Physiology.** Microbial structure and function, growth, metabolism, and regulation of cellular activity. Independent project required. Prerequisites: BY 271 and 3 semester hours of organic chemistry.

607. **Microbial Ecology.** Microorganisms in nature; interactions with each other and with the environment. Independent project required. Prerequisite: BY 271.

610. **Comparative Animal Physiology.** Special physical and chemical processes occurring at cell tissue, and organ le-

vels. Independent projects required. Prerequisite: BY 309 or permission of instructor.

616. **Cellular Physiology.** Structure and function of cells and their components at the molecular level. Laboratory experience using modern equipment and biochemical methods. Independent project required. Prerequisites: BY 309 or 330 and CH 232. 4 hours.

619. **Reproductive Physiology.** Comparative reproductive physiology in animals with emphasis on mammals. Independent project required. Prerequisites: BY 256 and 3 semester hours of organic chemistry.

628. **Biology Laboratory Teaching Techniques.** Student will assist in instruction of an introductory biology laboratory. Responsibilities will also include preparation of quizzes and practicals and designing and conducting an instructional laboratory exercise. Prerequisites: Permission of instructor.

633. **Advanced Molecular Genetics.** Examination of the molecular genetics of eukaryotic organisms, including genomes, nucleosomes, chromosomes, transcription, splicing, transposition and signal transduction. The role of molecular biology in immune diversity and cell growth will also be studied. Prerequisites: BY 311 and 431.

640. **Immunology.** Immune system and functions of host humoral and cellular immune responses. Mechanisms of antigen and antibody reactions and basic immunological methods. Independent project required. Prerequisites: BY 271, BY 330, and CH 231.

642. **Experimental Phycology.** Introduction to algae. Experimental approaches to productivity. Algae as model systems. Independent project required. Prerequisites: BY 104 and either BY 330, BY 450, and CH 462, or permission of instructor. Lecture and laboratory. 4 hours.

646. **Techniques in Biological Research I.** Concepts and practical application of techniques pertinent to biological research. Prerequisites: Permission of instructor. Lecture and laboratory.

648. **Psychoneuroimmunology.** Explores communication between neuroendocrine and immune systems. Prerequisite: Permission of instructor. 3 hours

652. **Field Botany for Teachers.** Principles and techniques of plant identification and classification; consideration of phylogenetic systems. Lectures and field trips. Independent project required. Prerequisite: BY 260 or permission of instructor. 4 hours.

653. **Mycology.** Fungi, including morphology, development, physiology, taxonomy, and phylogeny. Independent project required. Prerequisites: BY 260 or 271 and 3 semester hours of organic chemistry. Lecture and laboratory. Offered at irregular intervals. 4 hours.

662. **Introductory Neurobiology.** Introduction to biological basis of nervous system function. Comparative approach applying molecular, cellular, and systems' concepts to nervous system function is used to examine electrical and chemical signaling, neural circuitry, and cellular basis of behavior and neural development. Independent project required. Prerequisites: BY 309, CH 231, and PH 101.

665. **Limnology.** Introduction to ecology of inland waters and estuaries. Lectures and field trips. Prerequisite: BY 255 or 256. 4 hours.

671. **Biochemical Adaptations to Environment.** Examination of physiological and biochemical adaptations of organ-

isms to physical environment. Prerequisites: BY 309 and 330 and CH 460, or permission of instructor.

675. Mammalian Embryology. Examination of control mechanisms of embryonic development at molecular level and differentiation from fertilization through gestation. Mechanisms of abnormal embryonic development. Prerequisite: BY 314.

***681. Seminar in Physiological Ecology.** Current research. 1 hour.

***682. Seminar in Immunology.** Current research. 1 hour.

***683. Seminar in Physiology.** Current research. 1 hour.

***684. Seminar in Microbial Ecology.** Current research. 1 hour.

***685. Seminar in Cell Biology.** Current research. 1 hour.

***686. Seminar in Mammalian Development.** Current research. 1 hour.

***687. Seminar in Endocrinology.** Current research. 1 hour.

***688. Seminar in Algal Ecophysiology.** Current research in specific areas. 1 hour.

***689. Seminar in Genetics.** Current research. 1 hour.

***690. Seminar in Cellular Physiology.** Current research in specific areas. 1 hour.

***691. Seminar in Botany.** Current research developments. 1 hour.

***692. Seminar in Ecology.** Current research. 1 hour.

***693. Seminar in Embryology.** Current research. 1 hour.

***694. Seminar in Microbiology.** Current research in microbial ecology and microbial physiology. 1 hour.

***695. Special Topics in Biology I.** Lecture, laboratory, or both. 1-2 hours.

***696. Special Topics in Biology II.** Lecture, laboratory, or both. 1-2 hours.

***697. Investigative Techniques.** Application of modern experimental techniques in solving research problems. 1-2 hours.

***698. Nonthesis Research.** 1-10 hours.

***699. Thesis Research.** Prerequisite: Admission to candidacy. Pass/Fail. 1-10 hours.

746. Techniques in Biological Research I. Concepts and practical application of techniques pertinent to biological research. Prerequisites: Permission of instructor. Lecture and laboratory.

771. Biochemical Adaptations to Environment. Examination of physiological and biochemical adaptations of organisms to physical environment. Independent project required. Prerequisites: BY 309 and 330, and CH 461, or permission of instructor.

***781. Seminar in Physiological Ecology.** Current research. 1 hour.

***782. Seminar in Immunology.** Current research. 1 hour.

***783. Seminar in Physiology.** Current research. 1 hour.

***784. Seminar in Microbial Ecology.** Current research. 1 hour.

***785. Seminar in Cell Biology.** Current research. 1 hour.

***786. Seminar in Mammalian Development.** Current research. 1 hour.

***787. Seminar in Endocrinology.** Current research. 1 hour.

***788. Seminar in Algal Ecophysiology.** Current research in specific areas. 1 hour.

***789. Seminar in Genetics.** Current research. 1 hour.

***790. Seminar in Cellular Physiology.** Current research in specific areas. 1 hour.

***791. Seminar in Botany.** Current research developments. 1 hour.

***792. Seminar in Ecology.** Current research. 1 hour.

***793. Seminar in Embryology.** Current research. 1 hour.

***794. Seminar in Microbiology.** Current research in microbial ecology and microbial physiology. 1 hour.

***795. Special Topics in Biology I.** Lecture, laboratory, or both. 1-2 hours.

***796. Special Topics in Biology II.** Lecture, Laboratory, or both. 1-2 hours.

***797. Investigative Techniques.** Application of modern experimental techniques in solving research problems. 1-2 hours.

***798. Nondissertation Research.** 1-10 hours.

***799. Dissertation Research.** Prerequisite: Admission to candidacy. Pass/Fail. 1-10 hours.

Marine Science (MESC)

In addition to the course offerings listed below, certain courses given through the Marine Environmental Sciences Consortium at Dauphin Island, Alabama, may be taken for graduate credit. For detailed information, contact Dr. Ken R. Marion, Department of Biology, Campbell Hall, Room 173, 1300 University Boulevard, Birmingham, Alabama 35294-1170.

Telephone 205-934-3582

E-mail kmarion@uab.edu

611. Marsh Ecology. Habitat analysis, natural history studies, and population dynamics of selected marsh organisms. Lecture, laboratory, and fieldwork. 4 hours.

612. Marine Ecology. Bioenergetics, community structure, population dynamics, predation, completion, and speciation in marine ecosystems. Lecture, laboratory, and fieldwork. 4 hours.

614. Advanced Marine Ecology. Mechanisms controlling the distribution of marine organisms. Major concepts in marine ecological theory. 2 hours.

615. Coastal Ornithology. Coastal and pelagic birds, with emphasis on ecology, taxonomy, and distribution. Lecture, laboratory and field trips. 4 hours.

618. Benthic Ecology. Factors controlling life cycles of marine benthic organisms and organization of their communities. 2 hours.

619. Marine Microbial Ecology. Survey of the types of microorganisms found in the marine environment and their interactions with each other and their environment. Lecture and laboratory.

620. Coastal Ecosystems Dynamics. Investigation of the structure and function of a variety of coastal ecosystems and evaluation of energy and nutrient processing in disparate ecosystems. 2 hours.

621. Marine Plankton. Taxonomy and biology of marine phytoplankton, bacterioplankton and zooplankton. Lecture and laboratory.

622. Chemical Oceanography. An in-depth examination of the chemistry of seawater and its relationship with biological, geological and physical processes in the oceans.

623. Geological Oceanography. Historic and current consequences of both geophysical and classic geological processes as they relate to the marine environment. Tectonic

theory, sedimentary processes, stratigraphy, micropaleontology, erosion, and the formation of hydrocarbons. Lecture and laboratory.

625. **Physical Oceanography.** Physical properties of the world's oceans. Waves, tides, circulations, fluctuations, and interactions of the sea with the atmosphere and landmasses.

626. **Biological Oceanography.** Chemical, physical, and geological patterns and processes important in the interaction of organisms and the sea.

627. **Fisheries Oceanography.** Examination of the relationships between fish life history, recruitment dynamics and harvest potential, and local-, meso-, and global-scale oceanography processes. 2 hours.

629. **Fisheries Techniques.** Current biological and technological methodologies for studying fishes and aquatic habitats, with emphasis on study design and integration across subdisciplines.

630. **Marine Biogeochemical Processes.** Understanding how biogeochemical processes regulate ecosystem function in the marine environment. 2 hours.

631. **Sediment Biogeochemistry.** Sediment biogeochemical processes and their effects on nutrient cycles, plant production, and animal distribution. Lecture and laboratory.

632. **Ocean Variability and Global Change.** Examination of large-scale, spatial and temporal variability in the earth/ocean system. 2 hours.

633. **Marine Biogeography and Paleobiology.** Overview of the time course of evolutionary changes in marine ecosystems and the role of historical factors influencing the distribution of marine organisms. Lecture and field trip.

634. **Marine Resource Management.** Management of marine resources, development of legislation, and impacts of management on human resources. 2 hours.

635. **Marine Analytical Instrumentation.** Overview of the major analytical tools available to marine scientists. Lecture and laboratory.

636. **Oceanographic Experiences.** Participation in an oceanographic research cruise. Research project report. 1-3 hours.

670. **Field Marine Science.** Two-week field exercise at selected sites along the Gulf of Mexico and Atlantic shoreline of North America. Pretrip lectures and readings. 2 hours.

692. **Seagrass Ecosystem Ecology.** Ecology of seagrass systems of estuarine environments. 2 hours.

693. **Seminar in Marine Science.** Current research. 1 hour.

694. **Directed Studies on Marine Topics.** Research on marine topics. 1-6 hours.

696. **Special Topics in Marine Science.** Lecture, laboratory, or both. 1-6 hours.

714. **Advanced Marine Ecology.** Mechanisms controlling the distribution of marine organisms. Major concepts in marine ecological theory. 2 hours.

718. **Benthic Ecology.** Factors controlling life cycles of marine benthic organisms and organization of their communities. 2 hours.

719. **Marine Microbial Ecology.** Summary of the types of micro-organisms found in the marine environment and their interactions with each other and their environment. Lecture and laboratory.

720. **Coastal Ecosystems Dynamics.** Investigation of the structure and function of a variety of coastal ecosystems and

evaluation of energy and nutrient processing in disparate ecosystems. 2 hours.

721. **Marine Plankton.** Taxonomy and biology of marine phytoplankton, bacterioplankton and zooplankton. Lecture and laboratory.

722. **Chemical Oceanography.** An in-depth examination of the chemistry of seawater and its relationship with biological, geological and physical processes in the oceans.

723. **Geological Oceanography.** Historic and current consequences of both geophysical and classic geological processes as they relate to the marine environment. Tectonic theory, sedimentary processes, stratigraphy, micropaleontology, erosion, and the formation of hydrocarbons. Lecture and laboratory.

725. **Physical Oceanography.** Physical properties of the world's oceans. Waves, tides, circulations, fluctuations and interactions of the sea with the atmosphere and landmasses.

726. **Biological Oceanography.** Chemical, physical and geological patterns and processes important in the interaction of organisms and the sea.

727. **Fisheries Oceanography.** Examination of the relationships between fish life history, recruitment dynamics and harvest potential and local-, meso-, and global-scale oceanographic processes. 2 hours.

729. **Fisheries Techniques.** Current biological and technological methodologies for studying fishes and aquatic habitats, with emphasis on study design and integration across subdisciplines.

730. **Marine Biogeochemical Processes.** Understanding how biogeochemical processes regulate ecosystem function in the marine environment. 2 hours.

731. **Sediment Biogeochemistry.** Sediment biogeochemical processes and their effects on nutrient cycles, plant production and animal distribution. Lecture and laboratory.

732. **Ocean Variability and Global Change.** Examination of large-scale, spatial and temporal variability in the earth/ocean system. 2 hours.

733. **Marine Biogeography and Paleobiology.** Overview of the time course of evolutionary changes in marine ecosystems and the role of historical factors influencing the distribution of marine organisms. Lecture and field trip.

734. **Marine Resource Management.** Management of marine resources, development of legislation, and impacts of management on human resources. 2 hours.

735. **Marine Analytical Instrumentation.** Overview of the major analytical tools available to marine scientists. Lecture and laboratory.

736. **Oceanographic Experiences.** Participation in an oceanographic research cruise. Research project report. 1-3 hours.

770. **Field Marine Science.** Two-week field exercise at selected sites along the Gulf of Mexico and Atlantic shorelines of North America. Pre-trip lectures and readings. 2 hours.

792. **Seagrass Ecosystem Ecology.** Ecology of seagrass systems of estuarine environments. 2 hours.

793. **Seminar in Marine Science.** Current research. 1 hour.

794. **Directed Studies on Marine Topics.** Research on marine topics. 1-6 hours.

796. **Special Topics in Marine Science.** Lecture, laboratory, or both. 1-6 hours.

Biostatistics (Ph.D., M.S.)

Graduate program director: *Kirk*

Faculty

David B. Allison, Professor (Biostatistics); Statistical Genetics, Meta Analysis, Analysis of Clinical Trials Data, Applied Survival Analysis

Alfred A. Bartolucci, Professor (Biostatistics); Clinical Trials, Survival Analysis, Bayesian Statistics

T. Mark Beasley, Associate Professor (Biostatistics); Linear Models, Linkage and Association with Quantitative Traits, Nonparametrics

Christopher S. Coffey, Assistant Professor (Biostatistics); Linear Models, Power Analyses, Sample Size Re-Estimation

Varghese George, Professor (Biostatistics); Linkage and Association Studies in Humans, Human Genetics, Regression, Likelihood Inference

George Howard, Professor (Biostatistics); Design and Analysis of Multicenter Clinical Trials, Linear Models

Charles R. Katholi, Professor (Biostatistics); Computationally Intensive Statistical Methods, Applied Numerical Analysis; Mathematical Models of Biological Systems

Katharine A. Kirk, Professor (Biostatistics); Multivariate Analysis; General and Generalized Linear Models; Categorical Data Models

Grier Page, Assistant Professor (Biostatistics); Microarrays, Human Linkage, Disequilibrium

David T. Redden, Assistant Professor (Biostatistics); Nonparametric Statistics, Longitudinal Models, Regression Diagnostics

David L. Roth, Associate Professor (Biostatistics); Structural Equations Modeling, Psychometric Analysis

Brent J. Shelton, Associate Professor (Biostatistics); Linear Models Estimation for Incomplete Responses and Covariates

Hemant K. Tiwari, Assistant Professor (Biostatistics); Genetic Linkage Analysis, Disequilibrium mapping, Population Genetics, Molecular Evolution, Bioinformatics, Genetics of Infectious Diseases

Irene M. Trawinski, Associate Professor (Biostatistics); Multivariate Analysis, Mathematical Statistics, Probability

Adjunct and Emeriti Faculty

Edwin L. Bradley, Jr., Professor Emeritus, Biostatistics; M.Stat., Ph.D. (Florida); Mathematical Statistics; Research Consulting; Nonlinear Estimation

Herbert Cheung, Adjunct Professor, Biostatistics; Ph.D. (Rutgers); Mathematical, Biochemical Models

Fernandez, Jose, Adjunct Associate Professor, Ph.D. (Pennsylvania); Statistical Genetics

Jane B. Hazelrig, Associate Professor Emeritus, Biostatistics; M.S. (Minnesota), Ph.D. (UAB); Biomathematical Modeling

David C. Hurst, Professor Emeritus, Biostatistics; M.E.S., Ph.D. (North Carolina State); Design of Experiments; Variance Components, Discrete Multivariate Models

Catarina Kiefe, Adjunct Professor, Biostatistics; Ph.D., M.D. (California, San Francisco); Outcomes Research

Jeanette Lee, Adjunct Associate Professor, Biostatistics; Ph.D. (Johns Hopkins); Multicenter Clinical Trials

James E. McLean, Adjunct Professor, Biostatistics; Ph.D. (Florida); Applications in Education

David Naftel, Adjunct Professor, Biostatistics; M.S. (North Carolina State), Ph.D. (UAB); Applications in Cardiovascular Surgery, Parametric Survival Analysis

Sharina Person, Adjunct Research Assistant Professor, Biostatistics; M.S., Ph.D. (UAB); Time Series Analysis in the Presence of Missing Data

Seng-jaw Soong, Adjunct Professor, Biostatistics; M.S., Ph.D. (UAB); Biometry, Cancer Clinical Trials

Malcolm E. Turner, Jr., Professor Emeritus, Biostatistics; M.E.S., Ph.D. (North Carolina State); Biological Models, Scientific Inference, Distribution Theory

Michael Weaver, Adjunct Associate Professor, Biostatistics; M.S.N., Ph.D. (Toledo); Applications in Nursing, Multivariate Analysis

O. Dale Williams, Adjunct Professor (Biostatistics); M.P.H., Ph.D. (University of North Carolina at Chapel Hill); Public Health Education, Cardiovascular Disease Epidemiology, Clinical Trials

Program Information

The Department of Biostatistics offers programs through the Graduate School leading to the M.S. and Ph.D. degrees in Biostatistics. (An M.P.H. program is offered through the School of Public Health.) The programs provide a balance between theory and application, the perspective being the role of statistics and modeling in scientific research. The objective is to produce research-oriented scientists who can advance statistical and modeling theory and interact effectively with scientists in other disciplines to advance knowledge in those fields. Members of the department conduct research in statistical methodology and applications as well as in fundamental problems of modeling biological systems. Much of the department's research is collaborative in nature, involving participation in projects from basic science, clinical medicine, public health, and other health-related areas both within and outside UAB. Members of the department are actively involved in the development of grant proposals in these fields. This participation involves experimental and study design, form design, database design, data quality assurance and control, data analysis and formal interpretation of results.

Faculty and students in this department are involved in activities relating to the development and understanding of biostatistical models with their associated statistical theory and to the application of these models to the analysis of data collected in many different experimental situations. These experimental situations include statistically designed laboratory experiments, prospective and retrospective epidemiological studies, survey research, behavioral research and clinical research including, but not limited to, clinical trials, among others.

The graduate program in biostatistics was created to be a balanced program with both theoretical and applied aspects of biostatistics covered. Sufficient theory is necessary to enable the Ph.D. student to read and evaluate the theoretical bases underlying past and current statistical methodological development and to contribute to that development in a nontrivial manner and to enable the master's student to choose among available methodologies in an informed manner. Realizing, however, that the most important theory is often driven by a need for new models and new data analysis tools in particular

applications, this program is conceived as a serendipitous marriage of both theory and application. The biostatistics core for statistics majors includes a two-semester theory sequence in probability and inference and a third course in the theory of linear models which is required for students going on for the Ph.D., along with a simultaneous three-semester applied sequence. The first semester of the applied sequence provides a general introduction to commonly used, elementary statistical methods; the second is a matrix-based, applied regression/linear models course; and the third is a course in experimental design and analysis of variance. More advanced courses cover such fundamental areas as sampling theory, advanced analysis of variance, multivariate analysis, discrete data models, generalized linear models, advanced inference, survival analysis and nonlinear modeling. Advanced courses typically are offered in alternate years. All advanced courses contain both theoretical and applied components.

The M.S. Degree

Both Plan I and Plan II master's programs are available in biostatistics. For students planning to go on to the Ph.D., Plan I is highly recommended. For Plan I, an M.S. thesis is required. This will give the student experience with theoretical development of one or more statistical methods as well as their application to real data. The write-up plan is similar to that required for a dissertation, and final copies are submitted to the Graduate School. Plan II students are required to complete an extra 3-hour course (compared with Plan I students) in addition to developing, writing up, and presenting a detailed research project. The project is usually a thorough discussion, review of methods, and analysis of a more complex data set. Projects do not, in general, take as much adaptation of the statistical methods used as do theses and do not normally involve development of new methodology.

The M.S. program has been revised slightly this year (2001-2002). The revision requires a number of specific courses in addition to the old M.S. core and also requires courses in an applications area such as epidemiology. This is effective immediately for all newly admitted students.

In addition, all students completing a M.S. in the Biostatistics Department are required to take the Master's Exit Examination. For students planning to go on for the doctoral degree, this test serves also as the first test of the three required doctoral, qualifying examinations.

M.S. Course Work in Biostatistics

Course Number	Title	Semester Hours
BST 626/7	Data Management/Reporting with SAS	2/1
BST 631	Probability	3
BST 632	Inference	3
BST 633	Theory of Linear Models I (Recommended, required for students going on to the Ph.D.)	(3)
BST 621/621L	Statistical Analysis I	4
BST 623/623L	Statistical Analysis III: Regression	4
BST 624/624L	Statistical Analysis IV: Experimental Design and Analysis of Variance	4
BST 655	Logistic Regression	3

BST 690	Biometrical Consulting in Research	3
Non-Biostatistics Electives	Suggested EPI 600: Introduction to Epidemiology + one other	6
Biostatistics Electives	3 if project chosen or 2 if thesis chosen	9-6
BST 698 or 699	3 hours in 698 if project chosen or 6 hours in 699 if thesis chosen	3-6
Total		45 (48)

Possible Biostatistics M.S. Electives

BST 619	Data Collection and Management
BST 634	Theory of Linear Models II
BST 640	Introduction to Nonparametric Inference
BST 645	Discrete Data Analysis
BST 665	Clinical Trials and Survival Analysis
BST 671	Sampling Theory
BST 680	Continuous Data Analysis: Time Series
BST 704	Design and Conduct of Clinical Trials
BST 708	Applied Multivariate Analysis I: Multivariate Linear Models and Introduction to Longitudinal Data Analysis
BST 709	Applied Multivariate Analysis II: Discrimination, Scaling, Ordination and Clustering

And any other Biostatistics courses required for the Ph.D. or available as electives at the Ph.D. level, for which the prerequisites are met.

Notes: BST 621 and 623-624 each have a mandatory laboratory. BST 690 may be repeated for credit.

The Ph.D. Degree

Students entering the Ph.D. program without prior graduate work in statistics or biostatistics culminating in an M.S. will be required to begin with the master's course work (See the section on the M.S. degree.). It will be their option whether to obtain the M.S., but the department advises that they do so for their own protection. Students admitted to the Ph.D. program with advanced standing because of a previous M.S. in statistics or biostatistics may be asked to take a placement examination similar in character to the department's Master's Exit Examination, which is also used as the first step in the three required doctoral examinations.

Earning a Ph.D. is a matter of proving competency. This should include a general competency in the basic areas of biostatistics: probability, inference (both intermediate and advanced), theory of linear models, regression methods, intermediate experimental design and analysis of variance, survey sampling, nonlinear regression, stochastic processes, discrete data analysis, clinical trials and survival analysis, nonparametrics, linear and exploratory multivariate methods, advanced analysis of variance, and generalized linear models (including longitudinal methods). Continuing to take some hours in Biostatistical Consulting (BST 690) is always appropriate. Other specific courses on special areas within each of these general topics (e.g., time series analysis) may also be useful. Most practicing statisticians find that a solid general knowledge of all of these is very helpful to them in their daily collaborative and consultative work as professional biostatisticians.

Some doctoral-level courses require more mathematical knowledge than courses in the M.S. curriculum. In particular,

the student will need the content of Advanced Calculus I, II and III (MA 440-442 at UAB) to be well prepared to take Advanced Probability I and Advanced Inference I. We also require BST 633 (Theory of Linear Models I) and BST 645 (Discrete Data Analysis) if they have not previously been taken at the M.S. level. So a student might have from 0 to 15 hours of prerequisites to take before proceeding to the upper level theory courses. In addition, 30 hours of biostatistics upper-level courses and 9 hours from a chosen minor in an applications area are required. Appropriate supporting program areas include, but are not limited to, physiology, microbiology, epidemiology, health behavior, health care organization and policy, etc. Typically a student will have an additional six to twelve hours in dissertation research. Therefore, the total number of hours for a student not needing to take prerequisites will range from 42 to 48, while the hours for one needing to take all the prerequisites will range from 57 to 63.

A total of three doctoral examinations must be passed and a dissertation proposal accepted by a student's graduate committee before a student is admitted to candidacy for the Ph.D. The first is the M.S. exit examination, which should be taken as soon as possible upon admission to the Ph.D. program, if not before. The second requires content from advanced courses the student has taken and is administered by a departmental committee set up for that purpose. After this examination has been passed, the student takes an oral examination in the areas in which he or she has taken coursework. Typically some questions aimed at the proposed research area are included.

Ph.D. Coursework in Biostatistics

Course Number	Title	Semester Hours
MA 440-442*	Advanced Calculus I, II and III	(9*)
BST 633*	Theory of Linear Models	(3*)
BST 645*	Discrete Data Analysis	(3*)
BST 725	Advanced ANOVA	3
BST 727	Generalized Linear Models	3
BST 730	Advanced Probability I	3
Or BST 750	or Stochastic Processes I	
BST 735	Advanced Inference I	3
BST 745	Advanced Survival Analysis	3
BST Electives	Chosen from 675 and 715 or higher-numbered courses	12
Non-BST Electives	3 courses from chosen minor	9
BST 799	Doctoral Dissertation Research	6-12
Total		42-48 (57-63)

*If not previously taken at the M.S. level

Possible Biostatistics Ph.D. Electives

BST 675	Statistical Genetics
BST 715	Nonlinear Analysis
BST 720	Advanced Experimental Design I
BST 726	Advanced Analysis of Variance II: Estimation of Variance Components
BST 730	Advanced Probability I
BST 736	Advanced Inference II
BST 740	Nonparametric Statistics I
BST 750	Stochastic Processes I
BST 760	Multivariate Analysis I

BST 761 Multivariate Analysis II (BST 760 is a prerequisite for BST 761.)

BST 765 Computationally Intensive Statistical Methods

BST 775 Statistical Methods for Longitudinal Data

Admission

Applicants should be quantitatively oriented. For admission to these programs, a student's undergraduate curriculum must include a complete, full-year calculus sequence and linear (matrix) algebra. A demonstrated proficiency in computing is required. It is preferred that students have additional advanced mathematics courses, such as differential equations, advanced calculus including special functions, and complex analysis. Some background in the natural sciences would be helpful. The department requires a TOEFL score of at least 600 for all foreign students whose native language is not English. The GRE and GPA requirements are the same as those of the Graduate School. That is, scores of 550 or better on each of the three sections (verbal, quantitative and analytic) of the GRE General Test are preferred.

Additional Information

For detailed information, contact Dr. Katharine A. Kirk, UAB Biostatistics Graduate Program Director, 327 J Ryals Building, 1665 University Boulevard, Birmingham, AL 35294-0022.

Telephone 205-975-5048

Fax 205-975-2540

E-mail kkirk@uab.edu

Course Descriptions

Unless otherwise noted, all courses are for 3 semester hours of credit. Course numbers preceded with an asterisk indicate courses that can be repeated for credit, with stated stipulations. Courses with numbers lower than 604 are not available for graduate credit to graduate students in the Department of Biostatistics.

Biostatistics (BST)

401. **Introductory Descriptive and Inferential Statistics.** Organization and presentation of data, interpretation of tables, graphs and elementary statistical findings. Emphasis on application of statistical skills to data from social science experiments and clinical settings. Prerequisites: MA 102 or equivalent or permission of instructor.

491. **Special Topics.** 1-3 hours.

498. **Research Problems.** 1-6 hours.

521, 523-524. **Statistical Analysis and Design of Experiments.** Application of statistical techniques; tests of significance and confidence intervals; simple and multiple linear regression; experimental designs; analysis of variance. Prerequisite: For terms after the first, each preceding term. 4 hours each term, includes 1 hour for required laboratory.

531. **Introduction to Probability.** Sample spaces; discrete and continuous random variables; probability mass, density, and distribution functions; moments; transformations of random variables; limiting distributions.

532. **Introduction to Inference.** Point and interval estimation; tests of hypotheses; sufficiency; maximum likelihood estimation; Neyman-Pearson theorem; Rao-Blackwell theorem; other classical techniques. Prerequisite: BST 531.

533. **Introduction to the Theory of Linear Models.** Distribution of quadratic forms; least squares; properties of least

squares estimators; Gauss-Markov theorem; multiple linear regression and design models; other estimation methods for linear models. Prerequisites: BST 531-532.

535. Statistical Methods in Biological Assay. Dose-response relationships and potency estimation; graded responses and analysis of symmetric assays; quantal responses; dilution assays; designs and models in current research.

540. Nonparametric Methods. One- and two-sample rank tests; nonparametric confidence intervals and measures of association; analysis of variance of ranked data; goodness of fit tests; nonparametric regression models.

570. Sampling Methods. Fundamental principles and methods of survey sampling. Simple random, stratified and cluster sampling; questionnaire design; problems of nonresponse and sources of nonsampling error; surveys.

601-602. Biostatistics I and II. Logic and language of scientific methods in public health and other life science research; use of basic statistics in testing hypotheses and setting confidence intervals; simple and multiple linear regression; analysis of basic experimental designs. Prerequisite: BST 601 for BST 602. 3 hours each.

603. Regression Analysis from the Applied Perspective. Application of linear models to public health problems. Fitting straight lines to data, multiple variables, matrix approaches, tests, examination of residuals. Limitations and pitfalls in use of techniques. Prerequisites: BST 601-602.

604. Research Topics in Biometrical Analysis. Computing resources and utilization of various statistical packages for statistical analyses; multiple regression, logistic regression, discriminant analysis and simple genetic analyses. Epidemiologic topics include risk functions, adjustments for confounding factors and their relationships to statistical techniques discussed. Prerequisites: BST 601-602.

605-606. Methodology in Research. Probability and statistics from the viewpoint of the medical and biological investigator; sampling models; decision making; analysis and interpretation of research data. 3 hours each.

607. Environmental Sampling and Exposure Assessment. Application of statistical techniques including use of the lognormal distribution for environmental and occupational health exposure assessment problems. Spatial and temporal correlations are discussed. Appropriate analysis techniques are described for these situations. Statistical software package applications are used in the computer lab. Prerequisites: BST 601-602.

617. Design and Analysis of Clinical Dental Research. Provides an overview of the basic statistical skills required in the reading of medical and dental literature. Emphasis is on understanding concepts and not on computational techniques. 2 hours.

619. Data Collection and Management. Basic concepts of study design, forms design, quality control, data entry, data management and data analysis. Hands-on experience with data entry systems (e.g., DBASE) and data analysis software (e.g., PC SAS). Exposure to other software packages as time permits (e.g., Harvard Graphics and PC Tools). Prerequisites: BST 601-602 or equivalent; previous computer experience or workshop on microcomputers highly recommended.

620. Applied Matrix Algebra. Vector and matrix definitions and fundamental concepts; matrix factorization and application. Eigenvalues and eigenvectors, functions of matrices, singular and ill-conditioned problems.

621. Statistical Analysis I. More intensive coverage of applications of elementary statistical techniques used in BST 601-602. For biometry majors and others with sufficient mathematical background. Prerequisites: Full calculus sequence and linear (matrix) algebra. BST 621 is a prerequisite for BST 623. BST 621L must be taken concurrently. 4 hours, includes 1 hour for required laboratory.

621L. Laboratory for BST 621. BST 621 must be taken concurrently. 0 hours.

623. Statistical Analysis III. Linear and multiple regression; weighted and nonlinear regression; variable selection methods; modeling techniques; regression diagnostics and model validation; systems of linear equations. Matrix approach to analysis. Prerequisites: Full calculus sequence, linear (matrix) algebra and BST 621. BST 623L must be taken concurrently. 4 hours, includes 1 hour for required laboratory.

623L. Laboratory for BST 623. BST 623 must be taken concurrently. 0 hours.

624. Statistical Analysis IV. Intermediate experimental design and analysis of variance models. Matrix approach to analysis. Factorial and nested (hierarchical) designs; blocking; repeated measures designs; Latin squares; incomplete block designs; fractional factorials; confounding. Prerequisites: Full calculus sequence, linear (matrix) algebra and BST 621 and BST 623. BST 624L must be taken concurrently. 4 hours, includes 1 hour for required laboratory.

624L. Laboratory for BST 624. BST 624 must be taken concurrently. 0 hours.

626. Data Management/Reporting with SAS A hands-on exposure to data management and report generation with one of the most popular statistical software packages. BST 627 must be taken concurrently. 2 hour.

627. Laboratory for BST 626: Data Management/Reporting with SAS. 1 hour.

631. Probability. Intuitive background and axiomatic probability; change and credibility; probability space and random variables; distribution theory; probability generating, moment generating and characteristic functions; limit theorems. Prerequisite: One-year calculus sequence.

632. Inference. Small sample distributions; estimation theory, optimum properties of estimators; elementary theories of tests of hypotheses; asymptotic theory; maximum likelihood estimators; Bayesian inference. Prerequisites: One-year calculus sequence and BST 631.

633. Theory of Linear Models I. Treatment of linear statistical models from the point of view of infinite model theory; obtaining of results about model components; multiple regression and theory of balanced ANOVA designs. Estimation by general least squares; minimum absolute deviations; maximum likelihood. Prerequisites: One-year calculus sequence, linear (matrix) algebra, BST 631, and BST 632.

634. Theory of Linear Models II. Matrix formulation and estimation of unbalanced ANOVA and general linear models, introduction to estimation of variance component models, errors-in-variables models, weighted least squares, generalized linear models, linearizations of commonly used nonlinear models and the nature of errors. Prerequisites: BST 621, 623-624, 631-633.

640. Introduction to Nonparametric Inference. Properties of statistical tests; order statistics and theory of extremes; median tests; goodness of fit; location and scale parameter

estimation; confidence intervals. Prerequisites: BST 621, 623-624, 631, 632.

642. **Numerical Analysis I.** Quadrature, interpolation, rational approximation, numerical solution of ordinary differential equations, iterative solution of algebraic equation in single variable. Prerequisites: MA 252 with grade of C or better and either MA 263 or CS 210.

643. **Numerical Analysis II.** Mathematical stability and ill-conditioning, discretization error, convergence of iterative methods, rounding error. Prerequisite: BST 642.

645. **Discrete Data Analysis.** Analyses for multi-way tables; measures of association and of agreement; loglinear and logit models; ordinal discrete data; matched pairs; repeated categorical response data; asymptotic theory; direct and indirect adjustment of tables; iterative proportional fitting; models of change. Prerequisites: BST 621, 623-624, 631-633.

650. **Introduction to Stochastic Processes.** Poisson processes; random walks; simple diffusion and branching processes; recurrent events; Markov chains; stochastic processes with discrete sample spaces. Prerequisite: BST 631.

655. **Applied Logistic Regression.** Analysis of binary response data using logistic regression models. Maximum likelihood method; regression diagnostics; ordinal, proportional odds, logistic regression; nominal, polytomous logistic regression. Emphasis on problem definition, appropriate analysis using the SAS software package and interpretation of results. Prerequisites: BST 601-602 or equivalent. BST 603 or equivalent recommended.

665. **Clinical Trials and Survival Analysis.** Design and analysis of clinical trials; sample size computation; properties of survival distributions; estimation and hypothesis testing for survival parameters. Prerequisites: BST 601-602 or equivalent. BST 603 or equivalent highly recommended.

670. **Applied Sampling.** Various sampling schemes used in population research; methods of implementation and analyses associated with schemes. Prerequisites: BST 601-602. BST 619 recommended.

671. **Sampling Theory.** Simple random; stratified; cluster; ratio regression; systematic sampling. Sampling with equal or unequal probabilities of selection; optimization; properties of estimators; nonsampling errors. Prerequisite: BST 631.

675. **Statistical Genetics.** Probability models for genotypes and phenotypes; tests of genetic hypotheses and estimation of parameters; theories of random mating, evolution, and genetic drift; inbreeding; nonrandom mating patterns.

680. **Continuous Data Analysis: Time Series.** Harmonic analysis; autocorrelation and spectral density; autoregressive and moving models; parameter estimation and tests of hypotheses; forecasting.

*690. **Biometrical Consulting in Research.** Integration of statistical theory and application in current research; systematic formulation of problems; data format; collection procedures; design; analysis; interpretation and communication of results. Prerequisite: Permission of instructor.

691. **Special Topics Seminar.** Analytic examination and presentation of selected topic; formulation of research problems and interpretation of results. 1-3 hours.

695. **Directed Studies in Statistics.**

697. **Internship in Biostatistics.** Pass/Fail. 6 hours.

698. **Research in Statistics.** Pass/Fail. 1-10 hours.

699. **Master's Thesis Research.** Prerequisite: Admission to candidacy. Pass/Fail. 1-12 hours.

700. **Mathematical Foundations of Biostatistics.** Mathematical and statistical theory behind common procedures used in biostatistics, for the nonbiostatistics major. Basic principles of statistical inference necessary for research in epidemiological and statistical methods. Emphasis on mathematical theory used in estimation and hypothesis-testing procedures. Prerequisites: BST 601-602.

702. **Bioassay and Quality Control.** Basic statistical techniques for laboratory workers in public health and medicine. Concepts and methods for design, analysis and interpretation of biological assays; concepts and methods of measuring and/or performing quality control. Prerequisites: BST 603 and computer experience.

704. **Design and Conduct of Clinical Trials.** Concepts of clinical trials; purpose, design, implementation and evaluation. Examples and controversies presented. Students write proposal for clinical trial. Prerequisites: BST 601-602 and one advanced statistics course.

706. **Advanced Topics in the Analysis of Variance.** Experimental design and analysis of variance for nonbiostatistics majors. Deciding upon appropriate ANOVA procedures, computer analysis using SAS and interpretation. One-way designs, blocking, multifactor ANOVA, covariance, confounding, repeated measures and nested (hierarchical) models. Power and sample size calculations. Prerequisites: BST 601-602 and computer experience or permission of instructor.

708. **Applied Multivariate Analysis I: Multivariate Linear Models and Introduction to Longitudinal Data Analysis.** Conduct, using SAS, and interpret multivariate general linear models including multivariate regression, multivariate analysis of variance, multivariate analysis of covariance, multivariate analysis of repeated measures, canonical correlation, and longitudinal data analysis for general and generalized linear. Prerequisites: BST 601-602. BST 603 and BST 706 strongly recommended.

709. **Applied Multivariate Analysis II: Discrimination, Scaling, Ordination and Clustering.** Conduct, using SAS, and interpret linear, quadratic and logistic discriminant analyses, principal components, factor analysis, path analysis with manifest variables, confirmatory factor analysis, structural equations modeling, multidimensional scaling, correspondence analysis including multiple correspondence analysis, and cluster analysis. Prerequisites: BST 601-602. BST 603 and BST 706 strongly recommended.

715. **Nonlinear Analysis.** Least squares and maximum likelihood estimation for nonlinear models; methods of optimization; inference in the nonlinear case; methods of discriminating among models. Prerequisites: BST 621, 623-624, 631-633.

720-721. **Advanced Experimental Design I and II.** Methods of constructing and analyzing designs for experimental investigations; various multiple factor and incomplete designs; designs related to experiments with attributes. Prerequisites: BST 621, 623-624, 631-633. 3 hours each.

725-726. **Advanced Analysis of Variance I and II.** First term: general linear hypothesis with relation to multi-way classifications with unequal subclass numbers; weighting schemes; estimation of variance components. Second term: Models with multiple variance components and methods for

their estimation. Prerequisites: BST 621, 623-624, 631-633. 3 hours each.

727. Generalized Linear Models. Generalized linear models; mixed models, and generalized estimating equations. Prerequisites: BST 621, 623-624, 631-633.

730-731. Advanced Probability I and II. Prerequisites: BST 621, 623-624, 631-633. 3 hours each.

735-736. Advanced Inference I and II. Conceptual bases of statistical theory; critical analysis of ideas from different schools of thought; presentation and discussion of papers by participants. Prerequisites: BST 621, 623-624, 631-633, or permission of instructor. 3 hours each.

740-741. Nonparametric Statistics I and II. Nonparametric estimation and tests of hypotheses; confidence and tolerance regions; efficiency of tests; nonparametric analysis of variance. Prerequisites: BST 621, 623-624, 631-633. 3 hours each term.

745. Advanced Survival Analysis. Kaplan-Meier estimation, exponential tests, Gehan-Wilcoxon, Cox proportional hazards regression models, parametric survival models. Prerequisites: BST 621, 623-624, 631-633.

750-751. Stochastic Processes I and II. Normal processes and covariance stationary processes; Poisson processes in nonhomogeneous and compound form; Markov chains with discrete and continuous parameters; application. Prerequisites: BST 621, 623-624, 631-633. 3 hours each.

760-761. Multivariate Analysis I and II. Theoretical bases for multivariate regression, multivariate analysis of variance and multivariate analysis of covariance, canonical correlation; discriminant analysis; principal components; internal dependencies; factor analysis, multidimensional scaling, multiple correspondence analysis and clustering techniques. Prerequisites: BST 621, 623-624, 631-633. BST 760 is a prerequisite for BST 761. 3 hours each.

765. Computationally Intensive Statistical Methods. Modern computationally intensive methods for hypothesis testing and confidence interval estimation, including randomization tests, bootstrap, jackknife among others. Prerequisites: BST 621, 623-624, 631-633.

775. Statistical Methods for Longitudinal Data. Exploratory data analysis for longitudinal data; mixed models for continuous responses; repeated measures as a special case; modeling covariance structures; robust estimation of standard errors; nonparametric kernel and spline estimation of the mean function; models for binary and ordinal longitudinal data; incomplete data models; multidimensional longitudinal data. Prerequisites: BST 621, 623-624, 626/7, BST 631-633.

***790-791. Advanced Analysis I and II.** Diverse and nonstandard problems in the application of statistics. Prerequisites: BST 621, 623-624, 631-633. 3 hours each.

***795. Directed Studies in Statistics.**

798. Research in Statistics. Pass/Fail. 1-10 hours.

799. Doctoral Dissertation Research. Prerequisite: Admission to candidacy. Pass/Fail. 1-12 hours.

Breast Cancer Training Program

Graduate program director: *Lamartiniere*

Faculty

Stephen Barnes, Professor (Pharmacology and Toxicology); Chemoprevention of Breast Cancer, Pharmacokinetics, Drug Development, Mass Spectrometry

Wayne Brouillette, Professor (Chemistry); Protein Structure and Computer Modeling Methods for the Design and Synthesis of New Breast Cancer Drugs

Robert M. Conry, Associate Professor (Medicine); Targeted Gene Delivery to Accomplish Gene Therapy for Breast Cancer

Robert B. Diasio, Professor (Pharmacology and Toxicology); Pharmacogenetic and -genomic Factors Predicting Efficacy and Toxicity to Chemotherapeutic Agents in Patients

Charles N. Falany, Associate Professor (Pharmacology and Toxicology); Biochemistry and Molecular Biology of Estrogen Sulfation Mechanisms in the Mammary, and Toxicology of Silicone Gel Breast Implants

Mona Foud, Assistant Professor (Medicine); Preventive Medicine

Andra Frost, Associate Professor (Pathology); Clinico-pathologic Studies of Breast Carcinoma

Clinton J. Grubbs, Professor (Nutrition Sciences); Chemoprevention of Breast Cancer in Animal Models; Retinoids, Antiestrogens, Nutritional Chemoprevention, Combination Agents

Robert W. Hardy, Assistant Professor (Pathology); Regulation of Cell Proliferation and Signal Transduction

Sham S. Kakar, Assistant Professor (Physiology); Oncogene Expression and Cancer Regulation

Francis G. Kern, Associate Professor (Pathology); Mechanisms of Growth Control. Mechanisms Mediating Estrogen Independence and Antiestrogen Resistance in Breast Cancer

Jeffrey Kudlow, Professor (Medicine); Role of Growth Factors and Their Receptors in the Mammary Gland and Epithelial Development

Coral A. Lamartiniere, Professor (Pharmacology and Toxicology); Breast Cancer Causation from Environmental Estrogens; Breast Cancer Prevention with Genistein; Molecular and Cellular Endocrinology of the Mammary Gland

Donald Muccio, Professor (Chemistry); Use of Conformationally Constrained Retinoids for Cancer Prevention and Therapy

Deodutta Roy, Associate Professor (Environmental Health Science); Causation of Breast Cancer, Environmental Toxicology

Michael Ruppert, Assistant Professor (Medicine); Genetic Alterations on Tumors, Mechanisms of Transformation by Oncogenes

Denise Shaw, Research Associate Professor (Medicine); Targeted Immunotherapy

Theresa V. Strong, Assistant Professor (Medicine); Identification and Characterization of Tumor Antigens; Polynucleotide Immunization as a Means of Gene Therapy

De-chu Tang, Research Assistant Professor (Medicine); Gene Therapy, DNA-Based Noninvasive Vaccinations Against Breast Cancers

John Waterbor, Associate Professor (Epidemiology and International Health); Epidemiology and Cancer Control

Training Program Description

The goal of the Breast Cancer Training Program at UAB is to educate and train predoctoral students for interdisciplinary breast cancer research. The program is part of the Toxicology Feeder Program, recruiting and admitting students, providing the core curriculum, and facilitating laboratory rotations in the first year. A student in good standing after completing the core curriculum will identify a mentor and complete electives and dissertation research in a participating degree-granting program. Faculty and mentors are drawn from Biochemistry, Cell Biology, Comparative Medicine, Environmental Health Sciences, Epidemiology, Gene Therapy, Medicine, Nutrition Sciences, Oncology Subspecialties, Pathology, Pharmacology and Toxicology, Physiology, and Preventive Medicine.

We have identified 6 broad-based research foci, traditional and "cutting-edge": cancer causation, cancer chemoprevention, mechanisms of growth control, cancer pharmacology, gene therapy, and targeted immunotherapy. These criteria foster opportunities for collaboration and produce a trainee with diverse expertise in breast cancer research. Trainees with interdisciplinary education and training will have better insight and be more innovative in research and diagnosis, and in preventing and treating breast cancer.

Financial Assistance

Stipends and tuition are available via a federally funded training grant. In addition to an interest in breast cancer, the admission committee looks for students that have an educational background in chemistry, biology, biochemistry and, if possible, one or more courses in molecular biology, physiology, and/or cell biology. The applicant should have a GPA of 3.0 or better and a score of 1100 or better on the combined verbal and quantitative GRE. A campus visit and interview are strongly encouraged.

Additional Information

For more information on the Interdisciplinary Breast Cancer Training Program, contact Dr. Coral Lamartiniere, VH 124, 1670 University Blvd., mailing: VH 124, 1530 3rd Avenue South, Birmingham, Alabama 35294-0019.

Telephone 205-934-7139

E-mail coral.lamartiniere@ccc.uab.edu

Course Descriptions

TOX 750. Breast Cancer Causation and Regulation. Epidemiology, mechanism of therapeutic and chemopreventive drugs, and innovative research and clinical approaches. Fall.

IBS 700. Biological Chemistry and Cellular Physiology. (8 credits). Fall.

IBS 701. Pathophysiology and Pharmacology of Disease. (8 credits). Spring.

IBS 702. Molecular Medicine and Functional Genomics. (8 credits). Summer.

Cellular and Molecular Biology I-IV can substitute for the IBS series

Business Administration (M.B.A.)

Graduate program director: *Broom*

Faculty

Nell Adkins, Assistant Professor (Accounting and Information Systems); Corporate Taxes

Douglas Ayers, Associate Professor (Management, Marketing, Industrial Distribution); Business to Business Marketing, Product Management, Industrial Distribution

Theodore Bos, Professor (Finance, Economics and Quantitative Methods); Quantitative Analysis

Michael R. Bowers, Professor (Management, Marketing and Industrial Distribution); Sales, Product, and Quality Management

Lowell Broom, Professor (Accounting and Information Systems); Auditing, Governmental and Not-for-profit Accounting

Richard M. Burns, Associate Professor (Finance, Economics and Quantitative Methods); Financial Management, Financial Institutions

Manabendra Dasgupta, Associate Professor (Finance, Economics and Quantitative Methods); Economic Theory

James B. Dilworth, Professor Emeritus (Management, Marketing and Industrial Distribution); Production and Operations Management

W. Jack Duncan, University Scholar and Professor (Management, Marketing and Industrial Distribution); Strategic Management

Cindy Edmonds, Associate Professor (Accounting and Information Systems); Financial and Managerial Accounting

Thomas Edmonds, Professor (Accounting and Information Systems); Financial and Managerial Accounting

Thomas A. Fetherston, Professor (Finance, Economics and Quantitative Methods); Investments, International Finance

Peter M. Ginter, Professor (Management, Marketing and Industrial Distribution); Policy and Strategic Management

Robert Holmes, Professor, Dean (Management, Marketing and Industrial Distribution); Strategic Management

Buky Folami, Assistant Professor (Accounting and Information Systems); Managerial Cost

Eric P. Jack, Assistant Professor (Management, Marketing, Industrial Distribution); Operations Management

Karen Kennedy, Assistant Professor (Management, Marketing, Industrial Distribution); Personal Selling and Marketing Strategy

Susan Key, Associate Professor (Management, Marketing and Industrial Distribution); Social, Legal, and Ethical Environment of Business

Seung-Dong Lee, Professor (Finance, Economics and Quantitative Methods); International Economics, Applied Economic Theory

Frank M. Messina, Associate Professor (Accounting and Information Systems); Fraud Prevention

Warren S. Martin, Professor (Management, Marketing and Industrial Distribution); Survey Research, Marketing Research, Industrial Distribution

Michael K. McAlister, Professor (Accounting and Information Systems); Management Information Systems

Gail W. McGee, Professor (Management, Marketing and Industrial Distribution); Organizational Behavior

George M. Munchus, III, Professor (Management, Marketing and Industrial Distribution); Human Resource Management, Labor Relations

Philip Musa, Assistant Professor (Management, Marketing and Industrial Distribution); Production and Operations Management

Lance Nail, Assistant Professor (Finance, Economics and Quantitative Methods); Wealth Creation

Thomas L. Powers, Professor (Management, Marketing and Industrial Distribution); International Marketing, Strategic Marketing

Julio C. Rivera, Associate Professor (Accounting and Information Systems); Management Information Systems

Robert A. Scott, Associate Professor (Management, Marketing and Industrial Distribution); Administrative Theory and Practice, Organizational Design and Development

John E. Sheridan, Professor and Director, Center for Management Studies (Management, Marketing, and Industrial Distribution); Organizational Behavior

Sanjay K. Singh, Associate Professor (Accounting and Information Systems); Management Information Systems

Jay A. Smith, Jr., Professor, Ben S. Weil Chair of Industrial Distribution (Management, Marketing and Industrial Distribution); Logistics, Industrial Distribution

Robert E. Stanford, Professor (Finance, Economics and Quantitative Methods); Operations Research

John E. Swan, Professor Emeritus (Management, Marketing and Industrial Distribution); Marketing

Deborah Tanju, Professor (Accounting and Information Systems); Financial Accounting, Internal Auditing and Accounting Systems

Murat Tanju, Professor (Accounting and Information Systems); Financial Accounting

Bor-Yi Tsay, Professor (Accounting and Information Systems); Managerial Accounting and Accounting Systems

Richard Turpen, Associate Professor (Accounting and Information Systems); Financial Accounting and Auditing

Robert Underwood, Assistant Professor (Management, Marketing, Industrial Distribution); International marketing and Promotion/Advertising

Joseph G. Van Matre, Professor (Finance, Economics and Quantitative Methods); Multivariate Analysis, Total Quality Management

Joe Walker, Associate Professor (Finance, Economics and Quantitative Methods); Financial Management

Frank Watkins, Associate Professor (Accounting and Information Systems); Taxation and Business Law

Barbara Wech, Assistant Professor (Management, Marketing, Industrial Distribution); Organizational Behavior

Bradley Wilson, Assistant Professor (Finance, Economics and Quantitative Methods); Macroeconomics

Program Objectives

The objectives of the program are to provide professional, graduate-level education and to maintain a continuing relationship with the business community through service activities. In order to deal effectively with increasingly complex problems of organizations, managers require training in sophisticated analytical techniques, appreciation for the behavioral facets of management, and an ability to anticipate and adapt to changes in the organizational environment. The M.B.A. program is designed to provide competency in man-

agement and to acquaint the student with all aspects of business activity. The program is decision oriented, focusing on key aspects of modern administration, and seeks to prepare graduates for leadership roles in business, industry, government, or social service.

Admission Requirements

Requests for application forms and information concerning admission procedures should be directed to the UAB Graduate School of Management. Applicants must be holders of baccalaureate degrees from regionally accredited institutions and must present evidence including, but not limited to, admission test scores (see below) and undergraduate records indicating high promise of success in business study at the graduate level. Applicants must have completed satisfactorily an undergraduate calculus course within the previous five years of application or must pass a proficiency exam or complete the Graduate School of Management Calculus Review. In addition, foreign student applications must have a minimum score of 550 on the TOEFL.

Admission to the M.B.A. program is competitive. In order to be considered, applicants must submit transcripts from baccalaureate work and GMAT scores. In addition, the number of qualified applicants admitted may have to be limited when resource constraints and optimum enrollment considerations so dictate.

Program Requirements

The M.B.A. program is suitable not only for students with baccalaureate degrees in business but also for those who have degrees in engineering, science, or other liberal arts.

A maximum of 48 semester hours of credit is required for completion of the M.B.A. program; however, students with applicable undergraduate courses in business may have certain core courses (MBA 620, 632, 633, 640, 650, 660) waived. The minimum degree requirement is 36 semester hours.

After the student is admitted to the program, the M.B.A. graduate advisor is available to meet with the student, if needed, to help outline a plan of study. Once admitted, students are expected to complete at least three courses during each 12-month period. Each candidate for the M.B.A. must file formal application for the degree in the Graduate School of Management Office at least three months before the expected date of graduation.

Program Information

The M.B.A. program is taught in an evening format and is designed for students who work during the day. Most students can complete degree requirements within 2-2½ years. Concentrations are available in finance, information technology management, health care management and accounting. Each concentration consists of 12 semester hours. The accounting concentration is designed for students with undergraduate degrees in accounting (or the equivalent) who wish to establish their eligibility to sit for the Uniform CPA Examination while pursuing a graduate degree in business. The concentration consists of 12 semester hours of graduate accounting course work in the Master of Accounting (M.Ac.) Program as determined by the M.Ac. Program Director to assure consistency with the State of Alabama's Public Accountancy Act and 150-hour requirements. Enrollment in accounting concentration courses requires approval by the Program Director. M.Ac. course descriptions can be found in the M.Ac. section of the Graduate

Catalog. The M.B.A. program is accredited by AACSB—The Association to Advance Collegiate Schools of Business.

Additional Information

For detailed information, contact the UAB Graduate School of Management, School of Business, Room 219, 1150 South 10th Avenue, Birmingham, Alabama 35294-4460.

Telephone 205-934-8817

E-mail Graduate@business.uab.edu

Web www.business.uab.edu

Course Descriptions

Unless otherwise noted, all courses are for 3 semester hours of credit. Courses numbers preceded with an asterisk indicate courses that can be repeated for credit, with stated stipulations.

Master of Business Administration (MBA)

610. Financial Reporting and Analysis for Management. Determination and use of cost data for decision making, control and evaluation of performance, and formulation of goals and budgets. 3 hours.

611. Management Information Systems. Applications of information and management sciences to design and use of decision-oriented systems. 3 hours.

620. Corporate Finance. Introduction to financial management of nonfinancial corporations. Topics include time value of money, bond and stock valuation, cost of capital, capital budgeting, capital structure and dividend policy. Cases may be used. Prerequisites: MBA 610, and 660. 3 hours.

621. Advanced Topics in Corporate Finance. An advanced course in finance with emphasis on special topics such as financial planning, working capital management, leasing hybrid financing, international capital budgeting, etc. Case studies are used. Prerequisite: MBA 620. 3 hours.

630. Social, Ethical, and Legal Environment. Social, ethical, and legal environment in which business enterprise operates domestically and internationally. 3 hours.

632. Managerial Processes & Behavior. A study of classical and modern theories of organization, management and leadership with emphasis on applications to modern organizations. 3 hours.

633. Operations Management. Introduction to management planning and control techniques applicable to operations portion of various enterprises. Prerequisites: MBA 660. 3 hours.

634. Business Strategy. Integration of management, finance, accounting, marketing, economics, production, and decision-making concepts. Prerequisite: Last term in MBA program. 3 hours.

635. International Business Policy. Problems and strategic considerations of firms engaged in international business. Prerequisites: MBA 632 or equivalent. 3 hours.

640. Applied Microeconomic Analysis. Application of economic theory and methodology to decision making: theoretical and empirical analysis of demand, production, costs, and pricing behavior. Prerequisite: MBA 660. 3 hours.

650. Modern Marketing Concepts. Analytical approach to business systems directing flow of goods and services from product conception and production to consumption from a marketing manager's point of view. 3 hours.

651. Seminar in Marketing Policy. Problems of marketing managers; planning, implementing, evaluating, and controlling marketing activities. Prerequisite: MBA 650. 3 hours.

660. Business Statistics. Selected statistical techniques, including statistical inference, regression, and decision theory. Application to business problems. 3 hours.

661. Decision Science. Introduction to topics in operations research. Prerequisite: MBA 660. 3 hours.

667. Quantitative Methods for Finance. Development of the mathematical foundations of graduate level financial modeling and analysis, including applications of calculus, probability theory and linear algebra to the measurement of asset returns and the assessment of risk, to the pricing of options and other financial derivatives, and to the solution of important financial optimization problems. Prerequisite: 660. 3 hours.

Electives

615. Technology Based Entrepreneurship. Technology Based Entre- and Intra-preneurship. 3 hours.

616. Information Systems Planning and Decision Making. Provides the foundation for the strategic planning of information systems and solving problems faced by decision makers. 3 hours.

617. Enterprise Application Implementation. Provides the managerial foundation for developing and implementing large-scale enterprise applications. 3 hours.

618. Technology Based Project Management. Provides the foundation for the management and successful execution of IT based projects. 3 hours.

622. Portfolio Theory and Construction. Theoretical and practical aspects of investments and portfolio management. Prerequisites: MBA 620. 3 hours.

623. Mergers and Acquisitions. Introduces the student to the basic terminology, theories, and empirical evidence regarding the immediate and long-term wealth effects of corporate control events such as mergers, acquisitions and divestitures. Prerequisites: MBA 620. 3 hours.

624. Global Financial Management. Financial analysis and decision making in international context. Prerequisite: MBA 620. 3 hours.

626. Credit Markets and Instruments. Detailed coverage of the credit markets (Money and Bond markets) of the U.S. and an introduction to the international aspects of those instruments. Prerequisite: MBA 620. 3 hours.

627. Financial Risk Analysis and Management. Unifying approach to the valuation and use of derivatives in domestic and international financial risk management; exploration of issues in the measurement, analysis, and management of financial risk including interest rate, exchange rate, and commodity price risks. Prerequisite: MBA 620. 3 hours.

636. Human Resource Management. Critical management theory as applied to human resource problems such as employment, employee education and training, labor-management, health and safety, compensation and human resources research. Prerequisite: MBA 632 or equivalent. 3 hours.

639. Seminar in Management. Current issues and problems in selected areas of management. Prerequisite: MBA 632, or permission of instructor. 3 hours.

641. Macroeconomic Analysis and Decision Making. Macroeconomic analysis; modern theory of aggregate demand and supply; forecasting and link between business firm and

microenvironment. Prerequisites: 660. 3 hours. 654. International Marketing. Examination of international marketing activities, including environmental issues, marketing strategy, and tactical considerations in entering foreign markets. Prerequisite: MBA 650. 3 hours.

669. **Foundations of Total Quality Management.** Reviews essential elements of TQM and emphasizes their inter-relatedness. What thought processes of management must be changed, why, and how is discussed with application to manufacturing and service sectors. Prerequisites: MBA 660, which may be taken concurrently, or permission of instructor. 3 hours.

671. **Health Care Marketing.** Introductory survey of marketing concepts as applied to health services organizations. Consumer behavior, market segmentation, target marketing, marketing research, management, and control of marketing mix variables. 3 hours.

673. **Product Innovation Management.** Introduction of the process of new product development, managing existing products and product deletion decisions. Prerequisite: MBA 650 or HA 671. 3 hours.

674. **Services Marketing.** An examination of the generic differences between goods and services, with appropriate marketing strategies for services developed. Prerequisite: MBA 650. 3 hours.

675. **Seminar in E-Commerce.** Introduction to E-Commerce business-to-consumer and business-to-business activities. Prerequisite: MBA 650. 3 hours.

676. **Management Internship.** Provides students the opportunity to gain first-hand experience in local businesses for one term while receiving academic credit. Prerequisites: MBA 632, 650 or equivalent and permission of the instructor. 3 hours.

698. **Directed Study (Nonthesis).** Prerequisite: Approval of Graduate School of Management. 3 hours.

Graduate students may choose only two courses (6 hours) from the following list of 500-level electives or, if an undergraduate accounting major, from the list of 500-level accounting electives.

MG 521. **Entrepreneurship.** Analytical and critical examination of functions and environments where new organizational development takes place. Role of entrepreneurship in creation and development of new economic entities. Prerequisite: MBA 632. 3 hours.

MK 520. **Sales Management.** Management of personal selling function. Nature of selling task; recruiting, selecting, training, compensating, and evaluating sales personnel. Prerequisite: MBA 650. 3 hours.

MK 540. **Small Business Consulting and Research.** Applied field work integrating all of the functional business fields. Prerequisites: MBA 632, MBA 650, and permission of instructor. 3 hours.

QM 525. **Applied Regression Analysis.** Simple, multilinear, and polynomial regression analysis. Model selection, inferential procedures, and application with computer. Prerequisite: MBA 660. 3 hours.

Cell Biology (Ph.D.)

Graduate program director: *Collawn*

Faculty

Con Beckers, Assistant Professor (Geographic Medicine); Cell Biology of *Toxoplasma gondii*

David M. Bedwell, Associate Professor (Microbiology); Mitochondrial Biogenesis, ABC Transporters

Etty N. Benveniste, Professor and Chair (Cell Biology); Neuroimmunology, Cytokine Production in the Central Nervous System

J. Edwin Blalock, Professor (Physiology & Biophysics); Molecular Recognition, Immune Network, Immune Neuroendocrine Interactions

Daniel Bullard, Assistant Professor (Comparative Medicine); Adhesion Molecules in Inflammatory Disease

Chenbei Chang, Assistant Professor (Cell Biology); Developmental Biology, Signal Transduction and Transcriptional Control in Early Frog Embryogenesis

Xinbin Chen, Associate Professor (Cell Biology); p53 Tumor Suppressor Gene Family and Transcriptional Regulation

Charles Cobbs, Assistant Professor (Neurosurgery); Role of Human Cytomegalovirus in Oncogenesis

James F. Collawn, Associate Professor (Cell Biology); Molecular Mechanisms of Protein Trafficking, Antigen Processing and Presentation

Christine A. Curcio, Associate Professor (Ophthalmology); Relations of Human Retinal Anatomy and Spatial Vision

Ramon Dacheux, Professor (Ophthalmology); Physiology and Morphology of the Mammalian Retina

Stuart J. Frank, Professor (Medicine); Growth Hormone Receptor Structure-Function, Growth Hormone Signaling

Gerald M. Fuller, Professor (Cell Biology); Inflammatory Cytokine Signaling Pathways in Hepatocytes and Synovocytes

G. Yancey Gillespie, Professor (Surgery); Cell and Molecular Biology of Malignant Brain Tumors

Candece Gladson, Associate Professor (Clinical Pathology); Angiogenesis and Cellular Signals in Glioma Tumors that Promote Proliferation and Invasion

Clyde R. Guidry, Assistant Professor (Ophthalmology); Cell Biology of Retinal Wound Repair

James Hagood, Associate Professor (Pediatrics); Role of Fibroblasts in Tissue Remodeling

Gail V. W. Johnson, Professor (Psychiatry); Phosphorylation, Function and Metabolism of Neuronal Cytoskeletal Proteins

Mattias Kraus, Associate Professor (Medicine); Molecular Genetics of Oncogenic Transformation and Cancer; Signal Transduction and Growth Regulation by the ErbB/EGF Receptor Family of Tyrosine Kinases

Jeffrey Kudlow, Professor (Medicine); Transcriptional Control of Growth Factor Gene Expression

Matthieu Lesort, Assistant Professor (Behavioral Neurobiology)

Fang-Tsyr (Fannie) Lin, Assistant Professor (Cell Biology); Regulation of Cell Growth by G Protein-Coupled Receptor Signaling

Weei-Chin Lin, Assistant Professor (Cell Biology); Cell Cycle Control and DNA Damage Response

Richard B. Marchase, Professor (Cell Biology); Cytoplasmic Glycosylation and Intracellular Calcium Regulation

Richard Mayne, Professor (Cell Biology); Structure and Pathophysiology of Skeletal Muscle, Cartilage, Eye

Casey Morrow, Professor (Cell Biology); HIV Replication. RNA:RNA and RNA:Protein Interactions

Martin M. Pike, Associate Professor (Cardiovascular Disease); Nuclear Magnetic Resonance Studies of Myocardial Ion Regulation

Erik Schwiebert, Assistant Professor (Physiology & Biophysics); Extracellular Nucleotide Signaling and Epithelial Cell Biology and Physiology

Lisa Marshall Schwiebert, Assistant Professor (Physiology & Biophysics); Inflammatory Responses

Bingdong "Ben" Sha, Assistant Professor (Cell Biology); Protein Crystallography

Gene P. Siegal, Professor (Pathology); Tumor Cell Interaction with Extracellular Matrix During Invasion

Harald W. Sontheimer, Professor (Neurobiology); Regulation and Function of Ion Channels in Glia

Elizabeth S. Sztul, Associate Professor (Cell Biology); Intracellular Membrane Sorting and Fusion

W. Anne B. Theibert, Associate Professor (Neurobiology); Inositol-Phosphate Second Messengers in Neurotransmitter Action in the Brain

David S. Weiss, Professor (Neurobiology); Structure/Function Relationship of Ion Channels

Anne C. Woods, Associate Professor (Cell Biology); Cell-Extracellular Matrix Interactions and Transmembrane Signaling

J. Michael Wyss, Professor (Cell Biology); Neural Control of Cardiovascular System and Limbic Cortex

Bradley K. Yoder, Assistant Professor (Cell Biology); Polycystic Kidney Disease

Tong Zhou, Assistant Professor (Medicine); Apoptosis in Autoimmunity and Cancer Biology

Program Information

The Department of Cell Biology participates in the Cellular and Molecular Biology (CMB) Program and the Neurosciences Program, which are designed to provide a first-year curriculum to graduate students interested in the broad area of cellular and molecular biology. The CMB and Neurosciences Programs involves student recruitment, admissions, and the first-year curriculum. At the end of the first year, each CMB student chooses a mentor and elects to pursue a degree in biochemistry and molecular genetics, cell biology, microbiology, or neurobiology. Students from the Medical Scientist Training Program (MSTP) are also welcome to complete the basic science component of their training in Cell Biology.

The goal of the graduate program in Cell Biology (CB) is to prepare research-oriented individuals for careers as independent academic or industrial scientists. Each student is counseled and guided by faculty and staff and interacts with a variety of postdoctoral fellows and other graduate students. Thus, through both formal and informal discussion, the student is challenged to consider a wide range of scientific questions and methodologies and is encouraged to relate these to the particular scientific endeavor he or she is pursuing.

The student is expected to gain a broad research background through active participation in formal courses and through hands-on research. In addition to the research-oriented course offerings within the department, the student is expected to expand his or her knowledge by undertaking relevant coursework in biochemistry, statistics, physiology, molecular biology, and immunology. Each student's program is tailored to meet the student's needs and scientific interests. A student usually rotates through at least three independent laboratories (10 weeks each) before identifying a permanent laboratory where his or her formal research for the Ph.D. degree will be done. The Ph.D. program, including coursework, research, and dissertation, usually requires a commitment of at least four to five years, depending on the background of the student.

The program allows specialization in all areas of cell biology, including neurobiology. The program houses active, well-funded research projects that are indicated in the preceding faculty roster. In addition to UAB Graduate School admission requirements, the program requires a baccalaureate degree with a major emphasis in science, a B average in all courses and a slightly higher average in science coursework, and a minimum score of 1,100 on combined verbal and quantitative sections of the GRE General Test.

Ph.D. Program

Although it is expected that most students will enter the program with an advanced biological science background, exceptionally promising students with deficiencies in biological studies will be accepted into the program with the proviso that they take the necessary remedial coursework, usually while they simultaneously pursue research within the program. The successful student will, by the end of his or her graduate tenure, have an ability both to carry out independent research and to contribute to a teaching program in modern cell biology.

Following completion of basic coursework (usually one-and-a-half to two years), each student is required to pass a qualifying examination. This examination is structured to (1) test the student's ability to design a comprehensive research proposal that addresses a problem within an area of cell biology, (2) determine the breadth of the student's knowledge in modern biological sciences, and (3) examine the student's understanding of current concepts in cell biology. After successful completion of this examination by a graduate faculty committee, the student is admitted to candidacy.

All entering graduate students will be awarded fellowships plus full payment of tuition, fees, and insurance premiums. No teaching responsibilities are attendant to the fellowship acceptance.

Additional Information

For detailed information, contact Dr. James F. Collawn, UAB Cell Biology Graduate Program Director, MCLM 350, 1530 3rd Avenue South, Birmingham, AL 35294-0005.

Telephone 205-934-7667

E-mail jcollawn@uab.edu

Course Descriptions

Unless otherwise noted, all courses are for 3 semester hours of credit. Course numbers preceded with an asterisk indicate courses that can be repeated for credit, with stated stipulations.

Cell Biology (CB)

601. **Dental Gross Anatomy.** 8 hours.
712. **Developmental Biology.** Journal club. 1 hour. Pass/Fail. (Mayne)
713. **Growth Factors.** Journal club. 1 hour. Pass/Fail. (Gillespie)
714. **Calcium Signaling.** Journal club. 1 hour. Pass/Fail. (Marchase)
715. **Biochemical Approaches to Cell Biology.** Journal club. 1 hour Pass/Fail. (Collawn)
716. **Molecular Basis of Signaling in the Nervous System.** Journal club. 1 hour. Pass/Fail. (Theibert/Fuller)
720. **Developmental Neurobiology.** Journal club. 1 hour. Pass/Fail. (Wyss)
721. **Laboratory Rotation.** 5 hours. Pass/Fail.
722. **Vascular Biology.** Journal club. 1 hour. Pass/Fail. (Wyss)
723. **Membranes & Glycobiology.** Journal Club. 1 hour. (Rostand)
724. **Special Topics in Cell Biology.**
728. **Advanced Cell Biology.** (Collawn)
729. **Mechanisms of Signal Transduction.** (Fuller/Theibert)
730. **Molecular Basis of Conformational Diseases.** (Sztul/Wyss).
735. **Mechanisms of Writing a Scientific Paper and NIH Grant.** (Morrow)
746. **Cell Cycle and Cancer Genetics.** (Chen)
737. **Developmental Biology.** (Mayne/Chang/Yoder)
740. **Research in Cell Biology.** 1 hour. Pass/Fail.
747. **Cell Biology Seminar.** 1 hour. Pass/Fail. (Mayne/Sztul)
748. **Special Problems in Cell Biology.** 1-5 hours.
750. **Graduate Gross Anatomy.** Lectures, demonstrations, and dissection of all systems and regions of human body. 6 hours. (M. Casey)
752. **Graduate Histology.** Light microscopic features and ultrastructure of cells, fundamental tissues, and organ systems. 5 hours. (Fuller)
755. **Graduate Neuroanatomy.** Gross and microscopic preparations of brain and spinal cord. Functional significance of tracts and nuclei. 4 hours. (Wyss)
779. **Special Problems in Neuroanatomy.** 1-4 hours.
788. **Directed Readings.** Specialized advanced readings in selected topics under direction of appropriate faculty member. 1-4 hours.
790. **Developmental Neurobiology.** (Wyss) 4 hours.
798. **Doctoral Nondissertation Research.** 1-15 hours.
799. **Doctoral Dissertation Research.** Prerequisite: Admission to candidacy. 1-15 hours.

Cellular and Molecular Biology

Program Coordinator: *Eubank*

Faculty

Cell Adhesion and Matrix

Daniel Balkovetz, Assistant Professor (Medicine); Epithelial Cell Biology and HIV-Associated Nephropathy

Steve Barnes, Professor (Pharmacology); Bile Acids and Isoflavonoids

Candece Gladson, Associate Professor (Pathology); Molecular Mechanisms of Angiogenesis and those Involved in Malignant Astrocytoma Cell Migration, Invasion, and Proliferation

Richard Mayne, Professor (Cell Biology); Development and Structure of Mesenchymal Tissues

Anne Woods, Associate Professor (Cell Biology); Transmembrane signaling in cell-matrix interactions

Cell Physiology and Signaling

Ety Benveniste, Professor and Chair (Cell Biology); Bidirectional Communication Between the Immune and Nervous Systems

J. Edwin Blalock, Professor (Physiology & Biophysics); Immune, Neuroendocrine Interactions, Molecular Recognition

Chenbei Chang, Assistant Professor (Cell Biology); Signal pathways in frog development

James Collawn, Assistant Professor (Cell Biology); Intracellular Protein Sorting

Stuart Frank, Professor (Medicine); Eukaryotic Cell Biology and Genetics

Bruce Freeman, Professor (Anesthesiology); Tissue Production and Reactions of Reactive Oxygen Species

Gerald Fuller, Professor (Cell Biology); Regulation of Liver Plasma Protein Genes

Richard Jope, Professor (Psychiatry); Neuronal Signaling Systems, Mechanisms and Abnormalities in Neuronal Disorders

Kevin Kirk, Professor (Physiology & Biophysics); Ion Channels, Membrane Traffic, Cystic Fibrosis

Fang-Tsy (Fannie) Lin, Assistant Professor (Cell Biology); Regulation of Cell Growth by G Protein-Coupled Receptor Signaling

Richard Marchase, Senior Associate Dean for Biomedical Research, Professor (Cell Biology); Calcium Signaling and Cardiac Hypertrophy

Steven Rosenfeld, Associate Professor (Cell Neurology); Structure of Molecular Motors

Erik Schwiebert, Assistant Professor (Physiology & Biophysics); Epithelial Cell Biology and Physiology

Lisa Schwiebert, Assistant Professor (Physiology & Biophysics); Airway Inflammation

Elizabeth Sztul, Associate Professor (Cell Biology); Organellar Biogenesis and Membrane Traffic

John Thompson, Professor (Surgery); Molecular Mechanisms of Angiogenesis

Gene Regulation and Expression

Xinbin Chen, Associate Professor (Cell Biology); The p53 Tumor Suppressor Gene Family and Transcriptional Regulation

Patrick N. Higgins, Professor (Biochemistry and Molecular Genetics); Mechanics and Enzymology of Chromosome Movement

Jamila Horabin, Assistant Professor (Biochemistry and Molecular Genetics); Sex Determination in *Drosophila*

Weei-Chin Lin, Assistant Professor (Cell Biology); Cell cycle control and DNA damage response

Susan Lobo-Ruppert, Assistant Professor (Biochemistry and Molecular Genetics); Synthesis of Small Nuclear RNAs

Tim Townes, Professor and Chair (Biochemistry and Molecular Genetics); Developmental Regulation of Gene Expression

Chuck Turnbough, Professor (Microbiology); Bacterial Gene Regulation; Structure/Function of the *Bacillus anthracis* Spore Surface

Immunology

Prescott Atkinson, Associate Professor (Pediatrics); Signal Transduction in Lymphocytes

Scott Barnum, Associate Professor (Microbiology); Role of Complement in CNS Inflammatory Diseases

Louis Bridges, Associate Professor (Medicine); B Lymphocytes in the Pathogenesis of Rheumatoid Arthritis and Chronic Hepatitis C; Pharmacogenetics of Rheumatoid Arthritis

Patrick Bucy, Professor (Pathology); Immune Regulation, Transplantation, and HIV Pathogenesis

Peter Burrows, Professor (Microbiology); B Cells, Developmentally Regulated Genes, Isotype Switching

Robert Carter, Associate Professor (Medicine); Molecular Mechanisms of Control of B Lymphocyte Responses

David Chaplin, Professor and Chairman (Microbiology); T Cell Control of Tissue Inflammation, Regulation of Normal and Pathologic Immune Responses in Lymphoid Tissues

Max Cooper, Professor (Medicine); Immune System Ontogeny and Phylogeny

Vithal Ghanta, Professor (Biology); Tumor Immunology, Immune and Nervous System and Immune System Interactions

Raymond Hiramoto, Professor (Microbiology); Stress, Conditioning, and Cancer Immunotherapy

Louis Justement, Associate Professor (Microbiology); Lymphocyte Activation, Tyrosine Kinases and Phosphatases, CD45, CD22

John Kearney, Professor (Microbiology); B Cells, Idiotypes, Hybridomas, Transgenic Mice, Immunoregulation

Christopher Klug, Assistant Professor (Microbiology); Hematopoietic Stem Cell Development

William Koopman, Professor (Medicine); Pathogenesis of Immune Disease

Hiromi Kubagawa, Associate Professor (Pathology); B Cells; Antibodies; Fc Receptors; Immunoglobulin-like Receptors; Immunopathology

Jerry McGhee, Professor (Microbiology); Mucosal immunity and vaccines; mucosal tolerance and inflammation

Jiri Mestecky, Professor (Microbiology); Mucosal Immunity, Vaccines

Sue Michalek, Professor (Microbiology); Vaccine Delivery Systems, Mucosal Immunity, Inflammation, T Cells and Cytokines

John Mountz, Professor (Medicine); Autoimmunity, Complex Trait Genetics, Gene Therapy

Chander Raman, Assistant Professor (Medicine); Lymphocyte Activation, Immune Tolerance and Autoimmunity

Harry Schroeder, Professor (Medicine); Developmental Genetics, Clinical Immunology

Laura Timares, Assistant Professor (Dermatology); Engineering Dendritic Cells for Immunotherapy

Casey Weaver, Associate Professor (Pathology); T Cell Development

Macromolecular Structure and Function

Christie Brouillette, Associate Professor (Biochemistry and Molecular Genetics); Protein Structural Cooperativity and Energetics

Debasish Chattopadhyay, Assistant Professor (Medicine); Cellular Trafficking, Antimicrobial Chemotherapy

Herbert Cheung, Professor (Biochemistry and Molecular Genetics); Regulatory Mechanisms of Cardiac Muscle, Molecular Motors, and Fluorescence Spectroscopy

Lawrence DeLucas, Professor (Optometry); Protein Crystallography and Protein Crystal Growth

Gabriel Elgavish, Professor (Biochemistry and Molecular Genetics); NMR Studies of Intact Hearts

Stephen Harvey, Professor (Biochemistry and Molecular Genetics); Macromolecular Structure and Dynamics

Rama Krishna, Professor (Biochemistry and Molecular Genetics); Structural Biology and Biomolecular NMR Spectroscopy

Ming Luo, Professor (Microbiology); Structure-Based Approaches to Anti-Infectious Agents

Jere Segrest, Professor (Cell Biology); Plasma Lipoprotein Structure and Function

Ben Sha, Assistant Professor (Cell Biology); Protein Folding and Protein Trafficking

Mark Walter, Associate Professor (Microbiology); X-ray Crystallography, Molecular Recognition, Signal Transduction, Cytokine Structure and Function

Molecular Genetics and Disease

Ronald Acton, Professor (Microbiology); Immunogenetics

David Bedwell, Associate Professor (Microbiology); Translation Termination, Calcium Signaling

Michael Bertram, Assistant Professor (Medicine); Cell Cycle Regulation and Aging in Drosophila

Peter Detloff, Assistant Professor (Biochemistry and Molecular Genetics); Mouse Models of Human Genetic Disorders

Kevin Dybvig, Professor (Comparative Medicine); Mycoplasmas, Genetics, Phenotypic Switching, DNA Rearrangements

Lisa Guay-Woodford, Associate Professor (Medicine); Molecular Genetic Determinants of Polycystic Kidney Disease

Richard Kaslow, Professor (Epidemiology); Immunogenetic Determinants in AIDS and Other Infectious and Immune Diseases

Robert Kimberly, Professor (Medicine); Immunologic Diseases and Autoimmunity

Jeffrey Kudlow, Professor (Medicine); Diabetes and the Regulation of Gene Transcription by Glucose and its Metabolites

Elliot Lefkowitz, Research Associate Professor (Microbiology); Bioinformatics; Microbial Genomics and Evolution

Michael Ruppert, Associate Professor (Medicine); Mechanism of Action of Transforming Oncogenes in GLI and KLF4/GKLF in Carcinoma Genetic Progression

Theresa Strong, Assistant Professor (Medicine); Gene Therapy for Cancer and Inherited Disease

Bradley Yoder, Assistant Professor (Cell Biology); Cilia Assembly, Function, and Polycystic Kidney Disease

Molecular Pathogenesis

Con Beckers, Assistant Professor (Medicine); Cell Biology of *Toxoplasma gondii*

William Benjamin, Assistant Professor (Pathology); Genetics of Host-Bacterial Relationship

David Briles, Professor (Microbiology); Bacterial Pathogenesis, Virulence, Immunity, Pneumococcus, Tuberculosis

Noel Childers, Professor (Oral Biology); Oral Immunization, Dental Caries

Susan Hollingshead, Research Associate Professor (Microbiology); Mechanisms of Variation in Microbial Pathogenesis

Moon Nahm, Professor (Pathology); Vaccine, *S. pneumoniae*, Bacterial Pathogenesis, Immunity

David Pritchard, Professor (Biochemistry and Molecular Genetics); Molecular Basis for the Pathogenicity of Gram-Positive Bacteria

Thomas Unnasch, Professor (Medicine); River Blindness, Filariasis, Arboviruses, Molecular Entomology Diagnosis

Ken Waites, Professor (Pathology); Diagnostic microbiology, epidemiology and mechanisms of antimicrobial resistance

Janet Yother, Associate Professor (Microbiology); *Streptococcus pneumoniae* Genetics and Pathogenesis

Neurobiology

Michael Brenner, Associate Professor (Neurobiology); Molecular Neurobiology

Lynn Dobrunz, Assistant Professor (Neurobiology); Synaptic Transmission, Presynaptic Properties of Single Synapses

Michael Friedlander, Professor (Neurobiology); Synapse Function, Role of Nitric Oxide in Neural Signaling, Molecular Basis of Learning

John Hablitz, Professor (Neurobiology); Cellular Mechanisms of Neurotransmission

Gail Johnson, Professor (Psychiatry); Phosphorylation and Function of Cytoskeletal Proteins

Robin Lester, Associate Professor (Neurobiology); Nicotinic Receptors in the CNS; Neurobiology of Addiction

Stuart Mangel, Associate Professor (Neurobiology); Synaptic Plasticity and Modulation in the Retina; Circadian Rhythmicity

Lin Mei, Assistant Professor (Neurobiology); Synapse Formation and Synaptic Plasticity

Lucas Pozzo-Miller, Assistant Professor (Neurobiology); Calcium Signaling; Synaptic Plasticity; Neurotrophic Factors

Michael Quick, Associate Professor (Neurobiology); Regulation of Proteins Involved in Neuronal Signaling

Harold Sontheimer, Associate Professor (Neurobiology); Role of Neuroglia in Brain Function

Anne Theibert, Associate Professor (Cell Biology); Role of Phosphoinositides in Developmental Neurobiology

David Weiss, Professor (Neurobiology); Structure/Function and Regulation of Ligand-Activated Ion Channels

Michael Wyss, Professor (Cell Biology); Control of the Autonomic Nervous System

Virology

Grace Aldrovandi, Assistant Professor (Pediatrics); HIV/AIDS Pathogenesis, Recombination, and Drug Resistance

Andrew Ball, Professor (Microbiology); RNA Replication Mechanisms

William Britt, Professor (Pediatrics); Herpesvirus Envelope Assembly

Thomas Broker, Professor (Biochemistry and Molecular Genetics); Human Papillomavirus Gene Expression, Replication, and Pathogenesis

Louise Chow, Professor (Biochemistry and Molecular Genetics); Molecular and Cellular Biology of Human Papillomaviruses

Jeff Engler, Professor (Biochemistry and Molecular Genetics); Virus Protein Structure and Function

Patricia Fultz, Professor (Microbiology); Retroviral Pathogenesis, HIV Vaccines

Beatrice Hahn, Professor (Medicine); Human Retroviruses and Associated Diseases

Eric Hunter, Professor (Microbiology); Retrovirus Molecular Biology, Virus Assembly

John Kappes, Associate Professor (Medicine); HIV, Molecular Virology and Pathogenesis

Cindy Luongo, Assistant Professor (Microbiology); Double-Stranded RNA Viruses; Viruses-Based Therapies

Casey Morrow, Professor (Cell Biology); Viral Morphogenesis and Replication; Gene Therapy and Vaccines

Peter Prevelige, Associate Professor (Microbiology); Viral Capsid Self-Assembly: Defining the Underlying Subunit-Subunit Interactions and Their Potential as Therapeutic Targets

George Shaw, Professor (Medicine); Human Retroviruses, Molecular Virology and Pathogenesis

Wayne Sullender, Associate Professor (Pediatrics); Respiratory Syncytial Virus, Antigenic Diversity

Gail Wertz, Professor (Microbiology); Molecular Virology, Control of RNA Replication and Transcription

Richard Whitley, Professor (Pediatrics, Microbiology, Medicine); Virus, Herpesvirus, Herpes Simplex, *Varicella zoster* Virus

Allan Zajac, Assistant Professor (Microbiology); Antiviral Immunity; T Cell Responses

Tong Zhou, Associate Professor (Medicine); Apoptosis, autoimmunity, and cancer biology

Program Information

Graduate study in the multidisciplinary area of cellular and molecular biology is coordinated through the Cellular and Molecular Biology (CMB) Program. Faculty mentors in this program have primary or secondary appointments in the Departments of Biochemistry and Molecular Genetics, Cell Biology, Microbiology, or Neurobiology. The students enrolled in this program, therefore, have over 120 potential research laboratories in which to pursue their doctoral training.

The CMB Program administers an intensive, year-long core curriculum designed to provide entering graduate students with a comprehensive introduction to the broad fields of cellular and molecular biology. The core curriculum includes courses in biomolecules, genetics, cells, signaling, virology and immunology, and special topics. In addition, students are exposed to on-going research projects as they rotate through three different laboratories during their first nine months of residency.

Students enter the CMB Program with the intent of using their classroom and laboratory experiences during the first year to help them further define their research interests. The minimum admission criteria are those of the Graduate School (B-level scholarship and a combined score of 1,100 on the verbal and quantitative sections of the GRE General Test) and

a suitable background in the biological and physical sciences. Students for whom English is a second language are also required to take the TOEFL examination. At the end of their first year in graduate school, CMB students who successfully complete the first-year curriculum select an advisor and become affiliated with the graduate program of one of the four participating departments.

Advanced courses in CMB are then offered by the four individual departments. The CMB Program, therefore, acts as a mechanism for allowing students to be admitted into graduate school in this general area while maintaining as broad a spectrum of potential research mentors as possible. The program is highly interdisciplinary, and students benefit from the strong interrelationships between the basic science departments and between the basic and clinical sciences. This interdisciplinary approach and the ready willingness to work together to share ideas and methodologies have played a major role in UAB's rise to international prominence in many fields of research. Such interactions also allow graduate research experiences to move at a pace and in directions that might not be anticipated at the outset of thesis work. The program anticipates admitting 25-30 students each year.

Additional Information

For detailed information, contact Rene Eubank, Program Coordinator, Cellular and Molecular Biology Graduate Program, BBRB 260, 1530 3rd Avenue South, Birmingham, AL 35294-2170.

Telephone 1-800-262-7764

Fax 205-975-2536

E-mail cmb@uab.edu

Web www.cmb.uab.edu

Course Descriptions

Cellular and Molecular Biology (CMB)

700. **CMB I.** Biomolecules—Structural and biochemical properties of proteins, enzymes, and coenzymes are discussed. 5 hours.

701. **CMB II.** Genetics—Prokaryotic and eukaryotic genetics; control of gene expression; DNA recombination, replication, transcription and translation. 5 hours.

702. **CMB III.** Cells—Fundamental aspects of cell biology. 5 hours.

703. **CMB IV.** Signaling—Mechanisms of cellular signaling. 5 hours.

704. **CMB V.** Virology/Immunology—Virology; theoretical and experimental aspects of the immune system. 5 hours.

705. **CMB VI.** Special Topics—2 hours.

712. **Methods and Logic.** Practical aspects of critical evaluation the scientific literature. 1 hour.

721-723. **Laboratory Research.** 12-week rotations in each of three laboratories conducting research; 15-minute oral presentations on accomplishments following each rotation. 4 hours each.

Chemistry (Ph.D., M.S.)

Graduate program director: *Krannich*

Faculty

Rigoberto C. Advincula, Assistant Professor (Chemistry); Synthesis, Fabrication, and Characterization of Ultrathin Films

Wayne J. Brouillette, Professor (Chemistry); Drug Design and Synthesis, Stero-Specific Anticonvulsants, Antidiabetics

Juan P. Claude, Assistant Professor (Chemistry); Electrosynthesis and Photophysics of Semiconductor Nanoparticles

Gary M. Gray, Professor (Chemistry); Transition Metal P-Donor Complexes, Homogeneous Catalysts, Chemotherapeutic Agents

Tracy P. Hamilton, Associate Professor (Chemistry); Ab Initio Theoretical Chemistry Development and Applications

Larry K. Krannich, Professor (Chemistry); Synthesis, Characterization Chemical Dynamics of Group III and V Systems

John A. Montgomery, Adjunct Professor (Pharmaceutical Design); chemotherapy, Antifolates Nuclear Science, Alkylating Agents, Mitotic Inhibitors

Donald D. Muccio, Professor (Chemistry); Spectroscopy, Biophysical Chemistry, Energy Transfer in Biological Systems

William K. Nonidez, Associate Professor (Chemistry); Novel Flow System Detectors, Electrochemistry, Chemiluminescence, X-ray Fluorescence

James R. Piper, Adjunct Professor (Chemistry); Organic Synthesis, Folate Antagonists, Medicinal Chemistry, Drug Design

John A. Secrist III, Adjunct Professor (Chemistry); Drug Design and Synthesis, Medicinal Chemistry, Nucleic Acid Components

Frederick P. Smith, Associate Professor (Criminal Justice); Trace Element, Physiological Fluid, and Drug Detection

Lee R. Summerlin, Professor (Chemistry); Chemical Education, Computer-Assisted Instruction

Sergey Vyazovkin, Assistant Professor (Chemistry); Analytical Chemistry, Kinetics and Mechanisms of Condensed Phase Reactions, Thermal Methods of analysis, Polymeric and Energetic Materials.

Charles L. Watkins, Professor (Chemistry); NMR Spectroscopy, Biophysical Chemistry, Dynamics of Solute-Solvent Interactions

Program Information

General Requirements

Specializations available to M.S. and Ph.D. students in chemistry include analytical, organic, inorganic, and physical chemistry with biochemical applications. After being admitted to the graduate program and before registering for any graduate chemistry courses, the student must take placement examinations. Based upon the results of these examinations, some students may be required to take specified remedial work on a pass/fail basis before enrollment in the core courses; a pass must be obtained in each remedial course for continuation in

the program. Other students may be exempted from certain core courses and can proceed to a more advanced course level.

All chemistry graduate students are required to take a total of 18 semester hours of courses that include CH 601/701, 602/702 and four other courses selected from nine courses offered by the department or courses outside the department when career objectives suggest a knowledge base that can be best acquired in this manner. The choice should reflect individual career objectives. To continue in the Ph.D. program, the student must earn a grade of B or better in each of the selected core courses. To continue in the M.S. program, the student must earn a B average or better in the 18 semester hours of core courses. One repeat of any of these courses is allowed to raise grades.

All graduate students must present a departmental literature seminar after the third quarter of enrollment. A minimum of one quarter of teaching experience is required of all graduate students. Prior to the conclusion of the third quarter of enrollment, the student should select a major professor. This selection occurs after the student has interviewed each graduate faculty member in the Department of Chemistry. The student and the major professor will recommend to the director of the graduate program in chemistry the composition of the graduate study committee.

9 Core Courses:

(CH) 625/725, 622/722, 732, 640/740, 641/741, 642/742, 650/750, 651/751, 656/756.

Substitutions are permitted with the approval of the Advisory Committee.

Master's students choose from the 600 courses, Ph.D. students from the 700 courses.

M.S. Program

Plan I

Plan I is a research program that requires a minimum of 24 semester hours (including 18 semester hours of core courses) of formal academic coursework approved by the student's graduate study committee. The progress of the student's research program is monitored by the graduate study committee. The student, having been admitted to candidacy and having completed an approved plan of research, will complete and defend a thesis.

Plan II

Plan II is a nonthesis program that requires a minimum of 30 semester hours (including 18 semester hours of core courses) of appropriate graduate work that has been approved by the student's graduate study committee.

Ph.D. Program

For Ph.D. students, there are no specific course requirements beyond the core courses. The academic program is determined through the action of the student's graduate study committee. A written qualifying examination must be passed in the student's area of specialization. If failure occurs, only one repeat exam is allowed. A research proposal must be defended within 12 months of completion of the written qualifying examination. If failure occurs, one repeat defense is allowed. The student, having been admitted to candidacy and having completed an approved plan of research, will submit a dissertation to the Graduate School. This dissertation must be defended at an open meeting.

Additional Information

For detailed information, contact Dr. Larry K. Krannich, UAB Graduate Program Director, CHEM 201, 1530 3rd Avenue South, Birmingham, AL 35294-1240.

Telephone 205-934-8017

E-mail krannich@uab.edu

Web www.chem.uab.edu

Course Descriptions

Unless otherwise noted, all courses are for 3 semester hours of credit. Course numbers preceded with an asterisk indicate courses that can be repeated for credit, with stated stipulations.

Chemistry (CH)

525. Physical Chemistry I for Graduate Study. Thermodynamics and chemical equilibria; and chemical kinetics. Prerequisites: MA 126, PH 202, CH 117. Fall.

526. Physical Chemistry II for Graduate Study. Quantum mechanics, chemical bonding, and molecular spectroscopy. Prerequisite: CH 525. Spring.

535. Organic Chemistry I for Graduate Study. Structure of organic compounds based on bonding, stereochemical, and physical properties. Fall, spring, summer.

537. Organic Chemistry II for Graduate Study. Practical and theoretical considerations of organic reactions; Introduction to spectroscopy. Prerequisite: CH 535. Fall, Spring, Summer.

540. Inorganic Chemistry I for Graduate Study. Chemical reactivity and descriptive chemistry in terms of structural and electronic parameters. Fall.

541. Transition Metal Chemistry. Atomic structure, chemical bonding characterization and reactivity of transition metal complexes. Prerequisite: CH 340, CH 323. Spring.

550. Analytical Chemistry I for Graduate Study. Analytical measurements, spectrophotometric and gravimetric analyses, chromatography, and chemical equilibrium. Spring.

555. Analytical Chemistry II for Graduate Study. General operating principles and quantitative applications of commonly used analytical instruments. Prerequisite: CH 550. Spring.

561, 564. Biochemistry I, II: General Biochemistry. Chemistry, biosynthesis, intermediary metabolism, and function of carbohydrates, lipids, nucleic acids, and proteins and their monomeric units. General aspects of enzymology, energy metabolism, and biological control mechanisms. Prerequisite: CH 233. Fall, Spring.

580, 581. Polymer Chemistry I, II. Introduction to Polymer Chemistry (CH 580, also MSE 530). Structure and properties of crystalline and amorphous polymers; polymer processing; correlation of polymer structure with processability and performance. Synthesis and characterization of polymers; polymerization reactions, kinetics, and mechanisms; polymer solution properties. Prerequisite: CH 233, 321, or MSE 254. Spring, Spring.

600. Foundations of Physical and Analytical Chemistry. Quantum mechanics applied to electronic structure and chemical bonding. Symmetry and spectroscopic measurements. Fall.

601. Foundations of Organic and Inorganic Chemistry. Atomic structure, chemical bonding, and periodicity.

602. Principles of Chemical Instruction. Responsibilities of laboratory instructors, safety regulations, grading,

teaching styles and formats, and instructional objectives. Prerequisite: Permission of instructor. Fall. 1 hour.

610. Laboratory Experiences in Chemistry I. Application of simple experiments to high school science programs.

611. Laboratory Experiences in Chemistry II. Continuation of CH 602.

612. Polymer Chemistry for Teachers. Lecture and laboratory experiences focusing on natural and synthetic polymers. Morning lectures by polymer chemists with afternoon labs where polymers are synthesized and studied. Emphasis is on practical application and new developments in polymer chemistry. Experiments are suitable for high school science programs.

613. Introductory Organic Chemistry for Teachers. A laboratory/lecture/demonstration course on the nature of carbon compounds including hydrocarbons, functional groups and their reactions. Emphasis given to laboratory experiments and demonstrations suitable for high school students.

614. Introductory Biochemistry for Teachers. Lecture series covering carbohydrates, lipids, and proteins. Emphasis given to practical applications and relationship between chemistry and biology. Aspects of nutrition are discussed.

615. Introductory Biochemistry for Teachers II. Lecture series covering vitamins, minerals, enzymes, biochemical energy and metabolism. Strong connections between chemistry and biology. Practical applications are emphasized.

616. Chemical Demonstrations. A laboratory-based course exploring the teaching potential of selected chemical reactions. Teachers perform at least 50 demonstrations in the laboratory and share ways they can use these in their own classes. Emphasis on facilitating learning of chemistry.

617. Chemical Demonstrations II. At least 50 demonstrations will be performed. Focus is on safe, practical and effective experiments suitable for high school students.

***619. Special Topics in Chemical Education.** Topics determined by interest of students and faculty.

622. Chemical Dynamics and Equilibrium. Chemical thermodynamics, kinetic processes and chemical reaction dynamics from a molecular approach. Dynamic nature and molecular basis of equilibrium emphasized. Both theoretical and experimental approaches for understanding elementary chemical processes. Prerequisite: CH 321. Fall.

625. Molecular Structure and Spectroscopy. Classical and quantum mechanical descriptions of molecular structure and bonding. Basic principles and techniques of molecular spectroscopic methods. Exercises and experiments with computational software and spectroscopic instrumentation will be conducted.

***629. Special Topics in Physical Chemistry.** Topics determined by interest of students and faculty. Prerequisite: CH 325.

630. Physical Organic Chemistry. Localized and delocalized chemical bonds, stereochemistry, acidity and basicity, determining organic mechanisms and structure. Fall.

631. Organic Reactions and Their Mechanisms. Nucleophilic and electrophilic substitution, free radical substitutions, additions to carbon-carbon and carbon-hetero multiple bonds, elimination reactions. Prerequisite: CH 630. Spring.

***639. Special Topics in Organic Chemistry.** Topics determined by interest of students and faculty. Prerequisite: CH 323. 1-3 hours.

640. Bonding and Structure in Inorganic Compounds. Advanced treatment of bonding in main group and transition metal compounds, and a study of its relationship properties of compounds. Prerequisite: CH 540 or permission of instructor. Spring.

641. Coordination Compound Dynamics. Steady-state and time-resolved spectroscopy of coordination compounds; photophysics; electron transfer reaction; mixed-valence complexes; bioinorganic applications. Prerequisite: CH 640 or 740 or permission of instructor. Summer (alternate years).

642. Organometallic Chemistry and Catalysis. Study of transition metal organometallic compounds and their applications as homogeneous catalysts for organic and polymer syntheses. Prerequisite: CH 640 or 740 or permission of instructor. Summer (alternate years).

***649. Special Topics in Inorganic Chemistry.** Topics determined by interest of students and faculty. Prerequisite: Permission of instructor. 1-3 hours.

650. Advanced Analytical Chemistry. Survey of instrumental methods including separations, spectroscopy, and electrochemistry. Prerequisite: CH 600. 3 hours.

651. Advanced Analytical Chemistry II. Kinetic methods of analysis, fundamental principles of electrochemical, separation, and spectroscopic methods of analysis. Spring.

655. Electroanalytical Chemistry. Potentiometry, voltammetry, polarography, coulometry, pulse techniques, and trace analysis. Prerequisite: CH 551 or permission of instructor.

656. Analytical Separations. Advanced treatment of distillation, extraction, gas chromatography, HPLC, TLC, and GC-MS. Prerequisite: CH 551 or permission of instructor.

657. Analytical Spectroscopy. Physical optics, error and precision of optical methods, applications of modern atomic and molecular spectrometry. Prerequisite: CH 551 or permission of instructor.

658. Laboratory Electronics for Chemists. A basic course in applied electronics, covering fundamental circuit components and interfacing. Prerequisite: Permission of instructor.

***659. Special Topics in Analytical Chemistry.** Prerequisite: Permission of instructor. 1-3 hours.

664. Physical Techniques in Biology. Common physical methods for understanding the structure and stability of macromolecules that include several spectroscopic, thermodynamic and computational methods. Underlying physical principle described, instrumentation discussed, and examples cited from the literature. Prerequisite: CH 323 or 461. Spring.

***669. Special Topics in Biochemistry.** Detailed consideration of areas of special interest. Prerequisite: CH 363.

670. Chemical Literature. Use of on-line literature and development of searching techniques.

689. Special Topics in Polymer Chemistry.

691. Seminar. Seminars on current topics in chemical research. Pass/Fail. 1 hour.

692. Seminar Presentation. Seminar given by graduate students on current topics in chemical research. 2 hours.

698. Graduate Research. Prerequisite: Permission of graduate faculty member. Pass/Fail. 1-8 hours.

699. M.S. Thesis Research. Prerequisites: Admission to candidacy and permission of graduate faculty member. 1-8 hours.

700. Foundations of Physical and Analytical Chemistry. Quantum mechanics applied to electronic structure and chemical bonding. Symmetry and spectroscopic measurements. Fall.

701. Foundations of Organic and Inorganic Chemistry. Quantum mechanics applied to electronic structure and chemical bonding. Symmetry and spectroscopic measurements. Fall.

710. Medicinal Chemistry.

722. Chemical Dynamics and Equilibrium. Chemical thermodynamics, kinetic processes, and chemical reaction dynamics covered from a molecular approach. The dynamic nature and molecular basis of equilibrium is emphasized. Both theoretical and experimental approaches for understanding elementary chemical processes are discussed. Prerequisite: CH 321. Fall.

725. Molecular Structure and Spectroscopy. Classical and quantum mechanical descriptions of molecular structure and bonding. Basic principles and techniques of molecular spectroscopic methods. Exercises and experiments with computational software and spectroscopic instrumentation will be conducted.

***729. Special Topics in Physical Chemistry.** Typical are X-ray crystallography, molecular spectroscopy, solution properties of macromolecules, magnetic resonance. Prerequisite: Permission of instructor. 1-3 hours.

730. Physical Organic Chemistry. Localized and delocalized chemical bonds, stereochemistry, acidity and basicity, determining organic mechanisms and structure. Fall.

731. Organic Reactions and Their Mechanisms. Nucleophilic and electrophilic substitution, free radical substitutions, additions to carbon-carbon and carbon-hetero multiple bonds, elimination reactions. Prerequisite: CH 730. Spring.

732. Organic Reactions and Synthesis. Strategy of synthesis, carbon skeletal assembly, selective functional group interconversion, blocking groups, stereochemical control. Prerequisite: CH 731. Spring.

733. Reactive Intermediates and Conservation of Bonding. Behavior of organic molecules in static and reactive situations. Prerequisite: CH 731 or permission of instructor. Spring.

***739. Special Topics in Organic Chemistry.** Topics determined by interest of students and faculty. Prerequisite: CH 233.

740. Bonding and Structure in Inorganic Compounds. Advanced treatment of bonding in main group and transition metal compounds, and a study of its relationship to the properties of compounds. Prerequisite: CH 540 or permission of instructor. Spring.

741. Coordination Compound Dynamics. Steady-state and time-resolved spectroscopy of coordination compounds; photophysics; electron transfer reaction; mixed-valence complexes; bioinorganic applications. Prerequisite: CH 640 or 740 or permission of instructor. Summer (alternate years).

742. Organometallic Chemistry and Catalysis. Study of transition metal organometallic compounds and their applications as homogeneous catalysts for organic and polymer syntheses. Prerequisite: CH 640 or 740 or permission of instructor. Summer (alternate years).

743. Chemical Applications of Group Theory. Representations of groups, construction of hybrid orbitals, molecular

orbital theory, ligand field theory, infrared and Raman spectroscopy. Prerequisite: CH 740. Spring.

744. Spectroscopy of Inorganic Chemistry. Ultraviolet, visible, infrared, Raman, microwave, NMR, ESR, and magnetochemistry techniques. Prerequisite: CH 741. Summer.

***749. Special Topics in Inorganic Chemistry.** Topics determined by interest of students and faculty. Prerequisite: Permission of instructor. 1-3 hours.

750. Advanced Analytical Chemistry. Survey of instrumental methods including separations, spectroscopy, and electrochemistry. Prerequisite: CH 700.

751. Advanced Analytical Chemistry II. Kinetic methods of analysis, fundamental principles of electrochemical, separation, and spectroscopic methods of analysis. Spring.

755. Electroanalytical Chemistry. Potentiometry, voltammetry, polarography, coulometry, pulse techniques, and trace analysis. Prerequisite: CH 751 or permission of instructor.

756. Analytical Separations. Distillation, extraction, gas chromatography, HPLC, TLC, and GC-MS. Prerequisite: CH 751 or permission of instructor.

757. Analytical Spectroscopy. Physical optics, error and precision of optical methods, applications of modern atomic and molecular spectrometry. Prerequisite: CH 751 or permission of instructor.

758. Laboratory Electronics for Chemists. A basic course in applied electronics, covering fundamental circuit components and interfacing. Prerequisite: Permission of instructor.

***759. Special Topics in Analytical Chemistry.** Prerequisite: Permission of instructor. 1-3 hours.

764. Physical Techniques in Biology. Common physical methods for understanding the structure and stability of macromolecules that include several spectroscopic, thermodynamic, and computational methods. Underlying physical principle described, instrumentation discussed, and examples cited from the literature. Prerequisite: CH 323 or CH 461. Spring.

***769. Special Topics in Biochemistry.** Detailed consideration of areas of special interest. Prerequisite: CH 463. 1-3 hours.

770. Chemical Literature. Use of on-line literature and development of searching techniques.

789. Special Topics in Polymer Chemistry.

791. Seminar. Seminars on current topics in chemical research. Pass/Fail. 1 hour.

792. Seminar Presentation. Seminar given by graduate students on current topics in chemical research. 2 hours.

798. Nondissertation Research. Prerequisite: Permission of graduate faculty member. Pass/Fail. 1-8 hours.

799. Dissertation Research. Prerequisite: Admission to candidacy and permission of graduate faculty member. 1-8 hours.

Clinical Laboratory Sciences (M.S.C.L.S.)

Graduate program director: *Skrinska*

Faculty

George Fritsma, Associate Professor (Diagnostic and Therapeutic Sciences); Hematology, Coagulation, Body Fluids

Margaret Fritsma, Associate Professor (Diagnostic and Therapeutic Sciences); Immunohematology; Hemostasis, Laboratory Management

Pat E. Greenup, Associate Professor (Diagnostic and Therapeutic Sciences); Clinical Microbiology; Laboratory Operations Management

Linda H. Jeff, Associate Professor (Diagnostic and Therapeutic Sciences); Clinical Microbiology; Educational Methodology

Victor Skrinska, Associate Professor (Diagnostic and Therapeutic Sciences); Clinical Chemistry; Toxicology

Program Information

Program Mission

The faculty members are committed to service to the community and to providing quality education to prepare students and practitioners for the current and future in clinical laboratory sciences. The faculty, in its concern for the health and safety of the general public, is committed to ensuring that each student develops knowledge, skills, and values essential to the appropriate role providing the basis for continuing intellectual and professional growth.

The Master of Science in Clinical Laboratory Science (M.S.C.L.S.) is a part-time or full-time graduate degree program with two plans for degree completion: professional entry and postprofessional entry. The postprofessional entry plan enables professionals who hold a baccalaureate degree and certification (or eligibility for certification) as a Medical Technologist (ASCP) or Clinical Laboratory Scientist (NCA) to prepare for advanced technical and administrative career opportunities. Through courses, research, and project or thesis preparation, M.S.C.L.S. students can enhance their proficiency in clinical laboratory science disciplines, including immunohematology, chemistry, hematology, laboratory operations, informatics, or microbiology. For previously certified medical technologists, certification as a specialist is available in some disciplines upon completion of specific requirements established by national certification agencies.

Examples of positions graduates may prepare for include the following:

- technical consultant with advanced technical proficiency
- operations manager of a clinical laboratory
- clinical laboratory educator within a selected specialty discipline
- quality assurance/improvement manager
- clinical laboratory human resources manager
- clinical laboratory information systems manager.

The professional entry plan is designed for students who hold a Bachelor of Science in biology, chemistry, or a related major, and who are not certified medical technologists but who desire a career in clinical laboratory science. Such students, upon completion, will be eligible to take a national examination for certification as a Medical Technologist or Clinical Laboratory Scientist.

The professional entry plan requires 24 months as a full-time student for completion of the degree requirements. The postprofessional plan time requirement is determined by whether a student is a full- or part-time student.

The program is jointly sponsored by Clinical Laboratory Sciences in the School of Health Related Professions (SHRP)

and the Department of Pathology in the School of Joint Health Sciences.

M.S.C.L.S. Admission Requirements

In addition to the general Graduate School admission requirements, applicants to the M.S.C.L.S. program must

- possess a baccalaureate degree in medical technology, biology, chemistry, or a related major from an accredited college or university,
- have a minimum undergraduate GPA of 3.0 (A = 4.0), computed from all undergraduate credits or from the last 60 semester hours of undergraduate course credit,
- earn scores of at least 500 in each of the verbal and quantitative sections of the GRE General Test,
- if applicant is a clinical laboratory scientist, provide evidence of certification,
- provide a written statement of career goals,
- if foreign-educated, have a score of at least 550 on the TOEFL and submit a transcript evaluation from an acceptable agency, and
- if accepted, complete the UAB medical history questionnaire and physical, provide proof of required immunizations, and receive satisfactory screening by the UAB Medical Center Student Health Service before enrollment.

Persons with a Bachelor of Science who are not certified medical technologists should have completed natural science and mathematics courses equivalent to those required for a Bachelor of Science in Medical Technology (described in SHRP Catalog).

Persons with a Bachelor of Science or who are certified clinical laboratory practitioners may be eligible to register for some of the courses offered through the nondegree path of registration. These students can take up to 12 credits hours of graduate course work. If these students meet the program admission requirements, then these credits may be accepted toward the M.S.C.L.S. degree at the discretion of the M.S.C.L.S. faculty, program director, and faculty advisor. Admission of a student to any course as a nondegree student does not constitute admission to the M.S.C.L.S. degree program.

Essential Requirements

Fundamental tasks, behaviors, and abilities necessary to successfully complete the academic and clinical/residency requirements of the program and to satisfy licensure or certification requirements, if any, have been outlined and are available upon request from the academic program office. Students requesting disability accommodations must do so by filing a disability accommodation request in writing with the academic program office.

M.S.C.L.S. Program of Study

The purpose of the program is to prepare graduates with technical, cognitive, interpersonal, and critical thinking skills required of practitioners who are associated with the operations of clinical laboratory sciences and services. The graduates will have completed general, research skills and advanced technical and operational management courses under the direction of a graduate study committee. These courses assist the graduate to design research projects, collect and analyze data, write empirical research reports and narrative review papers, and prepare for various career opportunities related to clinical laboratory sciences and the in vitro diagnostics industry.

The M.S.C.L.S. program consists of a minimum of 33 semester hours of graduate academic credit, available as a part-time or full-time program. Students must

- complete course requirements and achieve defined competencies,
- maintain a cumulative GPA of at least 3.0 (A = 4.0), and
- write a paper and orally present a Plan II project or a Plan I thesis that reports original research within the student's chosen discipline.

Students complete required general, research, and advanced technical or operational courses and may select electives as explained below:

General Courses: The general course sequence requires a minimum of 9 semester hours. Courses in this sequence include health and safety management, scientific publications analyses, quality management, technology assessment, and educational methodology.

Research Courses: The research course sequence consists of a minimum of 9 semester hours and includes courses covering research design methodology, and statistics. Thesis and project credits are recorded as part of the research core.

Advanced Courses: This course sequence consists of at least 9 semester hours as needed from courses in clinical chemistry, hematology, immunology, immunohematology, laboratory operations, informatics, and microbiology. These course sequences are designed to provide in-depth scientific knowledge.

Electives: Electives may be selected from M.S.C.L.S. courses or other academic programs at UAB as approved by the student's advisor.

Students in the Professional Entry Plan have prescribed courses that fulfill the General, Research, and Advanced Areas. Electives are available.

Additional Information:

For detailed information, contact Victor Skrinska, Director, Clinical Laboratory Sciences Programs, UAB School of Health Related Professions, RMSB 431 1705 University Blvd., Birmingham, Alabama 35294-1212.

Telephone 205-934-4863.

Fax 205-975-7302

E-mail mscls@uab.edu

Web www.uab.edu/cls

Course Descriptions

All courses require permission of the student's academic advisor. Unless otherwise noted, all courses are for 3 semester hours of credit. Course numbers preceded with an asterisk indicate courses that can be repeated for credit, with stated stipulations.

Clinical Laboratory Sciences (CLS)

500. Biological and Chemical Weapons: Detectors/Response. Awareness of biological, chemical and social sciences concepts related to biological and chemical weapons. The identification of competencies needed by individuals, healthcare practitioners and researchers to detect and minimize harm to the public's health caused by biological and chemical weapons. Prerequisite: none. 2 hours.

600. Quality Management in Clinical Laboratory Markets. TQM/CQI change management practices, comparison and contrast to scientific management theory, principles, practices, tactics, and evaluation of practices that support per-

formance improvement for individuals, groups, and organizational business unit performance; quality management (QM) elements and interrelationships intended to achieve internal and external customer satisfaction; tactics supportive for implementation and internalization of internal support structures needed by internal customers so that commitment to improving personal competencies in knowledge, skills, abilities, service behaviors and intended performance achievement are more likely to occur; practices needed to achieve internal and external customer satisfaction and customer value/retention behaviors. Prerequisite: permission of instructor.

601. Designing Effective Laboratory Medicine Services. Application of organizational theory and behavior principles to operations of laboratory medicine services; structural, contextual, and system/process factors that affect delivery of services; outcomes to include tactic applications needed for maximizing personal and organizational performance behaviors and results; analysis of strategies and tactics for achieving exceptional and evolving service relationships with internal and external customers. Prerequisite: permission of instructor.

602. Managing Clinical Laboratory Financial and Cost Accounting Operations. Clinical laboratory approach to cost accounting, project management principles, reimbursement and fee determination mechanisms, budgeting practices, performance indicators/ratios, lease vs. buy decision criteria, and micro-costing practices linked with quality or performance management, legislation/regulations, external stakeholders, utilization management, billing practices, fraud and abuse/compliance practices, outcomes cost analysis models, and factors influencing cost accounting practices in clinical laboratory and in vitro diagnostic industries. Prerequisite: permission of instructor.

603. Strategic Human Performance Technology for Laboratory Medicine Professionals. Human performance technology and interventions to improve individual, unit, and organizational performance focusing on systems and processes; techniques for designing high-performance work units and service culture, process control and optimization of clinical laboratories, material and process flow, management of specimens, equipment, products, informatics and fit of people, technology, and internal marketing practices. Prerequisite: permission of instructor.

605. Transfusion Service Management. Regulatory and compliance issues; inspection and accreditation; Good Manufacturing Practices (GMP); historical perspective and future directions; basic concepts of management and management theory; legal and employment issues; personnel interview, selection, discipline, competency assessment, and performance management; ethical issues; quality assessment, management, and improvement; blood bank computer systems; budget, financial management, and cost assessment. Prerequisite: permission of instructor.

610. Advanced Technology Assessment. Analysis of technology assessment information for test methods and instruments utilized in diagnostic laboratory medicine services; experience with determining and evaluating performance characteristics and clinical utility information for specific diagnostic test procedures; application of quality management practices to establish the diagnostic accuracy of products sold and to establish process quality for services delivered; application of critical thinking skills to evaluate methodological and

substantive validity of correlation and evaluation studies relevant to laboratory medicine practices. Prerequisite: BST 601-602, CLS 693, and permission of instructor.

*620. **Applications of Educational Methodology.** Curriculum and course development and implementation, objectives, application of learning theory to educational strategies, laboratory teaching techniques; preparing a teaching laboratory budget, observation and supervised practice teaching, measurement and evaluation, presentation techniques. Prerequisite: permission of instructor. 1-3 hours.

625. **Principles of Blood Cell and Bone Marrow Counting.** Bone marrow aspirate and biopsy preparation and visual examination; review of normal and disease morphology; determination of bone marrow cellularity and myeloid:erythroid ratio. Prerequisite: permission of instructor. 1 hour.

630. **Advanced Hemostasis.** In-depth discussion of the plasma coagulation system and cellular systems comprised by hemostasis; pathophysiology and hemostasis laboratory diagnosis and case management of congenital and acquired thrombotic and hemorrhagic disorders; quality and efficacy issues affecting hemostasis laboratory testing. Prerequisite: permission of instructor. 2 hours.

631. **Advanced Hematology.** Structure and function of bone marrow, spleen, and lymphatic system; stem cell differentiation, hematopoiesis, erythrocyte kinetics; laboratory diagnosis and case management of acute and chronic leukemias, myeloproliferative disorders, myelodysplastic syndromes, anemias; application of cell population scattergrams and phenotyping; quality and efficacy issues affecting hematology laboratory testing. Prerequisite: MT 340 and permission of instructor; corequisite: CLS 632. 2 hours.

632. **Advanced Hematology Laboratory.** Laboratory sessions coordinated with CLS 631; myelogenous cell line, abnormalities and inclusions; erythrocyte structural changes; lymphocytic cell line, abnormalities and inclusions; erythrocyte maturation abnormalities; stains and cell markers used in classification of neoplasias. Prerequisite: AHS 500 and permission of instructor; corequisite: CLS 631. 1 hour.

637. **Emerging Diagnostic Technologies.** Emerging diagnostic technologies for use in clinical laboratories, including methods for molecular microbiology, oncology, hematology, genetics, and identity testing; flow cytometry, automation, and robotics. Review of rapid tests and new in vitro methodologies; economic factors; regulations and licensing issues; accreditation criteria; and social, ethical, and legal issues associated with emerging in vitro diagnostic technologies. Prerequisite: permission of instructor. 2 hours.

642. **Infectious Disease Principles.** Microbial virulence factors, host defense mechanisms, and methods of transmission; major clinical syndromes, infectious diseases and their etiologic agents with focus on microbial detection and/or isolation, identification of isolates and antimicrobial studies; issues of quality and performance management, resources utilization, and role of clinical microbiology laboratories/laboratory practitioners. Prerequisite: MT 336 and permission of instructor.

643. **Microbial Epidemiology Principles.** Epidemiology principles related to special host infections; notifiable diseases; surveillance methods, nosocomial infections; infection control practices; antimicrobial resistance; emerging infectious

diseases' prevention strategies and bioterrorism issues. Prerequisite: permission of instructor.

650. **Immunology.** Antigens, antibodies, cytokines; cellular and humoral immune response; genetics of immune system; complement; phagocytosis; adhesion molecules; major histocompatibility complex; antigen presentation and T and B cell activation; mucosal immunology; transplantation. Prerequisite: permission of instructor. 1 hour.

663. **Blood Transfusion Therapy.** Red cell metabolism, survival, and preservation; collection of blood for allogeneic and autologous transfusion; blood component preparation, storage, therapy, and indications for transfusion; physiology of blood loss and transfusion replacement; use of blood substitutes, immunomodulation by transfusion; immune mechanism of red cell destruction; other adverse effects of transfusion; immunology of hepatitis, HIV, and other transfusion-transmitted infections; bone marrow and peripheral blood stem cell transplant; transfusion for oncology, pediatric neonatal, obstetric, and transplant patients; hemolytic disease of newborn. Prerequisite: permission of instructor.

664. **Advanced Immunohematology.** Red cell blood group systems: antigens and antibodies, phenotypes, molecular biology, immunogenetics, biochemistry, serology, and clinical significance of antibodies; parentage testing; auto antibodies; drug-induced red cell sensitization; advanced techniques for problem solving; case studies. Prerequisite: permission of instructor. 3 hours.

675. **Advanced Clinical Chemistry.** Method evaluation; nutrition and wellness assessment, endocrinology evaluation, reproductive and pregnancy monitoring; pharmacokinetics, therapeutic drug monitoring and drugs of abuse; lipids; heme synthesis and evaluation; organ system evaluation and application of total testing process to error reduction; preparation for accreditation; nanotechnology; reference intervals and biological variation. Prerequisite: MT 320 and permission of instructor.

*684. **Clinical Practicum.** Directed clinical practice; advanced laboratory procedures and methods; quality control systems, preventive maintenance, problem solving, safety. Prerequisite: permission of instructor and AHS 500. 1-6 hours.

*686. **Special Topics in Clinical Laboratory Sciences.** Selected advanced topics of current scientific, clinical, and professional importance; specific topics designed to meet student need and interest. Prerequisite: permission of instructor. 1-4 hours.

688. **Managing and Marketing Laboratory Medicine Services.** Marketing management methods and evaluation of marketing tactics; examination of service management principles and elements of customer service-driven organizations in managed care/integrated systems environment; skills, abilities, and knowledge necessary for creating a service-, customer-, and market-oriented clinical laboratory industry. Prerequisite: permission of instructor.

692. **Immunohematology Seminar.** Current clinical, administrative, professional, and research developments in immunohematology and transfusion medicine. Prerequisite: permission of instructor. 1 hour.

693. **Scientific Publications Analysis.** Review and scientific critique of current literature related to laboratory medicine, overview of research design and interpretation of statistics, sources of publication journals and government docu-

ments, content and style of scientific paper. Prerequisite: biostatistics and permission of instructor.

*698. **Master's-Level Nonthesis Research.** Prerequisite: permission of instructor. 1-6 hours.

*699. **Master's-Level Thesis Research.** Prerequisite: Admission to candidacy. 1-6 hours.

Communication Studies

Although UAB does not offer a graduate degree in communication studies, courses in communication management and mass communication are available to interested graduate students.

Additional Information

For additional information, contact Dr. Mark Hickson, Chair, UAB Department of Communication Studies, 901 15th Street South, Room 223, Birmingham, AL 35294-1220.

Telephone 205-934-3877

E-mail Mhick91213@aol.com

Web www.uab.edu/CommunicationStudies

Course Descriptions

Communication Management (CM)

Unless otherwise noted, all courses are for 3 semester hours of credit. Courses numbers preceded with an asterisk indicate courses that can be repeated for credit, with stated stipulations.

501. **Instructional Communication.** Communication problems in the classroom. Definition of sign and sign process. Signs in communicative action. Prerequisite: Junior standing.

505. **Contemporary Philosophies of Communication.** Twentieth-century systems of Western rhetoric. Concepts selected from among works of Burke, Weaver, Toulmin, Perelman, Richards, and McLuhan. Prerequisite: 6 hours in CM courses or permission of instructor.

511. **Seminar in Organizational Communication.** Theory and research in communication audits of organizations. Prerequisites: CM 311 or permission of instructor.

513. **Nonverbal Communication.** Elements of nonverbal behavior (physical appearance, gestures, space, voice) that affect communication in person-to-person situations. Prerequisite: Sophomore standing.

514. **Language and Thought.** Semiotics and communication. Definition of sign and sign process. Cognitive processes and communication processes. Signs in communicative action. Prerequisite: Junior standing.

515. **Intercultural Communication.** Communication problems in intercultural and multicultural contexts. Interpretations and otherness. Ethnocentricity and culture. Analysis of one culture interpreting another, with special emphasis on modern societies.

555. **Seminar in Political Communication.** (also MC 555) Emerging cross-disciplinary field of political communication, literature and propositions surrounding key approaches, methods, and substantive areas of inquiry in political communication. Prerequisite: 6 hours in CM/MC courses or permission of instructor.

558. **Communication Criticism.** (also EH 458) Rhetorical systems for appraising persuasive messages and campaigns

in the 20th century. Prerequisites: Junior standing and 6 hours in CM courses or permission of instructor.

560. **Communication and Social Movements in America.** Exploration of role of public communication in political, religious, social, and economic evolution of America. Movements include war and peace, revolution, slavery, feminist concerns, and industrial change. Prerequisites: Junior standing and 6 hours in CM/MC or permission of instructor.

580. **Seminar in Health and Medical Communication.** Advanced communication theory and research in health care setting. Emphasis on impact of interpersonal, organizational, and mass communication policy in the field of human health and medicine. Prerequisite: CM 480.

581. **Communication and Aging.** Biological, neurological, and sociopsychological effects of aging on communication process. Emphasis on communication with elderly in various health and medical contexts. Prerequisite: CM 480.

592. **Independent Study.** Topics of mutual interest to student and faculty member. Prerequisites: 15 hours in CM courses and written permission of instructor prior to registration. 1-3 hours.

593. **Special Topics in Communication Arts.** Topics selected by faculty. Prerequisites: 15 hours in CM courses and permission of instructor. May be repeated for total of 6 hours. 1-3 hours.

594. **Communication Research Methods.** (also MC 494) Emphasis on research questions, design, methodology, data gathering, and analysis. Practice in conducting, interpreting, and communicating research findings to public. Prerequisites: Junior standing and permission of instructor.

595. **Seminar in Communication Arts.** Advanced topics in history and theory of communication. Prerequisites: 15 hours communication arts and permission of instructor. May be repeated for total of 6 hours. 1-3 hours.

Mass Communication (MC)

530. **Electronic Media Management.** Organizational structures and business policies of radio, television, and cable companies. Planning basic program structures for broadcast and cable operations with consideration of audience requirements. FCC policy and competitive market. Prerequisite: Junior standing.

555. **Seminar in Political Communication.** (also CM 555) Emerging cross-disciplinary field of political communication. Review of literature and propositions surrounding key approaches, methods, and substantive areas of inquiry in political communication.

592. **Independent Study.** Topics of mutual interest to student and faculty member. Prerequisites: 15 hours of MC courses and written permission of instructor prior to registration. 1-3 hours.

595. **Mass Media and Society.** History of mass communication and research from 1940s to present. Transactional model of communication and symbolic-interactionist perspective use among other approaches to evaluate role of mass media in 20th-century America. Prerequisite: Junior standing.

Computer and Information Sciences (Ph.D., M.S.)

Graduate program director: *Jones*

Faculty

Anthony C.L. Barnard, Professor Emeritus(Computer and Information Sciences); Computer Networking

Barrett R. Bryant, Professor (Computer and Information Sciences); Programming Languages, Compiler Design, Object-Oriented Technology

W. Michael Carson, Assistant Professor (Computer and Information Sciences); Molecular Graphics

Jeff G. Gray, Associate Professor (Computer and Information Sciences); Object-Oriented Distributed Computing

Gary J. Grimes, Wallace R. Bunn Chair of Telecommunications and Professor (Electrical and Computer Engineering); Optic Photonics, Switchings and Telecommunications

Robert M. Hyatt, Associate Professor (Computer and Information Sciences); Parallel Processing, Parallel Search, Distributed Processing Using Tuple Space, Distributed Algorithms

John K. Johnstone, Associate Professor (Computer and Information Sciences); Geometric Modeling, Computer Graphics, Bioinformatics

Warren T. Jones, Professor (Computer and Information Sciences); Knowledge Discovery, Machine Learning, Bioinformatics

Kevin D. Reilly, Professor (Computer and Information Sciences); Simulation, Artificial Intelligence, Software Engineering, Bioinformatics

Kenneth R. Sloan, Associate Professor (Computer and Information Sciences); Computer Graphics, Vision, Image Processing, Parallel Search, Bioinformatics

Alan P. Sprague, Associate Professor (Computer and Information Sciences); Algorithm Design, Knowledge Discovery, Bioinformatics

Ernest M. Stokely, Professor (Biomedical Engineering); Medical Imaging

Program Information

The field of computer and information sciences deals with theory and methods for processing of information. Graduate programs leading to the M.S. and Ph.D. degrees are designed to prepare individuals for professional and research-level careers in industry, government, and academia. Prospective students should have substantial background in computer science and mathematics.

M.S. Program

The M.S. program requires 30 semester hours of coursework and a thesis (Plan I) or 36 semester hours of coursework (Plan II). Specializations are available in computer graphics, distributed computing and bioinformatics.

Ph.D. Program

The Ph.D. program generally consists of three phases (with some overlap between phases). The first phase of the program is devoted primarily to formal coursework and preparation for the qualifying examination. The second phase consists of coursework and research in preparation for the comprehensive examination. This examination requires presentation of a dissertation research proposal. Successful completion of this phase leads to admission to candidacy. The final phase is the completion of the dissertation research and its defense. Ph.D. student progress will be reviewed annually.

Opportunities are available for a Ph.D. specialization in bioinformatics in collaboration with the UAB Academic Health Center.

Additional Information

For detailed information, contact Dr. Warren T. Jones, Chair, UAB Department of Computer and Information Sciences, Campbell Hall, Room 115-A, 1300 University Boulevard, Birmingham, Alabama 35294-1170.

Telephone 205-934-2213

E-mail wjones@uab.edu

Web www.cis.uab.edu

Course Descriptions

Computer and Information Sciences (CS)

All courses require permission of the student's academic advisor, the Computer Science graduate program director, or the Computer and Information Sciences Department chair. All 500-level and 600-level courses carry 3 semester hours of credit, unless otherwise specified. All 700-level courses carry 2 or 3 hours of credit, unless otherwise specified.

534. Internetworking and Intranets. Underlying network technology. Interconnecting networks using bridges and routers. IP addresses and datagram formats. Static and dynamic routing algorithms. Control messages. Subnet and supernet extensions. UDP and TCP. File transfer protocols. E-mail and the World Wide Web. Network address translation and firewalls. Mandatory weekly Linux-based lab. Prerequisite: CS 330.

535. Network and Distributed System Programming. Remote procedure call and client-server mechanisms. Protocol definition and compilation; client and server stubs, application code; transport independence; multiple client and server systems. Applications, e.g., remote database query and update, image filtering and archiving; systems programming, and file systems contexts. Prerequisite: CS 534 and permission of instructor.

536. Advanced Information Networking. Advanced Information Networking. Broadband wide-area networks, including frame relay and ATM. High-speed local access, including ISDN, ADSL, and cable modems. Prerequisite: CS 534.

537. Computer Network Security. Conventional and public-key cryptography. Message encryption and authentication. Secure communication between computers in a hostile environment, including E-mail (PGP), virtual private networks (IPSec) and the World Wide Web (SSL). Firewalls. Prerequisite: Thorough knowledge of TCP/IP protocol suite, for example from CS 434.

538. Distributed Object Systems. Object-oriented distributed systems design, distributed software architecture, data and resource access, communication, client-server computing, web technologies, enterprise technologies.

544. Supercomputer Programming. Use of the Cray C90 as separate CPUs to perform vector processing; Cray C90 as multiprocessor via multitasking and microtasking. Examination of specific supercomputer applications. Prerequisite: Permission of instructor.

600. Formal Semantics of Programming Languages. Context-sensitive and semantic aspects of programming languages, denotational semantics, mathematical foundations.

601. **Program Verification.** Proving properties of programs, termination and correctness, computability and decidability, role of formal methods in software design.

602. **Functional Programming.** Lambda calculus, polymorphism, lazy evaluation, higher-order functions, abstract machines, implementation and applications.

603. **Logic Programming.** Prolog, computation models, theoretical foundations, nondeterminism, meta-programming, applications.

606-609. **Programming Languages Seminar.** Pass/Fail. 1 hour.

610, 611. **Database Systems I, II.** Relational, hierarchical, and network models; object-oriented databases, knowledge-based systems; security issues, concurrency control and distributed databases, query optimization; advanced topics.

612. **Knowledge-Base Systems.** Logic model for deductive databases, top-down and bottom-up evaluation, conjunctive and disjunctive queries, recursion, query optimization, universal relation model.

613. **Object-Oriented Database Systems.** Object data model, object-oriented query languages and database architecture, schema evolution, integration with non-object-oriented models, query optimization.

614. **Distributed Database Systems.** Distributed DBMS architecture, query decomposition and data localization, distributed query optimization, transaction management, concurrency control, multidatabase systems.

616-619. **Database System Seminar.** Pass/Fail. 1 hour.

620, 621. **Software Development I, II.** Design techniques for large-scale systems, portability, life-cycle cost considerations, maintenance, software design methodologies.

622, 623. **Compiler Design I, II.** Lexical and syntactical scan, semantics, code generation and optimization, dataflow analysis, parallelizing compilers, automatic compiler generation.

624. **Formal Specification of Software Systems.** Formal methods for software requirements specification, including VDM, Z, and object-oriented extensions; the relationship among formal requirements, design, and implementation.

625. **Metrics and Performance.** Metrics in the development process, personnel skill levels and development time, error control; industrial settings; performance measures, capacity planning in Web systems; analysis via spreadsheets, discrete simulation, etc.

626-629. **Software Development Seminar.** Pass/Fail. 1 hour.

630. **Computer Systems I.** Basic computer architecture and operating system topics, including memory management hardware and algorithms, process scheduling, and input-output hardware and algorithms.

631. **Computer Systems II.** Parallel computer architecture, including SMP, shared and distributed memory systems. Parallel programming software topics include POSIX threads, PVM, and MPI.

636-639. **Computer Systems Seminar.** Pass/Fail. 1 hour.

640, 641. **Bioinformatics I, II.** Introduction to computational methodologies in bioinformatics.

646-649. **Bioinformatics Seminar.** Pass/Fail. 1 hour.

650. **Automata, Languages, and Computation.** Formal grammars and automata, Turing machines, computability and decidability, computational complexity, intractability.

651. **Formal Language Theory.** Parsing and translation theory, formal syntax, proof properties and complexity measures.

652. **Design and Analysis of Algorithms.** Algorithms for bioinformatics applications, especially string matching algorithms. Also, traditional algorithmic techniques, such as greedy algorithms, dynamic programming, and branch and bound.

653. **Computational Geometry.** Basic methods and data structures, geometric searching, convex hulls, proximity, intersections.

656-659. **Theoretical Foundations Seminar.** Pass/Fail. 1 hour.

660. **Principles of Artificial Intelligence.** Programming methodologies, logic foundations, natural language applications, expert systems.

661. **Expert Systems.** Concepts and architectures, tools, reasoning, evaluations, selected examples.

662. **Natural Language Processing.** Syntax, semantics, ATNs, logic grammars, language and memory.

663. **Knowledge Discovery & Data Mining.** Techniques used in data mining (such as frequent sets and association rules, decision trees, Bayesian networks, classification, clustering), algorithms underlying these techniques, and applications.

664. **Knowledge Representation.** Logic, production systems, semantic nets, frames, multiple representational systems.

665. **Neural Networks.** Theoretical foundations, associative memory, pattern processing, biological neural nets.

666-669. **Artificial Intelligence Seminar.** Pass/Fail. 1 hour.

670. **Computer Graphics.** Graphics architectures, geometric transforms, 3-D, object models, shading, intensity, hidden elements, color, advanced topics.

671. **Graphics and Modeling.** Geometric modeling for computer graphics. Parametric curve and surface design and fitting: polynomial and rational Bezier, B-spline, and Hermite curves; tensor product and triangular Bezier and B-spline surfaces, Coons patches. Keyframe animation and quaternions. OpenGL.

672. **Geometric Modeling.** Geometry for motion planning and lighting: visibility analysis, shortest path motion among obstacles, motion in orientation space, safest path motion, configuration space, shadows and lighting. Reconstruction from scattered data and contour data.

673. **Computer Vision Systems.** Image understanding feature extraction, domain-specific knowledge for high-level vision.

674. **Medical Imaging.** Representation, transformation, picture relations, graph grammars, animation, scenes, inference, databases.

675. **Computer Visualization.** Advanced Computer Graphics techniques aimed at "Scientific Visualization" applications.

676-679. **Graphics and Image Processing Seminar.** Pass/Fail. 1 hour.

680. **Numerical Computing Foundations.** Solution of linear systems, root finding of nonlinear equations, eigenanalysis, integration, Fourier Analysis, solution of ordinary differential equations, wavelets.

681, 682. **Modeling and Simulation I, II.** Combined continuous and discrete simulation, simulation theory, modeling environments.

683, 684. **Numerical Analysis I, II.** Interpolation, rational approximation, ODEs, algebraic equations, least squares, Gaussian elimination, stability, ill conditioning, discretization and rounding error, iterative convergence.

686-689. **Numerical Computing Seminar.** Pass/Fail. 1 hour.

690-694. **Special Topics.** Topics such as parallel algorithms and architectures, knowledge discovery biomedical computing, medical informatics, and genetic algorithms. 1-3 hours.

697. **Directed Readings.** 1-3 hours.

698. **Nonthesis Research.** (Plan II) Pass/Fail.

699. **Thesis Research.** Prerequisite: Admission to candidacy. Pass/Fail. 1-6 hours.

700. **Topics in Programming Language Semantics.**

701. **Topics in Program Verification.**

702. **Topics in Functional Programming.**

703. **Topics in Logic Programming.**

706-709. **Programming Languages Seminar.**

710, 711. **Topics in Database Systems.**

712. **Topics in Knowledge-Base Systems.**

713. **Topics in Object-Oriented Database Systems.**

714. **Topics in Distributed Database Systems.**

716-719. **Database Systems Seminar.**

720, 721. **Topics in Software Development.**

722, 723. **Topics in Compiler Design.**

724. **Topics in Formal Specification of Software Systems.**

725. **Topics in Metrics & Performance**

726-729. **Software Development Seminar.**

730, 731. **Topics in Computer Systems.**

736-739. **Computer Systems Seminar.**

740-741. **Topics in Bioinformatics.**

746-749. **Bioinformatics Seminar.**

750. **Topics in Automata Theory.**

751. **Topics in Formal Language Theory.**

752. **Topics in Design and Analysis of Algorithms.**

753. **Topics in Computational Geometry.**

756-759. **Theoretical Foundations Seminar.**

760. **Topics in Artificial Intelligence.**

761. **Topics in Expert Systems.**

762. **Topics in Natural Language Processing.**

763. **Topics in Knowledge Discovery & Data Mining.**

764. **Topics in Knowledge Representation.**

765. **Topics in Neural Networks.**

766-769. **Artificial Intelligence Seminar.**

770. **Topics in Computer Graphics.**

771. **Topics in Graphics and Modeling.**

772. **Topics in Geometric Modeling.**

773. **Topics in Computer Vision.**

774. **Topics in Image Processing.**

775. **Topics in Computer Visualization.**

776-779. **Graphics and Image Processing Seminar.**

780. **Topics in Numerical Computing.**

781, 782. **Topics in Modeling and Simulation.**

783, 784. **Topics in Numerical Analysis.**

786-789. **Numerical Computing Seminar.**

790-794. **Special Topics.**

795. **Medical Informatics Seminar.**

796. **Directed Readings and Research.** 1-6 hours.

799. **Dissertation Research.** Prerequisite: Admission to candidacy. Pass/Fail. 1-6 hours.

Coordinated Degrees

Degree Requirements

Through UAB's coordinated degree programs, outstanding students with appropriate career goals may be allowed to pursue two advanced degrees concurrently. (The general policy is that students pursue only one degree at a time.)

The majority of these programs permit students to pursue both a research degree (such as the Ph.D. or M.S.) and a professional degree (such as the M.D., D.M.D., O.D., or M.P.H.) simultaneously. The Graduate School is eager to cooperate with all qualified students who wish to extend their professional capabilities into the areas of independent scholarship, originality, and research characterizing graduate study.

Medical Scientist Training Program: M.D.-Ph.D.

Graduate Program Director

Pat Bucy

Phone:

(205) 934-6246

E-mail:

bucy@uab.edu

Web site:

www.uab.edu/mdphd

UAB's outstanding research and clinical training programs provide an unusual opportunity for students interested in careers in basic biomedical research. Such students may be admitted concurrently to the School of Medicine and the Graduate School in order to pursue both the M.D. degree and the Ph.D. degree. Ph.D. study in this program is available in the broad areas of biochemistry, molecular genetics, and biophysical sciences, cell biology, microbiology, neurobiology, pathology, pharmacology, and physiology.

Individuals admitted to this highly competitive program must have an outstanding MCAT score and appropriate undergraduate training and must provide evidence of a genuine interest in research. A laboratory research experience is considered an important asset. Fellowship support, including a stipend and payment of tuition and fees, is provided to successful applicants.

In general, M.D.-Ph.D. students will complete the basic science phase of the medical curriculum; appropriate substitutions will be made to provide more detailed and more research-oriented fundamental course work. The second phase of study will include advanced graduate courses in the area of Ph.D. specialization, as well as completion of the dissertation. Finally, the student will participate in the required clinical rotations. A seven- to eight-year period of study will usually be required.

All application materials for the M.D.-Ph.D. program must be received no later than December for admission in the following summer or fall term.

Students who have initiated study in the school of Medicine may also apply for Graduate School admission. Graduate study can be pursued during the summer, during time scheduled electives in the medical curriculum, or at other times with permission of the dean of the School of Medicine. Alternatively, upon approval of the appropriate graduate program director and the dean of the School of Medicine, a student may be granted a temporary leave from the medical curriculum to complete the requirements for a graduate degree. Approval for pursuit of Ph.D. degrees rests with the Graduate School and the appropriate graduate program or department. Students should contact the graduate program director of the program in which they wish to enroll.

Other Coordinated Degree Options

Other coordinated degree opportunities, and appropriate contact persons are listed below:

O.D.—M.S. & O.D.—Ph.D.

Graduate program director: *Dr. Kent Keyser*
Phone: (205) 934-6743
E-mail: ntravis@uab.edu

M.D.—M.S.B.M.S.

Graduate program director: *Dr. Lisa Schwiebert*
Phone: (205) 934-3970
E-mail: lschieb@uab.edu
Web site: www.physiology.uab.edu

M.B.A.—M.P.H.

Graduate program director: *Dr. Stuart A. Capper*
Phone: (205) 934-3748
E-mail: dept@uab.edu

M.S.H.A.—M.B.A.

Graduate program director: *Admissions Coordinator*
Phone: (205) 934-1669

M.P.A.—J.D.

(Coordinated degree program with Cumberland School of Law)

Graduate program director: *Dr. R. Steven Daniels*
Phone: (205) 934-9680
E-mail: sdaniels@uab.edu

M.P.A.—M.P.H.

Graduate program director: *Dr. R. Steven Daniels*
Phone: (205) 934-9680
E-mail: sdaniels@uab.edu
Graduate program director: *Dr. Janet Bronstein*
Phone: (205) 934-8962
E-mail: jbronstein@uab.edu

Criminal Justice (M.S.C.J.)

Graduate program director: *Sloan*

Faculty

J. Heith Copes, Assistant Professor (Justice Sciences); Qualitative Methods; Criminal Decision Making; White Collar Crime; Police

John W. Grimes, Instructor (Justice Sciences); Criminal Law, Evidence, and Procedure; Private Security; Terrorism and Social Control; Mock Trial; Pre-Law Advisor

Tomislav V. Kovandzic, Assistant Professor (Justice Sciences); Inequality and Crime; Firearms and Violence; Research Methods; Criminal Justice Policy; Police

Kathryn D. Morgan, Assistant Professor (Justice Sciences); Corrections; Criminological Theory; Minorities

John J. Sloan, III, Associate Professor (Justice Sciences); Victimization; Fear of Crime; Criminal Justice Policy; Juvenile Justice; Program Evaluation

Brent L. Smith, Professor (Justice Sciences); Terrorism and Social Control; Criminological Theory; Victimology

Lynne M. Vieraitis, Assistant Professor (Justice Sciences); Criminological Theory; Gender Inequality and Crime; Labor Markets and Crime; Violence Against Women

Adjunct Faculty

Robert Berry, Police Administration; Criminal Justice Policy

Foster Cook, Research Professor (Psychiatry); Drugs and Crime; Addiction; Program Evaluation

Kevin Fitzpatrick, Associate Professor (Sociology); Urban Sociology; Violence; Quantitative Methods

Mark LaGory, Professor (Sociology); Urban Sociology; Demography; Violence

Charles Lindquist, Associate Professor (Emeritus); Corrections; Comparative Criminal Justice Systems; Intentional Injury; Criminal Justice Policy

James Philips, Criminal Law, Evidence, and Procedure; White Collar and Corporate Crime

Program Information

The criminal justice graduate program requires study in the overall discipline, including intensive investigation in the areas of criminal justice policy, criminal justice administration, research methods and statistics, and criminological theory.

Each year, students are admitted to the M.S.C.J. program for the fall term. **The application deadline is May 1.** Students may be admitted to the M.S.C.J. program "in good standing" provided they meet all minimum admission criteria established by the Graduate School **and** have taken an introductory-level statistics and an introductory-level research methods course in which a grade of B or better was earned in each course. Students who otherwise meet the minimum admission criteria but have not taken one or both of these courses, may be admitted to the M.S.C.J. program on a "contingency" basis. Students so admitted will not be allowed to register for graduate coursework until the contingencies are removed. Students meeting the minimum requirements for admission but lacking a substantive background in criminal justice **may** be admitted to the M.S.C.J. program on a "contingency" basis, but will be required to undertake remedial coursework before they will be allowed to register for any graduate coursework. Students failing to meet the minimum requirements for admission, but who are reasonably close, **may** be admitted to the M.S.C.J. program "on probation." Students admitted on probation will be given the opportunity to establish and maintain a minimum GPA of 3.0 for all graduate coursework undertaken. Failing to do so will result in dismissal from the program.

Degree Requirements

Plan I (Thesis)

Students selecting the Plan I option must (1) complete a minimum of 30 semester hours (24 of which are the required professional seminars JS 580 and JS 600-606) and (2) propose and then complete a major research project under the direction of a thesis committee chaired by the student's major advisor. Students who select the Plan I option must establish and maintain a minimum GPA of 3.0 in all coursework undertaken (required and elective). Students failing to do so may be dismissed from the program.

Plan II (Nonthesis)

Students selecting the Plan II option must (1) complete a minimum of 36 semester hours in coursework, 24 hours of which consist of the required professional seminars; (2) write a 20-25 page "area paper" in their area of substantive interest, and (3) pass a series of written comprehensive examinations

covering the areas of criminological theory, research methods, statistics, criminal justice policy, and criminal justice administration. Students who select the Plan II option must establish and maintain a minimum GPA of 3.0 in all coursework undertaken (required and elective). Students failing to do so may be dismissed from the program.

White Collar and Corporate Crime Specialization

In conjunction with the M.B.A. program in the School of Business, students in the M.S.C.J. program may pursue a specialization in the investigation and prosecution of white collar and corporate offenders. Students choosing this specialization will take 15-18 elective hours in coursework. Information on the White Collar and Corporate Crime specialization is available from the M.S.C.J. Program Director.

Financial Aid

Students who are admitted to the M.S.C.J. program "in good standing" are eligible to receive department-based financial aid in the form of research assistantships or scholarships that are awarded on a competitive basis. Students are typically notified of such awards in early June of each year for the following fall.

Additional Information

For detailed information contact Dr. John J. Sloan, Department of Justice Sciences, OB15, 901 15th Street South, Birmingham, Alabama 35294-2060.

Telephone: 205-975-5701

E-mail prof@uab.edu

Web www.uab.edu/criminaljustice

Course Descriptions

Unless otherwise noted, all courses are for 3 semester hours of credit. Course numbers preceded by an asterisk indicate courses that can be repeated for credit, with stated stipulations.

Criminal Justice (JS)

Required Seminars

580. **Computer Applications in Criminal Justice.** Computer applications in criminal justice agency settings, including statistical analysis packages, crime mapping, word processing, and graphics packages.

600. **Proseminar in Criminal Justice.** Critical analysis of formal and informal processing of offenders by criminal justice agencies, including police, courts, and corrections; effectiveness and future directions.

601. **Nature of Crime.** Analysis of crime patterns and known correlates; theoretical explanations of criminality including classical, biophysiological, psychological, and sociological theories.

602. **Seminar in Criminological Theory.** Classic and contemporary structural explanations of crime; substantive focus on relationships between crime and cultural and institutional arrangements.

603. **Seminar in Criminal Justice Administration.** Theories of organizational structure, motivation, and management applied to criminal justice agencies.

604. **Seminar in Criminal Justice Policy Analysis.** Origins, formulation, implementation, and evaluation of criminal

justice policy; classic and contemporary examples of policy innovations.

605. **Seminar in Criminal Justice Research Methods.** Quantitative methods of empirical research emphasizing criminal justice/criminological applications; current research methodologies relating to analysis of issues involving crime and criminal justice.

606. **Seminar in Criminal Justice Data Analysis.** Bivariate and multivariate analyses and interpretation of results from substantive research.

Elective Courses

500-504. **Special Topics in Criminal Justice.** Investigation of topics of current interest to faculty members. Topics selected for in-depth analysis are listed each term in class schedule. May be repeated in different topics for a maximum of 12 hours. 3 hours each.

507. **Advanced Criminal Law.** In-depth, case-study examination of substantive criminal law; analysis of acts, mental states, and attendant circumstances constituting various crimes.

540. **White Collar and Corporate Crime.** Analysis of illegal or deviant behavior occurring in organizational settings, including crimes committed by and against complex organizations.

541. **Terrorism and Social Control.** Analysis of the causes and consequences of terrorism; substantive focus on government response including investigation, prosecution, and punishment of terrorists.

542. **Race, Crime, and Justice.** An examination of how the subordinate status of minority groups (primarily African Americans, Hispanics, and Native Americans) affects their interaction with the justice system.

543. **Women and the Criminal Justice System.** Examination of the role of women in the criminal justice system as offenders, victims, and professionals.

544. **Law and Society.** Origins and definition of law; overview of legal systems and their characteristics; use of law to facilitate or retard social control, social change, and social conflict.

545. **Juvenile Corrections.** Analysis of ongoing efforts to reduce juvenile delinquency; particular attention paid to recent innovations, programs, and program effectiveness.

607. **Seminar in Criminal Justice Planning.** Planning and integration of programs in criminal justice system; techniques and tools used by planners.

608. **Seminar in Current Issues in Law Enforcement.** Analysis of such issues as administration, police-community relations, corruption, and design of law enforcement agencies.

609. **Seminar in Juvenile Delinquency.** History, measurement, patterns, and theories relating to delinquent behavior.

610. **Seminar in Correctional Systems.** Correctional philosophy; legal decisions, correctional programs, research, treatment approaches, and decision-making processes.

612. **Seminar in Comparative Criminal Justice Administration.** Theories, philosophies, and techniques of criminal justice systems worldwide; evaluation of governmental role in administration of justice systems.

613. **Seminar in Law and Society.** Classical and modern perspectives on the nature, origins, and functions of law.

614. **Seminar in Advanced Legal Problems.** Legal theories; criminal law, evidence, and procedure; origins, philosophy, and development of legal system; exposure to legal reasoning.

620. **Investigation and Prosecution of White Collar Crime.** Analyses of legal aspects of case preparation and presentation; legal theories of individual and collective criminal responsibility; trial strategies

676. **Law, Evidence, and Procedure.** Legal aspects of physical evidence; role of expert witnesses in criminal process; moot court activities.

*696. **Graduate Internship in Criminal Justice.** Field experience in criminal justice agency setting. May be repeated for a maximum of 6 hours of credit.

*697, 698. **Directed Research.** Independent study in a student's substantive area of interest under the direction of a faculty member.

*699. **Thesis Research.** Prerequisite: Admission to candidacy and successful defense of thesis proposal. 1-6 hours.

Dentistry (M.S.)

Graduate program director: *Rahemtulla*

Faculty

Alfred A. Bartolucci, Professor (Biostatistics); Dental Epidemiology, Research Methods

James Broome, Associate Professor (Prosthodontics and Biomaterials); Polymers, Adhesives, Physical and Mechanical Testing, Clinical Research

James T. Butts, III, Adjunct Associate Professor (Pediatric Dentistry); Public Health, Community Dentistry, Cariology, Oral Health

Eli I. Capilouto, Professor (School of Public Health); Health Services Research

Mary Lynne Capilouto, Professor (Diagnostic Sciences); Dental Epidemiology, Advanced General Dentistry

Noel K. Childers, Professor (Oral Biology); *Streptococcus mutans*, Dental Caries, Oral Immunization, Liposomes

John M. Coke, Associate Professor (Diagnostic Sciences); Oral Medicine, Clinical Pharmacology, Hospital Dentistry

Paul Eleazer, Professor (Endodontics and Pulp Biology); Microbiology of Waterlines, Microbiology of Endodontic Anaerobic Pathogens

Milton Essig, Professor (Comprehensive Dentistry); CAD-CAM, Ceramic Bonded Restorations

Steven J. Filler, Professor (Diagnostic Sciences); Medically Compromised Patients, Oral Microbiology

Ragnar F. Flatland, Professor Emeritus (Dentistry); Application of Computer Science in Teaching and Administration

Harold M. Fullmer, Professor Emeritus (Dentistry); Oral Pathology

Kohtaro Fujihashi, Associate Professor (Oral Biology); Mucosal Immunity, Molecular Pathogenesis, Periodontal Disease, Alpha and Beta T Cells and Epithelial Cells

Gregg H. Gilbert, Professor (Diagnostic Sciences); Oral Epidemiology, Dental Health Services

Daniel Givan, Assistant Professor (Prosthodontics and Biomaterials); Composite, Resin, Wear, Fatigue

Timothy Heaven, Associate Professor (Comprehensive Dentistry); Dental Digital Imaging, Use of Computer in Digital Imaging Analysis

Alexander Jacobson, Professor Emeritus (Orthodontics); Cephalometric Evaluation of Orthognathic Surgery and Skeletal Open Bite Cases

Marjorie K. Jeffcoat, Professor (Periodontics); Techniques for the Diagnosis of Progressive Periodontal Disease, Clinical Trials

Robert Jeffcoat, Professor (Prosthodontics and Biomaterials); Instrumentation, Software, Computers, Statistics, Implants

Jannet Katz, Associate Professor (Oral Biology); Periodontal Disease, *Porphyromonas gingivalis*, Hag B, T-Helper Cells, Immune Response, Cytokines

Hiroshi Kiyono, Professor (Oral Biology); Mucosal Immunobiology, T-Cell and Lymphokine Regulation

William R. Lacefield, Professor (Prosthodontics and Biomaterials); Coatings for Implants, Dental Ceramics and Alloys, Porcelain

Jack E. Lemons, Professor (Prosthodontics and Biomaterials); Biocompatibility of Synthetic Materials, Alloys and Casting Technology, Biomechanics

Perng-Ru Liu, Associate Professor (Comprehensive Dentistry); Dental CAD-CAM, Esthetic, and Dental Implant Restorations

Patrick J. Louis, Associate Professor (Oral and Maxillofacial Surgery); Maxillofacial Reconstruction, Dental Implantology, Dentoalveolar Surgery, Temporomandibular Joint Therapy

Mario G. Martinez, Jr., Professor Emeritus (Dentistry); Odontogenic Tumors, Oral Cancer, Fibro-Osseous Lesions of the Jaws

Raquel Mazer-Gurmendi, Assistant Professor (Comprehensive Dentistry); Dental Materials, Composite Resins, Adhesives, Clinical Investigation, Physical and Mechanical Testing

Michael McCracken, Assistant Professor (Prosthodontics and Biomaterials); Dental Implants, Biomimetic Materials, Growth Factors

Leonard A. Mueninghoff, Professor (Prosthodontics and Biomaterials); Implants, Biomaterials, Microleakage, Adhesives, Veneering, Composites

S. Jean O'Neal, Professor (Prosthodontics and Biomaterials); Fixed Prosthodontics, Color and Clinical Evaluation of Dental Materials

Kent G. Palcanis, Professor (Periodontics); Clinical Periodontology, Control of Periodontal Disease

Firoz Rahemtulla, Professor (Prosthodontics and Biomaterials); Connective Tissue Biochemistry, Oxidants and Antioxidant Enzymes, Salivary Proteins, Peroxidases

Michael Reddy, Professor (Periodontics); Periodontal Disease Progression, Implants, Periodontal Therapeutics

D. Hugo Retief, Professor Emeritus (Dentistry); Composite Restorative Materials, Acid-Etch Technique, Preventive Dentistry

Brad K. Rodu, Professor (Pathology); HSV Candidiasis, Aphthous Ulcers, Clinical Trials, PCR, Oncogenes, Smokeless Tobacco

P. Lionel Sadowsky, Professor (Orthodontics); Temporomandibular Joint Dysfunction, Growth and Treatment, Surgical Orthodontics, Bonding

Shiro Suzuki, Professor (Prosthodontics and Biomaterials); Restorative Materials, Composites, Wear, Bonding System, Clinical Evaluations

Joe P. Thomas, Adjunct Professor (Dentistry); Clinical Caries Investigation, Sickle Cell Anemia

John B. Thornton, Jr., Professor (Pediatric Dentistry); Incidence of Periodontal Disease in the Mentally Retarded, Dental Health of Aging and Elderly Persons with Mental Retardation

Christos C. Vlachos, Clinical Assistant Professor (Orthodontics); Occlusion, Temporomandibular Dysfunction, Orthodontics

Peter D. Waite, Professor (Oral and Maxillofacial Surgery); Orthognathic Deformities, Cosmetic Facial Surgery, Facial Reconstruction, Cleft Lip and Craniofacial Disorders, Obstructive Sleep Apnea

Thomas W. Weatherford, III, Professor (Periodontics); Chemotherapy of Plaque, Clinical Trials in Periodontal Diseases

Richard Weems, Associate Professor (Diagnostic Sciences); Dental Radiology, Digital Radiographic Imaging, Diagnostic Decision Support Software

Program Information

Advanced clinical specialty training and research, leading to the degree of Master of Science in Dentistry, is offered to meet two areas of need: the preparation of qualified teachers and investigators in the various branches of academic dentistry and the preparation of fully trained dental specialists. The program is a combination of the conventional work for the M.S. degree plus the achievement of proficiency in some phase of clinical dentistry. The course of study requires a minimum of two academic years; most students will require three years to complete the work. The applicant must be a graduate of an accredited school of dentistry and must have achieved, in both preclinical and dental requirements, a superior scholastic record.

At the time of enrollment in the Graduate School, the student is assigned an appropriate faculty advisor, who works with the student in outlining a course of study consistent with objectives. This curriculum must cover the three areas of a selected phase of clinical dentistry, a related basic health science, and research.

Major and Minor

The major field of study must be selected from the following: dental biomaterials, endodontics, general dentistry, hospital dentistry, maxillofacial prosthetics, oral surgery, orthodontics, pediatric dentistry, periodontics, prosthodontics, public health dentistry, or dental radiology. Not less than 18 semester hours of credit in the program must be in the major subject, with the minimum acceptable grade being B. A minor must involve at least six semester hours of study in one or two basic health science departments related to the student's major and research interests.

By the time the student has been in residence one year and has finished some of both major and minor courses, the student and the advisor should recommend to the Graduate School dean at least two additional graduate faculty members, one from the minor area, for appointment to the graduate study committee. The student should discuss with this committee plans for the remaining course of study, including a proposed thesis title and outline of experimental design. Depending

upon the nature of the research plan, it may be desirable for a different advisor to be appointed, serving either as co-chair or as new chair of the graduate study committee. At this time, demonstration of a reading knowledge of one foreign language, competence in biostatistics, experience with computer techniques, or other tools of research may be required, as appropriate to the student's investigation.

Admission to Candidacy

When the graduate study committee is satisfied that the student is prepared to undertake the research, the student is admitted to candidacy for the master's degree. This step should be taken at least three semesters before the anticipated date of completion of the program.

Research and Thesis

Sufficient research work to train the candidate in the principles and methods of scientific investigation is required. The research project should involve the student's own intensive work in some area of dentistry, preferably related to the basic health sciences. The thesis is based on the research study and must show the candidate's ability to delineate a problem, plan its solution, and present the results of the work in an orderly fashion. Familiarity with the literature of the field is expected.

Final Examination

The final oral examination is administered by the student's graduate study committee before the deadline is set by the Graduate School. The examination begins with oral presentation and defense of the thesis and may include any work fundamental thereto. At the close of the examination, the committee votes on the candidate, taking into account all of the work undertaken. Majority approval is required.

Additional Information

For detailed information, contact the graduate program director, Dr. Firoz Rahemtulla, University of Alabama School of Dentistry, School of Dentistry Building, Box 54, 1919 Seventh Avenue South, Birmingham, AL 35294-0007.

Telephone 205-934-1693

Fax 205-975-6251

E-mail firoz@uab.edu

Web www.dental.uab.edu

Course Descriptions

Clinical Dentistry (CD)

Course credits in semester hours are to be arranged by consultation with the chair of the department involved. In general, courses in clinical dentistry may be expected to carry 3-6 hours of credit per semester. Course numbers marked with an asterisk indicate courses that may be repeated for credit.

*601. **Advanced Topics in Endodontics Seminar I.** Correlation of basic science and endodontics by literature review, lectures, seminars, demonstrations, presentations, and patient clinical treatments. Prerequisite: Permission of instructor. 3-6 hours.

*602. **Special Topics in General Dentistry.** 3-6 hours.

*603. **Special Topics in Oral and Maxillofacial Surgery.** Unique areas of surgical treatment in oral and maxillofacial surgery; orthognathic, TMJ, and facial reconstruction. 1-12 hours.

*604. **Special Topics in Orthodontics.** Diagnosis and treatment of orthodontic malocclusion in children, adolescents, and adults. 3-6 hours.

*605. **Special Topics in Pediatric Dentistry.** Areas affecting practice of pediatric dentistry, such as developing malocclusions, and their early diagnosis and management. 1-6 hours.

*606. **Special Topics in Periodontics.** Review of basic sciences and periodontics by special readings, lectures, seminars, and clinical instruction. Patient evaluation, treatment, planning, and therapeutic skills. 3-6 hours.

*607. **Removable Prosthodontics Seminar.** Current treatment modalities.

*608. **Special Topics in Radiology.** Lectures, seminars, and clinical instruction regarding intraoral and extraoral radiographic examinations. Technical and interpretation facets. 1-6 hours.

*609. **Special Topics in Fixed Prosthodontics.** Gnathological concepts and implantology.

610. **Introduction to Medical Genetics.** 3-6 hours.

*611. **Special Topics in Maxillofacial Prosthetics.** Application of biologic knowledge to planning treatment for restoration and reconstruction of special maxillofacial prosthetic patient. 1-3 hours.

*612. **Advanced Prosthodontics.** First-year clinic. Laboratory and clinical diagnosis, treatment planning, and care delivery, including implantology.

*613. **Special Topics in Hospital Dentistry.** Hospital protocol and procedures, medical emergencies in dental office, infection control, treating the medically compromised patient. 1-6 hours.

*614. **Periodontal Case Conferences.** 1-3 hours.

*615. **Periodontal Literature Review Seminar.** 1-3 hours.

*616. **Periodontal Board Topics.** 1-3 hours.

*620. **Clinical Pediatric Dentistry I.** 3-6 hours.

625. **Design and Analysis in Clinical Dental Research.** Basic statistical concepts, including terminology and appropriateness of study design and statistical tests. 1-4 hours.

626. **Surgical Implants in Dentistry.** Materials used for dental implants, design, fabrication, and tissue response to implants. 3-6 hours.

*627. **Biocompatibility Testing and Biodegradation Phenomena.** Degradation of materials in body, effect of ion release to tissues, tests for biocompatibility.

*628. **Enamel Properties, Acid Etching, and Adhesion.** Properties of enamel and dentin, acid-etching techniques, principles of adhesion, dentin bonding agents. 4 hours.

*629. **Ceramic Materials in Dentistry.** Basic science of ceramic materials, porcelain, cements, gypsum, investments, and ceramic implant materials.

*630. **Clinical Biomaterials Research Methods.** Design of studies for clinical evaluation of biomaterials, clinical test methods, and correlation of laboratory results.

*631. **Polymeric Biomaterials.** Basic science of polymers, acrylics, waxes, composite resins, impression materials, and polymeric implant materials.

*632. **Seminar in Biomaterials.** Review of biomaterials literature. 1 hour.

*633. **Alloy Systems in Dentistry.** Basic science of metals, mobile and base metals and alloys, amalgam, metallic implants.

*634. **Craniofacial Genetics.** Craniofacial findings in children with genetic disorders; dental features and other physical abnormalities associated with such disorders.

*635. **Pediatric Dentistry Journal Club.** 2 hours.

*636. **Hospital Dentistry.** Aspects of general anesthesia for pediatric and handicapped patients, including laboratory tests, indications for general anesthesia, etc. 2 hours.

*637. **Growth and Development-Genetics.** Mechanisms and control of craniofacial growth, both normal and aberrant; background in genetics.

638. **Current Topics In Dentistry.** Fixed and removable prosthetics, restorative techniques, endodontics, periodontics, practice management. 1 hour.

639. **Dental Management of the Medically Compromised Patient.** Treatment modifications for the medically compromised patient; heart disease, diabetes, renal disease, organ transplantation, antibiotic protocols. Summer.

*640. **Physical Diagnosis.** Basic principles of physical examination.

*650. **Advanced Topics in Hospital Dentistry.** Dealing with medically complex patient; anesthesia and sedation techniques; dental care of hospitalized patient. 1-6 hours.

651. **Advanced Topics in Endodontics Seminar II.** Readings, lectures, seminars, and clinical instruction in surgical therapies, trauma, and resorption of roots; fundamental research techniques. Prerequisite: CD 601. 3-6 hours.

*652. **Advanced Topics in General Dentistry.** 3-6 hours.

*653. **Advanced Topics in Oral and Maxillofacial Surgery.** 3-6 hours.

*654. **Advanced Topics in Orthodontics.** Diagnosis and treatment planning of complex orthodontic malocclusions including orthognathic surgical problems, craniofacial malformations, and temporomandibular joint dysfunction. This includes didactic and clinical programs. 3-6 hours.

*655. **Advanced Topics in Pediatric Dentistry.** Individually selected topics researched and presented in manuscript form at end of semester. 1-6 hours.

*656. **Advanced Topics in Periodontics.** Special readings, seminars, lectures, and clinical instruction in advanced clinical procedures and clinical research techniques. Prerequisite: CD 606. 3-6 hours.

*657. **Advanced Clinical Prosthodontics.** (Continuation of CD 612). Emphasis on full-mouth rehabilitation and implantology. Prerequisite: CD 612.

*658. **Advanced Topics in Radiology.** Advanced imaging systems; radiographic procedures. 1-12 hours.

*659. **Advanced Topics in Fixed Prosthodontics.** Total patient care; emphasis on implantology and rehabilitation. Prerequisite: CD 609.

*660. **Advanced Topics in Maxillofacial Prosthetics.** Principles of maxillofacial prosthetics; technical procedures and material; mechanical testing and laboratory evaluation of materials.

*661. **Physical Properties of Biomaterials.** Physical and chemical properties of metallic, ceramic, and polymeric materials; mechanical testing and laboratory evaluation of materials.

*662. **Laboratory Methods for Biomaterials Research.** Dental casting methods, metallography, hardness and mechanical properties testing, corrosion and surface testing, design of laboratory and clinical experiments, photography, use of light and scanning electron microscopes.

*663. **Diagnosis and Screening Procedures in Dentistry.**

*664. **Grand Rounds in Pediatric Dentistry.** 2-3 hours.

665. **Maxillofacial Seminar.**

*666. **Clinical Maxillofacial Prosthetics.** Prosthetic rehabilitation of patients with deficient maxillofacial system. 1-3 hours.

667. **Selected Topics in Anatomy of Head and Neck.**

*668. **Advanced Oral Histopathology.**

*669. **Clinical Pediatric Dentistry II.**

*670. **Microcomputer Applications in Dental Research, Public Health Dentistry, and Clinical Dentistry.** Use of microcomputers, different types of software; application to specific research, clinical, public health, and practice management procedures.

*671. **Special Topics in Microcomputer.**

*672. **Advanced Topics in OMS.** 5 hours.

*673. **Special Topics in OMS Trauma.** 4 hours.

*674. **Advanced Topics in OMS-Orthognathic.** 4 hours.

*675. **Special Topics in OMS Patient Care.** 4 hours.

*676. **Advanced Topics in OMS Oral Pathology.** 4 hours.

*679. **Fundamentals of Pediatric Dentistry.** Topics include operative dentistry, physical therapy, preventive orthodontics. 1-6 hours.

*680. **Dental Clinical Pathology.**

*681. **Clinical Pediatric Dentistry III.**

*682. **Special Topics in Endodontics.**

*685. **Advanced Endodontics.** First-Year Clinic.

*686. **Advanced Endodontics.** Second-Year Clinic.

*688. **Special Pathology.**

*689. **Conscious Sedation.**

*690. **Physiology and Concepts of Occlusion.**

*691. **Special Topics in Biomaterials Science.** 1-6 hours.

*692. **Advanced Prostodontic Seminar.** Correct and historical prostodontic literature.

*693. **Special Topics in OMS.** 5 hours.

*694. **Advanced General Dentistry Seminars (I-IV).** Diagnosis, treatment planning and case management; patient and practice management; quality assurance; instruction and advanced clinical procedures; comprehensive case presentations. 1 hour.

*695. **Literature Review in Pediatric Dentistry.**

*698. **Nonthesis Research.** 1-6 hours.

*699. **Thesis Research.** Prerequisite: Admission to candidacy. 1-6 hours.

Education

General Information

UAB's programs in education are fully approved by the Interstate Agreement on Qualifications of Educational Personnel, the National Association of State Directors of Teacher Education, and the National Council for Accreditation of Teacher Education. There are 13 graduate majors in the area of education; these are described in sections arranged alphabetically following this general information section.

Degrees and Certificates

Degrees are awarded by UAB in recognition of scholastic achievement and may be pursued for their own sake. However, employment in the public schools is governed not by the degree but by the professional Certificate issued by the Alabama State Department of Education (SDE). Since many stu-

dents in these programs are preparing for work in the public schools, the pursuit of a degree is usually coupled with pursuit of SDE certification. There is a rough correspondence between degree level and certification class, as follows:

<i>Degree Level</i>	<i>Certification Class</i>
Bachelor's	B
Master's	A
Specialist (post-master's)	AA
Doctoral	No Equivalent

In spite of this correspondence, we emphasize that the admission and completion requirements for the degree and for the certificate are often significantly different. Furthermore, not all education students are pursuing SDE certification. Students seeking certification should verify requirements with an advisor or program director.

Students who wish to add to an existing certificate through a SDE evaluation letter must be eligible for admission to the Graduate School. In addition, a copy of the SDE letter must be filed with the appropriate department chairperson and with Academic Advising Services, Room 100, School of Education Building, before coursework is begun. In some instances, prerequisites will have to be met in order to enroll in the desired courses.

Education, Curriculum and Instruction (Ph.D., M.A., Ed.S., Ed.)

Graduate program director: *Burns*

Education, Early Childhood (Ph.D., Ed.S., M.A.Ed.)

Education, Elementary (Ed.S., M.A.Ed.)

Education, High School (Ed.S., M.A.Ed.)

Art Education (M.A.Ed.)

Music Education (M.A.Ed.)

English as a Second Language (M.A.Ed.)

Faculty

Jerry T. Aldridge, Professor (Early Childhood Education); Early Childhood, Special Education, Elementary Education

Joseph C. Burns, Associate Professor (Elementary and High School Education); Biology, Science Education

Charles Calhoun, Associate Professor (Elementary Education); Elementary Math Education, Curriculum and Instruction

Anarella Cellitti, Associate Professor (Early Childhood Education); Early Childhood Development, Foundations of Early Childhood Education, Multi-Cultural Education

Lois M. Christensen, Assistant Professor (Elementary Education); Elementary Social Studies, Qualitative Research Methodology, Elementary Preservice Teacher Education, Ethnographic Processes, Study of Diversity, Women, and International Topics

Patricia Fitzgerald, Clinical Instructor (Elementary Education); Classroom Management, Organizational Skills of Teachers

Virginia D. Horns-Marsh, Professor Emerita (Early Childhood and Elementary Education); Early Childhood, Reading, Language Arts

Thomas W. Jambor, Associate Professor Emeritus (Early Childhood Education); Early Childhood Development, Play Environments, Development Through Play

Connie Kamii, Professor (Early Childhood Education); Early Childhood Education and Theory of Jean Piaget

Lynn Kirkland, Assistant Professor (Early Childhood Education); Early Childhood Development, Early Childhood Curriculum

Janice Kluge, Associate Professor (Art); Art Education, Drawing, Sculpture

Roberta A. Long, Professor Emerita (Elementary Education); Reading and Language Arts, Children's Literature

Gary L. Manning, Professor Emeritus (Elementary Education); Elementary Education, Individualization of Instruction, Language Arts and Reading

Maryann M. Manning, Professor (Elementary Education); Reading and Language Arts, Individualization of Instruction, Creative Teaching

Kathleen Martin, Assistant Professor (Early Childhood Education); Reading, Child Development, Reading Recovery

Gwen McCorquodale, (Elementary Education); Children's Literature, Language Arts

Lee Meadows, Associate Professor (High School Education); Science Education, Multicultural Issues, K-14 Science

Dail W. Mullins, Associate Professor (High School Education); Science Education (Early Childhood and Secondary)

Eddie P. Ort, III, Professor Emeritus (Elementary Education); Elementary School Social Studies, Curriculum Development and Evaluation

Janice Patterson, Assistant Professor (Elementary Education); School/University Partnerships, Resilience for Teachers and Students in Urban Schools, Preservice Teacher Education for Elementary Schools, Professional Development for Teacher Leaders

Tonya Perry, Teacher In Residence (Secondary Education); Language Arts Education

Cecilia Pierce, Associate Professor (High School Education); Social Studies Education, Curriculum Development, Qualitative Research

David Radford, Associate Professor (Science Education); Assessment, Professional Development

Michele Sims, Instructor (High School Education); Reading, Middle School Education

Tommy G. Smith, Associate Professor (High School Education); Mathematics Education

Stephen S. Underwood, Associate Professor Emeritus (Elementary Education); Science Education, Analysis of Teaching and Learning Environment

Graduate Programs

The M.A.Ed., Ed.S., and Class AA programs emphasize improving the teaching skills of the student and broadening the student's understanding of the field(s) of teaching specialization. Numerous teaching fields are available. All prospective students must apply for admission through the Graduate School.

The M.A.Ed. program requires a minimum of 33 semester hours of study, and the Ed.S. and AA programs require at least an additional 33 semester hours. All programs require a written final examination. An outline of the specific course requirements can be obtained from the office of the graduate program director or the Academic Advising Office in the

School of Education. The M.A.Ed. programs satisfy the academic requirements for the State Department of Education Class A Professional Certificate. The Ed.S. programs satisfy academic requirements for the State Department of Education Class AA Professional Certificate and an Ed.S. degree. The AA programs satisfy AA certification requirements, but do not lead to a degree. See also the section "Education (General Information)" earlier in this catalog.

The program leading to the Doctor of Philosophy (Ph.D.) degree in early childhood education is sufficiently flexible to accommodate the interests and previous preparation of the student, but it must include an internship and a substantial research component culminating in the completion of a dissertation. The minimum admission requirements are those of the UAB Graduate School. However, admission is highly selective, and most successful applicants have qualifications much higher than the minimum. Admission is open only once annually, with the program of study beginning in June (summer term). Application packets must be complete in the Graduate School office, at the latest, by six weeks before the program begins.

Additional Information

For detailed information, contact Dr. Jerry Aldridge (Early Childhood), Dr. Maryann Manning (Elementary) or Dr. Cecilia Pierce (Secondary), UAB Department of Curriculum and Instruction, EB 119, 1530 3rd Avenue South, Birmingham, Alabama 35294-1250.

Telephone 205-934-5371

Web www.ed.uab.edu

Course Descriptions

Unless otherwise noted, all courses are for 3 semester hours of credit. Course numbers preceded with an asterisk indicate courses that can be repeated for credit, with stated stipulations.

Early Childhood Education (ECE)

545. Curriculum for Young Children. Basic knowledge of curriculum and concepts of mathematics, science, and social studies for young children. Child growth and development as basis for planning and teaching mathematics, science, and social studies to young children. Teaching methods and use of instructional media. Practicum experience required. Prerequisite: Admission to ECE 5th-Year Program. 6 hours.

546. Communication Arts and Reading for the Young Child. Nature of reading and language arts experiences for children, infant through grade three. Media, materials, experiences, programs, and strategies to facilitate development of communicative abilities with emphasis on preserving and maintaining creative expression in different cultural settings. Integration of learning in areas of listening, speaking, reading, composition, literature, handwriting, spelling, and other communicative arts. Laboratory experiences required. Prerequisite: Admission to ECE 5th-Year Program. 6 hours.

548. Infant/Toddler Development. Study of human development within an ecological context from before birth to three years of age. Course covers social-emotional, physical, cognitive, language, and creative development of the infant and toddler in the home and also in programs for very young children.

549. Educational Environment: Infants/Parents (Toddlers/Parents). Study of infant (or toddler) development as it

relates to the organization of a parent/infant (or toddler) educational program. Information concerning program management, observation of parent/infant (or toddler) interaction, development and sequencing of activities, creation and evaluation of materials, and an examination of techniques and procedures for parent involvement and education. Actual experience in working with a parent/infant (or toddler) program will be an integral part of the course. Prerequisite: ECE 548 or equivalent. 3 or 6 hours.

620. Introduction to Curriculum and Teaching. Basic knowledge of early childhood curriculum for programs, infant through third grade, in a variety of settings. Relationship of child growth and development in planning and implementation of all areas of curriculum. Prerequisite: Admission to ECE 5th-Year Program.

630. Cognitive Curriculum in Early Childhood Education. Mathematics and science for children four to eight years of age based on constructivism. Children's thinking, particularly in physical-knowledge activities, group games, and situations in daily living.

631. Program for Young Children. Early childhood education programs and theoretical perspectives. Existing curricula such as Piaget, behavior modification, Montessori, open classroom, foreign-based programs. Required for students without undergraduate majors in ECE.

632. Young Children and Their Literature. Literature for children in nursery school, kindergarten, primary grades; selection, use, and integration of literature in total curriculum.

633. Social Development of the Young Atypical Child. Theoretical issues and political, sociological relationship of the atypical child. Nature, assessment, and intervention of emotional disorder. Program planning, teaching, and interdisciplinary considerations.

690. Practicum in Early Childhood Education. Required of all M.A.Ed. students. Prerequisite: Permission of instructor. 3 or 6 hours.

692. Practicum in Primary Education. Prerequisite: Permission of advisor and department. 6 or 9 hours.

693. Internship in Early Childhood Education. Full-time internship for 10 weeks (300 clock hours). 3 or 9 hours.

694. Practicum in Early Childhood Education for the Young Atypical Child.

730. Doctoral Seminar I: Issues in Developmental Theory. Historical, sociological, and psychological influences on theories of development. Prerequisites: Graduate course in development or educational psychology and admission to doctoral program.

731. Doctoral Seminar II: Children and Society. Societal influences on child development. Role of family and various agencies in different cultures. Prerequisite: Admission to doctoral program.

732. Doctoral Seminar III: Special Topics in Early Childhood and Development Studies. Specific topic announced in class schedule. Prerequisites: ECE 730 and 731. 1-3 hours.

733. Doctoral Seminar IV. Advanced Research in Early Childhood Education. Evaluation and planning of research in preparation for dissertation. Prerequisite: At least one course in research, measurement, or statistics. 3-9 hours.

734. Logic and Scientific Inquiry. Scientific investigation as applied in education. Conceptual issues in research

process. Methods of analysis and presentation. Prerequisite: Master's degree.

735. Meaning and Development of Play. Nature of play, its importance and how it is nurtured. Prerequisite: Master's degree.

736. Personality Development of the Young Child. Theoretical perspectives; review of research, including cross-cultural studies. Prerequisite: Admission to doctoral program.

737. Parent, Child, School Interface. Historical development of parent involvement. Theoretical bases of family-school interactions. Prerequisite: Admission to doctoral program.

738. The Consultation Process and the Young Child. Problem areas affecting young children; skills for working with families and community agencies. Prerequisites: ECE 730 and 731.

739. Developing Interpersonal Competence for Leaders. Relationships with coworkers and subordinates. Various approaches to interpersonal relationships. Prerequisites: Admission to doctoral program.

740. Research Apprenticeship. Planning, implementation, analysis, and presentation of research. Prerequisites: ECE 730 and 731. 3 or 6 hours.

741. Research Study: Design and Implementation. Development of rationale, literature search, collection and analysis of data, and formal written report (according to APA guidelines). Must be completed before admission to candidacy. Prerequisites: EPR 607, 608, 609, and ECE 740.

742-745. Piaget: Theory and Research. Jean Piaget's theory, application to early childhood education; physical and social (conventional) knowledge. Representation and memory, logico-mathematical knowledge. Prerequisites or corequisites: Master's degree and either EEC 672 or EPR 621.

746. Contemporary Issues in American Science Education. Crisis atmosphere surrounding science education in American classroom. Prerequisites: ECE 730, 731 and 732.

747. Social Development of Young Children. Factors influencing socialization of young children. Prerequisites: ECE 730 and 732.

748. Research in Infancy. Theoretical and empirical evidence relating to psychomotor domain. Prerequisite: Admission to doctoral program in early childhood education.

749. Advanced Early Childhood Curriculum. Historical, philosophical, psychological, and social thought influencing curriculum in early childhood education. Prerequisites: ECE 730, 731, and 732.

750. Literacy Before School. Written language development of preschool children. Prerequisites: Master's degree and two courses in language development.

751. Schooling and Literacy Instruction. Primary-level literacy instruction and children's literacy development. Prerequisites: Admission to doctoral program in early childhood education and two courses in language development.

752. Theory and Research on Literacy Development and Instruction. Philosophical and psychological beliefs regarding literacy development. Prerequisite: Admission to doctoral program in early childhood education.

753. John Dewey and the Early Childhood Curriculum. Dewey's philosophy, epistemology; relationship to early childhood education and development.

760. Current Issues in Education. 1-3 hours.

774. **Advanced Seminar in Language Development.** Relationship of thinking and knowing to language development; strategies for analysis; strengths and weaknesses of techniques of examining language development. Prerequisites: Master's degree and one course in language development or equivalent.

790. **Internship in Early Childhood Education and Development.** 6 or 9 hours.

791. **Field Studies in Early Childhood Education.** Prerequisite: Permission of instructor. 1-6 hours.

792. **Directed Readings in Research.** Review of research in early childhood education to gain understanding of conceptual and methodological basis.

793. **Individual Research in Early Childhood Education.** Recent research in early childhood education; systematic solutions to problems in education.

794. **Current Research Topics in Early Childhood Education.** Philosophical aspects of scientific methods in education; functions of paradigms, theories, and models in inquiry; theory development and validation; major types of experimental and nonexperimental inquiry appropriate to study of educational phenomena.

798. **Nondissertation Research.** 3-12 hours.

799. **Dissertation Research.** Prerequisite: Admission to candidacy. 3-12 hours.

Arts Education (EDA)

583. **Methods of Teaching Art.** Learning experiences necessary for development of essential teaching competencies. Prerequisite: Admission to 5th-Year Program. 3 or 6 hours.

584. **Methods of Teaching Art Laboratory.** Required. 1 or 2 hours.

591. **Art Education Final Exhibition.** M.A. students plan and mount exhibition of work during final year. Graphic design students may prepare public portfolio presentation instead of exhibition. Art History students prepare a thesis research paper. Should be taken with the student's thesis advisor. Prerequisite: Permission of advisor.

651. **Innovative Practices in Teaching Art in the Schools.** Innovative practices in planning, instructing, and evaluating in art education. Specialized study of contemporary needs in art and art education.

680. **Art Experiences in the Teaching of Art N-12.** Concepts, methods, and skills for teaching art.

690. **Internship in Art Education N-12.** For 5th-Year Program students. Observation and student teaching in elementary and secondary schools (10 weeks or 300 clock hours). Prerequisites: Unconditional acceptance into the 5th-Year Program, completion of 9 hours in professional studies, EDA 680, and completion of 9 hours in academic courses. 9 hours.

Curriculum (EDC)

600. **Transition into the Teaching Profession.** Introductory course in 5th-Year (nontraditional) Program for all levels (early childhood, elementary, and high school). Developing basic teaching skills and understanding of interdependence among all levels within school and community. Prerequisite: Acceptance into 5th-Year Program in early childhood, elementary, or high school education.

651. **Innovative Practices in Curriculum.** Current issues and special topics in curriculum; topics vary. May be repeated with different subject areas.

655. **Curriculum Principles and Practices.** Current curriculum practices; concepts and principles underlying their development.

656. **Developmental Problems and Issues in Curriculum Construction.** Includes field study of curriculum in teachers' own schools.

694. **Curriculum Seminar: Special Problems in Curriculum Development.** Prerequisite: EDC 655 or permission of instructor. 1-3 hours.

706. **The Dynamics of Educational Change.** Defining roles as change agents; understanding school as unit undergoing change; guiding perspectives in making changes. Prerequisite: Master's degree.

707. **Curriculum Theory.** Prerequisites: Master's degree and EDC 655.

711. **Analysis and Evaluation of Teaching.** Strategies and models for analysis of teaching. Use of data in evaluating teacher effectiveness. Prerequisite: Master's degree.

712. **Seminar in Curriculum and Instruction.** Critical issues and research. Development and discussion of individual research. Prerequisite: Master's degree.

713. **Educational Issues and Human Diversity.** Social, economic, and cultural forces contributing to deprivation; implications for teachers, administrators, and educational staff. Prerequisite: Master's degree.

720. **Problems and Issues in Education.** Exploration of problems and issues associated with education. Emphasis on needs of teachers and implications of the current problems and issues. Prerequisite: Master's degree.

725. **Advanced Study in Social Studies Curriculum.** Major problems and issues associated with social studies curriculum and instructional practices. Prerequisites: Completion of graduate course in teaching social studies and experience in teaching social studies.

728. **Ed.S. Research Project I.** Development of research proposal. Proposal must be accepted and approved by appointed faculty committee. Prerequisites: EPR 692 or equivalent, EPR 596 or EPR 608, and 12 hours in Ed.S. program.

729. **Ed.S. Research Project II.** Prerequisites: EPR 692, EDC 728, EPR 596 or EPR 608, and 12 hours in Ed.S. program.

Reading (EDR)

540. **Developmental Reading I.** Materials and methods. Emphasis on planning balanced program and understanding reading process. Includes field experiences. Prerequisite: Admission to 5th-Year Program.

541. **Literature for Adolescents.** Literary works written for or about adolescents.

543. **Developmental Reading II: Focus on Content Areas.** Reading process as it relates to content area materials. Prerequisite: Admission to 5th-Year Program.

551. **Reading in Content Areas.** Reading process; evaluation of content area materials; analysis of different content area textbooks; meeting individual differences.

640. **Reading Improvement Workshop.** For inservice teachers of reading. Specific content varies according to needs of teachers. 3 or 6 hours.

650. **Teaching Reading.** Understanding of reading process. Nature of reading programs; readiness motivation, methods, skills, assessment, evaluation, materials, and resources.

652. **Pre- and Early-Reading Instruction.** Theoretical bases, procedures, techniques, and materials for prereading and reading instruction. Prerequisite: Developmental reading course.

653. **Literature for Elementary and Middle Schools.** Emphasis on needs of children, selection of books, societal issues in children's literature.

654. **Assessment, Evaluation, and Correction of Reading Difficulties.** Observation, standardized oral and written reading tests, and informal reading inventories. Selecting learning activities based on diagnostic data. Prerequisite: Special Education majors only.

655. **Reading Assessment and Evaluation.** Examines evaluation techniques, such as observations, and standardized oral and silent reading tests, and informal reading inventories, such as miscue analysis.

656. **Reading Strategies for Students with Reading Difficulties.** Development and application strategies for remediating reading problems based on assessment data. Prerequisite: Diagnostic reading course.

657. **Supervision of Reading.** Supervisor's role in improving reading instruction; methods of supervision and evaluation. Prerequisite: Permission of instructor.

659. **Research and Problems in Reading.** For teachers in elementary and early childhood education.

690. **Internship in Remedial Reading.** Supervised experience with children with reading difficulties. Prerequisites: Admission to reading certification program, permission of instructor and department, and EDR 654.

691. **Practicum in Reading.** Prerequisite: Permission of instructor.

692. **Internship in Supervision of Reading.** Prerequisites: Admission to Reading Supervisor Program, EDR 654 and 657, and permission of instructor. 6 hours.

698. **Independent Nonthesis Research in Reading.** Prerequisite: Permission of instructor.

701. **Advanced Diagnosis and Remediation of Reading Problems.** Examination of serious reading disabilities; diagnosis, possible remediation strategies, and development; diagnosis, possible remediation strategies, and development of remediation plan in lab setting. Prerequisites: Master's degree and M.A.-level diagnostic reading course or permission of instructor.

702. **Reading: Theoretical Foundations.** Relates concepts of learning, development, and linguistics to reading-learning process; emphasis on current theory; implications for program planning and classroom practice. Prerequisites: EDR 650 or permission of instructor, and master's degree.

703. **Advanced Research in Reading.** Prerequisites: EDR 650 and master's degree.

704. **Field Experiences in Reading.** Supervised field experiences under direction of qualified reading consultant or supervisor in school setting. Prerequisites: Admission to Sixth-Year Program for Reading Teacher and permission of instructor. 3 or 6 hours.

705. **Seminar in Reading Instruction.** Examination of trends and issues in field of reading, topics determined by each class. Prerequisites: Master's degree and 9 graduate hours in reading or permission of instructor.

706. **Research.** Prerequisites: Master's degree and permission of instructor. 1-3 hours.

Elementary and Early Childhood Education (EEC)

500. **Pedagogy One.** Develops candidate's knowledge, skills/performance, and dispositions in the teaching of reading and language arts in the early childhood and elementary classroom. Refines abilities in instructional planning, instructional delivery, classroom management, and assessment of learners in order to address the literacy needs of diverse learners. 9 hours.

501. **Pedagogy Two.** Curriculum and field experience of P-6 curriculum in the areas of math, science, literacy, and social studies. Emphasis is placed on the scope, sequence, and content of each content area. Extensive field experiences required. 9 hours.

540. **Advanced Workshop in Education.** May be repeated for total of 9 hours with various topics. 1-3 hours.

560. **Current Issues in Education.** Topics announced in class schedule. May be repeated for maximum of 6 hours with different topics. 1-3 hours.

565. **Teaching Globe and Map Skills.** Concepts and skills related to understanding functional use of globes and maps. Teaching strategies and methodologies for teaching concepts and skills. Curriculum scope, sequence, continuity, and application within social studies program.

573. **Teaching in a Multicultural Society.** Implications of cultural pluralism for teaching, student learning, curriculum planning, and instructional techniques.

592. **Individual Curriculum Projects: (Area Specified).** Field projects in curriculum modification and improvement of classroom practice. Prerequisite: Permission of instructor. 3 or 6 hours.

593. **Individual Readings.** Individualized readings on special topics. Prerequisite: Permission of instructor. 1-3 hours.

594. **Field Work in Elementary and Early Childhood Education.** Observation and participation experiences with children. Prerequisite: Permission of instructor. 1, 2, 3, or 6 hours.

610. **Curriculum Development in Elementary and Early Childhood Education.** Curriculum decisions, planning and implementation.

611. **Teacher Roles in Elementary and Early Childhood Education.** Models of instructional roles such as facilitator, program planner, curriculum designer; models of social roles. Includes practicum experiences.

612. **Models of Teaching.** Selecting and applying specific teaching strategies. Includes practicum experiences.

620. **Teaching Mathematics N-6.** Issues and approaches in early childhood and elementary mathematics; research and implementation for instruction.

621. **Teaching Language Arts N-6.** Issues and approaches in teaching early childhood and elementary school language arts. Implications of research for instruction.

622. **Teaching Social Studies N-6.** Function and organization of social studies programs in early childhood and elementary schools. Selection and adaptation of content, resources, teaching materials, and teaching strategies and methods with emphasis on current trends.

623. **Teaching Science N-6.** Issues and approaches in early childhood and elementary science. Implications of research for instruction.

625. **Critical Theory in P-6 Education.** Course encompasses current issues in education from critical, postmodern,

and feminist perspectives. Issues of equity, social justice, racism, sexism, and the marginalization of minorities in education will be explored. Prerequisites: Admission to Graduate School and EEC 660, Readings in Teaching and Learning. 3 hours.

628. **Master's Project.** Course is designed for the nontraditional 5th-year student in early childhood and elementary education. This one-hour seminar must be taken concurrently with the student's internship experience. 1 hour.

632. **Advanced Children's Literature.** Course is designed to explore literature for preschool, kindergarten, and primary- and intermediate-level children. Selection, use, and integration of literature throughout the total curriculum is stressed. Prerequisites: Admission to Graduate School or permission of the instructor. 3 hours.

650. **Systematic Reflections About Teaching.** Theory and practice of reflective inquiry in the elementary classroom which includes observations, data collection, analysis, and narrative reporting. Prerequisite: Admission into Graduate School. 3 hours.

660. **Reading in Teaching and Learning.** This introductory course is designed to assist the student in locating, analyzing, and synthesizing current research in early childhood and elementary education. 3 hours.

670. **Studying the Child in School.** Analysis of child study in school; values and limitations of assessment.

671. **Creative and Affective Experiences.** Nature and nurture of creativity through creative learning experiences. Maintaining and preserving creative expression throughout curriculum.

672. **Piaget and Perspectives in Learning.** Piaget's theory of intellectual or cognitive development; applications to elementary and early childhood education. Prerequisite: Course in human growth and development.

674. **Language Development.** Developmental processes involved in language, relationship to education programs.

675. **Teaching in the Urban School.** Methods and materials; evaluation of school and school-related programs for equalizing educational opportunity.

676. **Discipline and Social Education.** Child growth and development as the basis for sound discipline in elementary school.

677. **Readiness for Learning.** Preschool and primary level language development and literacy development; assessment techniques.

678. **Primary Math: A Constructivist Approach.** How children acquire logico-mathematical knowledge.

680. **National Board Portfolio.** Course involves 18 Saturday seminars during the school year to prepare teachers for National Board Candidacy and to support candidates as they go through the certification process. Students enrolled in this course may be either precandidates or candidates for National Board Certification. Prerequisites: Admission to Graduate School and permission of candidate's advisor and course instructor. 6 hours.

690. **Internship in P-3/3-6.** Supervised teaching in an early childhood (P-3) and an elementary (3-6) program. The student gradually assumes responsibility for planning and teaching for the entire class (minimum of 12 weeks). The internship experience includes supervision in working with professional resource professionals and parents. Prerequisites: Approval of application for Internship in P-3/3-6. 9 hours.

691. **Practicum in ECE/ELE.** Prerequisite: Permission of instructor. 3 hours.

692. **Individual Curriculum Projects: (Area Specified).** Field projects in curriculum modifications and improvement of classroom practice. Prerequisite: Permission of instructor. 3 or 6 hours.

693. **Independent Study.** Prerequisite: Permission of instructor. 1-3 hours.

694. **Field Study.** Prerequisite: Permission of instructor. 1, 2, 3, or 6 hours.

695. **Practicum Supervision in ECE/ELE.** Prerequisite: Permission of instructor or advisor. 2 hours.

696. **Internship Seminar.** Prerequisite: Concurrent enrollment in EEC 690. 2 hours.

698. **Independent Nonthesis Research.** Prerequisite: Permission of instructor.

699. **Thesis Research.** Prerequisites: Admission to candidacy and permission of instructor. 6 or 9 hours.

701. **Advanced Seminar in Language Development.** Relationship of thinking and knowing to language development; strategies for analysis. Prerequisites: EEC 674 or equivalent and master's degree.

702. **Administration and Supervision of Programs for Young Children.** Evaluation, decision making, supportive services, staff development, community interaction strategies. Prerequisite: Master's degree.

710. **Research.** Prerequisite: Permission of instructor. 1-3 hours.

Foreign Language (EFL)

585. **Teaching Strategies for Foreign Language, N-12.** Approaches and methods of teaching and testing foreign language. Selection and use of audiovisual equipment and materials. Includes structured school observations. 6 hours.

598. **Student Teaching in Foreign Languages, N-12.** Supervised teaching in foreign languages (N-12). Prerequisite: Approval of application for student teaching. 9 hours.

691. **N-12 Foreign Language Internship.** Supervised foreign language teaching in elementary and secondary schools. Prerequisite: Approval of application for internship. 9 hours.

High School (EHS)

556. **Classroom Management in the Secondary Schools.** Designed to help teachers build their own personal system of discipline, consonant with their philosophies and personalities as well as with realities of students and schools. Emphasis on successful classroom management techniques.

558. **Science, Technology, and Society: A Primer for Education Majors.** (Also EHS 458). Explores nature of momentous changes: origin, current status, and future direction. Emphasis on role of educational community in helping young people to better understand and deal with various issues raised.

565. **Secondary School Curriculum: Mathematics.** Preparation to teach secondary school mathematics: making informed decisions about curricula, learners, and methodology in mathematics. Acquainting students with current state and national reforms in mathematics education. Problem solving, computers and calculators, and manipulatives in teaching mathematics. Developmental levels and individual differences of learners. Includes field experiences. Prerequisite: Admission to 5th-Year Program.

566. **Secondary School Curriculum: Language Arts/English.** A study of and practicum in the teaching of Language Arts and English in the secondary school; includes field experiences. Prerequisite: Admission to 5th-Year Program.

567. **Secondary School Curriculum: Science.** Teaching methods and curricula in secondary science programs. Includes field experiences. Prerequisite: Admission to 5th-Year Program.

568. **Secondary School Curriculum: Social Studies.** Understanding curriculum design and implementation as it relates to Social Studies in grades 7-12. Required demonstration of abilities to make informed decisions concerning what strategies to use with what students and how best to evaluate the students' progress in achieving the defined goals of a lesson. Includes field experiences. Prerequisite: Admission to 5th-Year Program.

569. **Secondary School Curriculum: Foreign Language.** Approaches and methods of teaching and evaluating foreign language at all levels. Includes field experiences. Prerequisite: Admission to 5th-Year Program.

570. **Practicum in Secondary Education.** Prerequisite: Concurrent enrollment in EHS 565, 566, 567, or 568. 1 hour.

597. **Special Problems in Education.** Seminar for seniors and graduate students; individualized readings and research projects based on student's special interests. May be repeated for total of 6 hours. 1-3 hours.

599. **Field Studies in Selected Educational Settings.** Field visits to locations of high educational impact, preceded by organized group meetings to develop background and concepts on which visits will be based; summation meetings follow visits. Individual projects and papers prescribed as appropriate. Credit determined by complexity of area or topic under study and necessary length of time rather than by distance involved. Cost for travel and other related arrangements to be announced for each study group. 1-3 hours.

611. **Advanced Special Methods for Teaching Foreign Languages.** Instructional objectives, classroom learning activities, utilization of differential pedagogical activities, improved use of source materials, and material sources.

612. **Teaching English, Grades 7-14.** Curriculum and instruction in English programs. Issues, materials, and methods. Prerequisite: Undergraduate methods.

614. **Teaching Social and Behavioral Sciences, Grades 7-14.** Advanced course in methods and materials of teaching social and behavioral sciences in high school. General philosophy and purpose of social science disciplines. Prerequisite: Undergraduate methods.

615. **Methods of Teaching Science, Grades 7-14.** Science teaching methods, classroom interaction, current research, process skills, science/society issues, and cognitive development of students. Prerequisite: Undergraduate methods.

616. **Teaching Mathematics in Secondary School.** Philosophical and psychological principles applied to teaching math. Prerequisite: Undergraduate methods.

644. **Workshop in Teaching (Selected Topics).** Prerequisite: Permission of instructor.

645. **Inquiry in the Social Studies.** Inquiry and discovery techniques through use of simulation, games, role playing, and other group activities. Social studies projects, programs, and materials.

647. **Secondary School Programs.** Innovations, programs, and classroom practices; forces leading to recent trends.

650. **Teaching the Emerging Adolescent.** Curriculum, materials, and methods of instruction reflecting needs and characteristics of age group.

*651. **Innovative Practices in Teaching in Secondary School (Area Studies).** Innovative practices in planning, instructing, and evaluating high school area studies. May be repeated if taken in different areas of study.

653. **Current Issues in Secondary Education.** Critical problems affecting teacher and curriculum in grades 7-14.

681. **Special Topics in Education.** Prerequisite: Permission of instructor. 1-6 hours.

691. **Secondary School Internship.** Observation and teaching in secondary school (10 weeks or 300 clock hours minimum). Prerequisites: Unconditional acceptance in 5th-Year Program, completion of graduate methods course, 9 hours in certification area, at least 9 hours in professional courses in addition to methods course, and approval of application for internship. 9 hours.

692. **Field Studies in (Selected Educational Settings).** 1-3 hours.

693. **Advanced Field Experience.**

695. **Secondary School Internship for Speech Communication/Theater.** Observation and teaching in secondary school (10 weeks or 300 clock hours minimum). Students also attend minimum of five 3-hour seminars designed to meet specific needs. Prerequisites: Unconditional acceptance in 5th-Year Program, completion of graduate methods course 9 hours in certification area, at least 9 hours in professional in addition to methods course, and approval of application for internship. 6 hours.

697. **Individual Readings in Education.** May be repeated for total of 6 hours. Prerequisite: Permission of advisor and instructor. 1-3 hours.

698. **Individual Research in Education.** Prerequisite: Permission of instructor. 1-6 hours.

699. **Thesis Research.** Prerequisites: Admission to candidacy and permission of instructor. 6 or 9 hours.

710. **Creative Teaching in Middle School.** Advanced methods and materials for teaching grades 6-9.

720. **Individual Research in Education.** Prerequisites: Master's degree and permission of instructor.

Elementary (ELE)

512. **Elementary School Curriculum: Mathematics.** Material and methods of teaching mathematics. Emphasizes scope, sequence, and content of the mathematics program. Computation skills and problem solving are stressed. Includes field experiences. Prerequisite: Admission to 5th-Year Program.

513. **Elementary School Curriculum: Science.** Scope, sequence, materials, and methods. Emphasis on teaching and the development of content and process skills. Field experiences completed in conjunction with practicum. Prerequisite: Admission to 5th-Year Program.

514. **Elementary School Curriculum: Social Studies.** Scope, sequence, and content of elementary school social studies curriculum. Teaching strategies, program articulation, and instructional planning. Field experiences completed in conjunction with practicum. Prerequisite: Admission to 5th-Year Program.

620. **Teaching Mathematics in the Elementary School.** Issues and approaches in elementary mathematics; research and implementation for instruction.

621. **Teaching Language Arts in the Elementary School.** Issues and approaches in teaching elementary school language arts. Implications of research for instruction.

622. **Teaching Social Studies in the Elementary School.** Function and organization of social studies programs in elementary schools. Selection and adaptation of content, resources, teaching materials, and strategies and methods. Emphasis on current trends.

623. **Teaching Science in the Elementary School.** Issues and approaches in elementary science. Implications of research for instruction.

624. **The Elementary School.** Organizational patterns in American elementary schools.

690. **Practicum in Elementary Education.** Prerequisite: Permission of instructor. 3 or 6 hours.

691. **Internship in Elementary Education.** Full-time internship as elementary education teacher for 10 weeks (300 clock hours). Responsibility as teacher for at least 10 days. 3 or 9 hours.

721. **Developing Effective Instruction in the Elementary School.** Leadership role of senior teachers; analysis and enhancement of instructional programs; development of teaching staff. Prerequisite: Master's degree.

Middle School (EMS)

590. **Middle School Internship.** Observation and teaching in middle school (10 weeks or 300 hours minimum). Students will attend a minimum of five 3-hour seminars designed to meet specific needs. Prerequisites: Unconditional acceptance in the 5th-Year Program and completion of graduate methods course, 9 hours in academic work, and at least 9 hours in professional courses in addition to the methods course.

648. **The Middle School.** Curriculum and principles in middle school education. Development of middle school from early junior high school movement. Examination of middle school programs and activities.

649. **Studies in Middle School Education I, II, III.** Advanced workshops in various phases of middle school program. Phase I foundations (history, growth and development, philosophy); Phase II, curriculum; and Phase III, instruction. 1-3 hours.

698. **Individual Research in Education.** Prerequisite: Permission of instructor. 1-6 hours.

699. **Thesis Research.** Prerequisites: Admission to candidacy and permission of instructor. 6 or 9 hours.

710. **Creative Teaching in Middle School.** Advanced methods and materials for teaching grades 6-9.

720. **Individual Research in Education.** Prerequisites: Master's degree and permission of instructor.

Music Education (EMU)

502. **Methods of Teaching Music N-6.** Teaching music in the elementary school environment. Investigation of critical elements in the teaching and learning process as related to music in grades N-6. Prerequisites: Permission of instructor. 3 hours.

503. **Methods of Teaching Music N-6 Laboratory.** This lab will provide public school observation experiences for

music education students enrolled in EMU 502. Prerequisites: Permission of instructor. 1 hour.

English as a Second Language (EESL)

610. **Second Language Acquisition.** An in-depth look at major theories of second language acquisition. Exploration of learning environments, programs, home language, culture, and other factors that influence second language acquisition. 3 hours.

620. **Special Topics in ESL.** Overview of institutional structures that support new language learners, curriculum and teaching modifications supported by second language acquisition theory, support networks, and legal issues. 3 hours.

630. **Methods and Materials of Teaching ESL.** Course examines traditional and current approaches to teaching English to speakers of other languages and curriculum materials, texts, and other resources. 3 hours.

640. **Teaching ESL through Reading and Writing.** Theory, research and practice in reading and writing for second language learners. Implications for teaching reading and writing skills that allow second language learners to participate in the full range of academic situations. 3 hours.

690. **Internship in ESL, N-12.** The internship requires a minimum of 300 contact hours elementary (150 hours) and secondary (150 hours) settings. Interns are engaged in the full scope of teaching activities including planning and delivering lessons, evaluating students, and conducting managerial tasks and other appropriate duties. Prerequisites: Approval of internship application. 3, 6, and 9 hours.

Education, Human Studies

Graduate program director: *Macrina*

Education, Counseling (Ed.S., M.A.)

Education, Health (Ed.S., M.A.Ed.)

Education, Health Education/Health Promotion (Ph.D.)

Education, Physical (Ed.S., M.A.Ed.)

Education, School Psychology (Ed.S.)

Faculty

Gypsy Abbott, Professor; Educational Psychology, Psychological Testing, Evaluation

Terry Conkle, Assistant Professor; Physical Education Pedagogy

Angie Coker, Assistant Professor; Counseling

William A. Crunk, Jr., Associate Professor; Rehabilitation Counseling, Family Guidance, Counseling Theories

Suzie Davies, Assistant Professor; Health Education

Brian F. Geiger, Associate Professor; Health Promotion Models, Comprehensive School Health, Technology, Community Education

Donna J. Hester, Associate Professor; Motor Development, Elementary Physical Education, Adapted Physical Education

Gary R. Hunter, Professor; Exercise Physiology, Sport Conditioning, Body Composition and Energy Metabolism

Maxie P. Kohler, Associate Professor; Personality Theory, Human Development, Educational Psychology

David M. Macrina, Professor; Health Promotion, Community Health, Planning and Administration

Charles McLafferty, Assistant Professor; Qualitative Research, Education Psychology, Counseling Theory

Cynthia J. Petri, Associate Professor; Health Behavior, HIV Education and Prevention, Technology, Theory

Jane Roy, Assistant Professor, Exercise Physiology

Gary L. Sapp, Professor; Cognitive Assessment, School Psychometry, School Psychology

Kristi Sayers, Assistant Professor, Physical Education Pedagogy, Adapted Physical Education

Patricia M. Sheets, Assistant Professor; Rehabilitation Counseling, Legal and Ethical Issues in Counseling, Clinical Coordinator

Scott W. Snyder, Associate Professor; Child Development, Measurement, Early Childhood Special Education, Program Evaluation

Lawrence Tyson, Assistant Professor; School Counseling, Human Development Group

David Whittinghill, Assistant Professor; Career Counseling, Substance Abuse Counseling, Counseling Technology, Pharmacology

Lesa Woodby, Assistant Professor; Evaluation Research, Smoking Cessation, Health Education

M.A.Ed. Program

Admission Requirement and Prerequisites

In addition to the general admission requirements of the Graduate School, the following prerequisites apply to these programs. The prerequisites are not part of the graduate program. Applicants without the prerequisites may be admitted conditionally and take up to 12 semester hours of graduate work while completing the prerequisites. Specific course prerequisites are determined on an individual program basis by the student's advisors.

Exercise Physiology

The Exercise Physiology specialization offers a master's degree option for students interested in either clinical exercise physiology or physiology research. The curriculum is multidisciplinary and comprises courses in the Schools of Education, Medicine, Health Related Professions, and Public Health. Two program plans are offered (detailed below). Plan I culminates with a thesis research project, and Plan II culminates with a written comprehensive exam. Resources for student participation in research include a Muscle Research Laboratory, a Strength Performance Laboratory, and a Body Composition/Energy Metabolism Laboratory. Wide arrays of field experiences are also available in local agencies and clinics. In addition to Graduate School admission requirements, prospective students must have completed undergraduate coursework in physiology, anatomy, and chemistry. First-year students begin in the fall term. Listed below are the courses required in the program and a sample of elective courses.

Plan I (27 hours and thesis)

Major Courses (12-15 hours)

Course	Course Name	Semester Hours
PE 637	Exercise Physiology I	3
PE 638	Exercise Physiology II	3
EPR 692	Research Methods	3
PE 642	Practicum in Exercise Physiology	3
EPR 609	Statistical Methods and Research in Education	3
	Thesis	6

Related Field

6-9

Plan II (36 hours of coursework)

Major Courses (12-15 hours)

Course	Course Name	Semester Hours
PE 637	Exercise Physiology I	3
PE 638	Exercise Physiology II	3
EPR 692	Research Methods	3
EPR 609	Statistical Methods and Research in Education	3
	Elective in Major	3
	Thesis Substitution	12
	Related Field	6-9

Sample Major Electives for Plan I and II

PE 656	Advanced Sport Psychology
PE 640	Advanced Techniques in Conditioning the Athlete
PE 639	Exercise Prescription for High Risk Populations
PE 672	Advanced Treatment of Athletic Injuries
PE 674	Sport Performance and Nutrition
PE 645	Motor Development
PE 695	Problems in Physical Education
PE 630	Mechanical Analysis of Motor Skills
PE 585	Principles of Fitness Leadership

Sample Courses for Related Fields, Plan I and II

NTR 601	Medical Nutrition
NTR 618	Nutritional Biochemistry I
NTR 619	Nutritional Biochemistry II
NTR 650	Body composition & energy Metabolism
PHA 602	Epidemiology of Chronic Disease
GER 540	Biology of Aging
HE 502	Mental Health & Stress Management
HE 532	Administration of Health & Fitness Programs

Course Descriptions

See physical education course descriptions.

Health Education/Health Promotion (M.A.Ed.)

The health education graduate program (master's) is designed to prepare individuals for advanced health education careers in agency, schools, worksites, and allied health care settings. Program options allow students to choose between a thesis or nonthesis option and an opportunity to pursue elective course work in a related field area or allied health area.

Programs of Study

Health Education Thesis & Health Education Nonthesis

Plan I

Thesis required (24 hours course work required.)

Major Courses (15 hours)

1. EPR 692. Introduction to Educational Research Design
2. HE 610. Foundations of Health Education
3. HE 640. Content Issues I or HE 641, Content Issues II
- 4-5. Choose 6 hours from the following:

HE 531	Planning and Evaluating Effective Health Education and Promotion Programs
HE 532	Administration of Health and Fitness Programs
HE 642	Health Behavior and Health Education
HE 689	Methods and Materials for Planning Health Education Programs
HE 697	Evaluation of Health Education Programs

Research Course (3 hours)
 EPR 609 Statistical Methods and Research in Education: Intermediate. Prerequisite: EPR 608.

Plan II

Nonthesis (33 hours course work required.)

Major Courses (15 hours)

1. EPR 692. Introduction to Educational Research Design
 2. HE 610. Foundations of Health Education
 3. HE 640. Content Issues I or HE 641, Content Issues II
 - 4-5. Choose 6 hours from the following
- | | |
|--------|---|
| HE 531 | Planning and Evaluating Effective Health Education and Promotion Programs |
| HE 532 | Administration of Health and Fitness Programs |
| HE 642 | Health Behavior and Health Education |
| HE 689 | Methods and Materials for Planning Health Education Programs |
| HE 697 | Evaluation of Health Education Programs |

HE elective (502, 508, 521, 523, 557, 592, 593, 598, 602, 606, 612). (3 hours)

Research Course. (3 hours)

EPR 609. Statistical Methods and Research in Education: Intermediate. Prerequisite: EPR 608.

Physical Education

Degrees offered include the Master of Arts in Education and the Educational Specialist. At the master's degree level students may specialize in Exercise Physiology (see listing above for more information about this program) or complete a teacher certification program. The teacher certification program links teacher certification with the graduate program in physical education. For example, the M.A. Ed. awards the level A certificate and the Ed.S. is linked to the AA certificate. Each program requires a teaching certificate in physical education at the previous level (e.g., B certificate for admission to the A level, except the Alternative A program, and the A certificate for admission to the AA certificate).

Master of Arts in Education and "A" level teaching certificate; Nonthesis (31-37 hours)

Teaching Field: At least 1/3 of the program shall be teaching field courses. (18 hours)

PE 645	Motor Development	3
PE 647	Teaching Strategies and Issues in K-12 Physical Education	3
PE 643	Curriculum Development in Physical Education	3
	600-level electives as approved by advisor	9

Survey of Special Education Coursework: Required if not previously completed (0-3 hours)

ECY 600 Introduction to Exceptional Learners

Additional Courses: (13-16 hours)

EPR 608	Statistical Methods and Research in Education	3
EPR 607	Microcomputer Applications to Statistics	3
Foundations and Profes-	(see approved list)	3

sional Studies

Elective	Technology Competency (as approved by advisor)	0-3 3
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Alternative A (Nontraditional 5th-Year Physical Education program) Nonthesis

Additional requirements are 59 hours of prescribed coursework. Contact Student Services in Suite 100 Education Building, UAB for specific courses required.

Curriculum and Teaching:

PE 643	Curriculum Development in Physical Education	3
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Professional Studies:

EDF 604	Social Philosophies and Education	3
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Survey of Special Education Coursework: Required if not previously completed. (0-3 hours)

ECY 600	Introduction to Exceptional Learners	0-3
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Technology:

Competency in technology 0-3

Evaluation of Teaching and Learning:

EPR 608	Statistical Methods and Research	3
EPR 607	Microcomputer Applications in Statistical Analysis	1

Reading:

Reading in Content Area 3

Internship:

PE 696	Elementary/Secondary Physical Education Internship	9
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Teaching Field:

At least 1/3 of the program shall be teaching field courses (12)

PE 645	Motor Development	3
PE 647	Teaching Strategies and Issues	3
	Additional hours of Physical Education	6

Ed.S. Degree

Teaching Field:

At least 1/3 of the program shall be teaching field courses (21-24 hours)

PE 726	Supervised Research in Physical Education	3
PE 694	Seminar in Physical Education	3
	600- and 700-level Physical Education courses	15-18

(PE 643, 645, 647 must be taken if comparable courses were not part of the master's program)

Survey of Special Education Coursework:

ECY 600	Introduction to Special Education	0-3
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Additional Courses:

EPR 692	Introduction to Educational Research	3
EPR 609	Statistical Methods and Research: Intermediate	3
	Technology Competency	0-3
Electives	600- or 700-level Professional Studies	3-6

with or Teaching Field courses
Permis-
sion of
advisor

Course Descriptions

Unless otherwise noted, all courses are for 3 semester hours of credit. Course numbers preceded with an asterisk indicate courses that can be repeated for credit, with stated stipulations.

Health Education (HE)

502. **Mental Health and Stress Management.** Fundamental concepts of mental health and mental illness, with emphasis on etiology, symptomology, treatment, and prevention of mental illness. Elementary skills, dynamics of stress, and contemporary methods of stress management.

508. **Drug Use and Abuse.** Emphasis on emotional, intellectual, psychological, and social aspects of drug use. Misconceptions about drugs. Attitudes toward drugs and drug prevention and treatment programs.

521. **Health Communication.** Skills appropriate for selected health problems; problem solving and referrals.

523. **Human Sexuality.** Biological, sociological, and cultural aspects of sexuality.

531. **Planning and Evaluation.** Program planning and curriculum development for school, agency, and health care settings. Need assessment, objective setting, methodology, and evaluation are emphasized.

532. **Administration of Health and Fitness Programs.** Administrative theory applied to health and fitness settings.

593. **Educational Gerontology.** Program preparation for generic consumers. Major health concerns facing many senior citizens and ways to communicate educational interventions. Prerequisite: Permission of instructor.

598. **Issues in Women's Health.** Historical and psychosocial factors that have and may continue to influence the potential health status of the American female. Major causes of morbidity and mortality as well as tips for health care system utilization.

601. **Current Readings in Health Education.** Review of literature in health education. Development of annotated bibliography pertinent to professional practice. Prerequisite: Permission of advisor.

602. **Alcohol and Society Seminar.** Effects of alcohol on individual health, family relations, and community life. Prerequisite: Permission of instructor.

606. **Issues in Disease Control.** Nature and distribution of disease; communicable and nutritional diseases of childhood; possibilities for prevention. Prerequisite: HE 223 or permission of instructor.

610. **Foundations of Health Education.** Issues in health education; school, community, or patient health education. Prerequisite: Permission of instructor.

611. **School Health Programs.** National, state, and local factors influencing school health programs; influences of official and nonofficial agencies. Historical perspective, present and future directions of profession and school health. Prerequisites: HE 342, 343, 431, and 489.

612. **Workshop in Health.** Concepts and methods to increase proficiency. Comprehensive health education K-6 or 7-12; health education in school, community, or both. 3 to 6 hours.

640. **Content Issues I.** Drugs, death, human sexuality, nutrition, international health, legislation, and physical and spiritual dimensions of health. Decision making and problem solving. Implication of research, computer applications.

641. **Content Issues II.** Selected health issues. Personal characteristics of population (age, sex, emotional well-being) and external factors (societal and environmental); interventions and other approaches and solutions. Prerequisite: Admission to graduate program in HE and permission of instructor.

642. **Health Behavior and Health Education.** Prerequisite: HE 610.

689. **Materials and Methods of Health Education.** Ethical, theoretical, and practical aspects of health education; teaching techniques, decision-making skills, curricular development, organization skills, and techniques. Prerequisites: HE 342, 431, 434, and 489.

691. **Special Topics in Health Education.** Topics in school and community health education; development of new ways to examine situations. Prerequisite: Completion of HE core courses. 3 or 6 hours.

692. **Supervised Research in Health Education.** Research problem based on school, community, or public health education needs. Prerequisite: Permission of advisor and EPR 508 or 509. 3 or 6 hours.

693. **Advanced Field Experience.** Professional practice and research supervised by qualified health education professionals in approved health education work setting. 3 or 6 hours.

695. **Junior/Secondary Health Education.** Student teaching. Prerequisite: HE 610, 689, and other courses identified by advisor. 9 hours.

698. **Nonthesis Research.** 1-6 hours.

699. **Thesis Research.** Supervised research project. Prerequisite: Admission to candidacy and permission of advisor. 1, 2, 3, or 6 hours.

Health Education/Health Promotion (Ph.D.)

The Ph.D. program in Health Education/Health Promotion has been designed to provide students with the academic and practical experiential background to become leading practitioners and researchers in health education and health promotion. The program combines the resources of academic units from the University of Alabama at Birmingham (School of Education and School of Public Health) and the University of Alabama at Tuscaloosa (College of Education).

Admission

Student applications are reviewed by a joint admissions committee composed of members of the participating academic units. Applicants should meet the admissions requirements of the graduate school, including submittal of scores on the GRE. Admission to the program is competitive, with evidence of scholarship, career goals and research interest, professional recommendations, and professional experience among those factors receiving strong consideration. Candidates for admission must have completed a bachelor's or master's degree from an accredited institution in health education or a health-related field.

Program of Study

Students may enter the program with either a bachelor's or master's degree in health education or a master's degree in a closely related health field. Prerequisite coursework includes

Foundations of Health Education, Administration of Health Education, Health Education Planning and Evaluation, Health Education Methods, Materials and Delivery, and Research Design and Statistics

These requirements may be corequisite components in the program.

The Ph.D. degree program will require students to complete a minimum of 72 credit hours: 36 hours of coursework, 12 hours of research internship, and 24 hours of dissertation research.

Students entering the program with a master's degree may transfer appropriate coursework to this program, but this will not reduce the number of courses required. Students will not be required to retake coursework already completed but may be required to complete prerequisites as part of their planned course of study. A required review of student credentials prior to admission will identify strengths and needs. This review will provide students with a blueprint for their course of study and will be conducted by their advisor.

The specific components of the Ph.D. program in health Education and Health Promotion are outlined below.

I. Health Education/Promotion Core Courses

(UA = HHE, UAB-Public Health = HB, UAB-Education = HE)

A. Advanced Theoretical and Scientific Basis of Health Education and Health Promotion (HHE 605, HB 750, HE 705)	3 hr
B. Planning and Administration of Health Education and Health Promotion (HHE 606, HB 760, HE 710)	3 hr
C. Health Communications Research (HHE 607, HB 730, HE 710)	3 hr
D. Doctoral Studies Seminar (HHE 604, HB 770, HE 695)	3 hr
Subtotal	12 hr
II. Advanced Research and Statistical Methods	
A. Multivariate/Multiple Regression Analysis	3 hr
B. Advanced Epidemiological Research Methods	3 hr
C. Data Management/Computer Technology	3 hr
D. Evaluation/Research Methods	3 hr
Subtotal	12 hr
III. Coursework in the Social and Behavioral Sciences Minor	12 hr
IV. Research Internship	24 hr
V. Dissertation	24 hr
Total	72 hr

Course Descriptions

Unless otherwise noted, all courses are for 3 semester hours of credit. Course numbers preceded with an asterisk indicate courses that can be repeated for credit, with stated stipulations.

Health Behavior (HB)

730. **Health Communication Research.** In-depth exposure to current research involving media strategies used to persuade individuals to adopt new lifestyles. Critically ex-

amines major research conducted during last decade regarding single subjects, groups, communities, and media intervention. Focus on all media, including print, audiovisual, radio, and television.

740. **Evaluation Research: Health Promotion/Disease Prevention Research.** Theory and applications of original behavioral repopulation, selection of measurement, data collection, design and analytical techniques, and preparation of evaluation research report. NIH-type research proposal required. Prerequisite: Doctoral student or advanced master's student with permission of instructor.

Health Education (Ph.D.)

700. **Seminar in Health Education.** Presentation of health education research.

701. **Special Topic in Health Education.** Topics in school and/or community health education; development of new ways to examine situations. Prerequisite: Permission of advisor. 3 or 6 hours.

702. **Supervised Research in Health.** Research problem based on school, community, or public health education needs. Prerequisite: Permission of advisor. 3 or 6 hours.

703. **Advanced Field Experience.** Professional practice and research supervised by qualified health education professionals in approved health education work setting. 3 or 6 hours.

705. **Advanced Theoretical and Scientific Basis of Health.** Analysis of knowledge, attitude and behavior change strategies, and resulting effect on health status.

710. **Planning and Administration of Health Education/Health Promotion Programs.** Case study of school and community health education interventions. Decision making and development of program planning skills in designing interventions in a variety of health education settings.

720. **Evaluation of Health Education Programs.** Evaluation protocols in health education settings; needs assessments, process and formative evaluations, cost benefits, summary reports.

729. **Ed.S. Thesis Research.** Prerequisite: Admission to candidacy.

730. **Evaluation Research Methods.** Theory and application of behavioral evaluation research including preparation of research NIH type proposals.

731. **Health Education Planning and Promotion.**

732. **Evaluation of Health Education Programs.**

740. **Evaluation of Health Education Programs.**

* 798. **Nondissertation Research.**

* 799. **Dissertation Research.** Prerequisite: Admission to candidacy.

Physical Education (PE)

601. **Introduction to Sport Administration.** Planning, organizing, staffing, managing, directing, and evaluating sport and athletic programs.

607. **Principles of Coaching.** Philosophy, physiology, pedagogy, athletic training, and law related to coaching.

615. **Sport Facility Planning.** Factors influencing the planning, funding, and construction of a variety of sports facilities.

630. **Mechanical Analysis of Motor Skills.** Application of principles of physics to human movement. Analysis through videotape and cinematography techniques. Prerequisite: PE 307.

631. **Foundations of Physical Education.** Overview of various subfields of physical education.

632. **Supervision of Physical Education.** Study of skills required to supervise teachers of physical education and in other related fields.

636. **Current Readings in Physical Education.** Individual readings on contemporary topics and issues in physical education. Prerequisite: Permission of advisor.

637. **Physiology of Exercise I.** Description of basic organ systems and their functioning in relationship to the physiology of exercise.

638. **Physiology of Exercise II.** Applied exercise physiology information, techniques, and research methods.

639. **Exercise Prescription for High Risk Populations.** Lecture and laboratory practice; physiological basis of exercise testing and training. (Prepares students to take ACSM Exercise Specialist certification examination.) Prerequisites: PE 400 and BY 115.

640. **Advanced Techniques in Conditioning the Athlete.** Advanced training principles; developing testing and training programs for athletes. Prerequisites: PE 400, BY 115 and 116.

642. **Practicum in Physiology.** Practical experience and observations in human physiology. Seminars by medical, dental, and nursing faculty. Effects of drugs, diet, exercise, and disease on human body. Prerequisite: PE 641. 3 or 6 hours.

643. **Curriculum Development in Physical Education.** Trends in methodology, programming, and scheduling.

645. **Advanced Motor Development.** Factors influencing development of motor skills across lifespan.

647. **Teaching Strategies and Issues in K-12 Physical Education.** Design, implementation, and evaluation of appropriate physical education programs for elementary and secondary schools.

649. **Adapted Physical Education.** Current research and teaching methodology in adapted physical education; nature of selected disabilities, implications for physical education.

650. **Social Aspects of Sport.**

651. **Issues and Problems in Coaching.**

652. **Measurement and Evaluation of Athletes.**

655. **Motor Learning.** Factors influencing learning and performance of motor skills.

656. **Advanced Sport Psychology.** Relationship of psychology to sports performance.

672. **Advanced Treatment of Athletic Injuries.** Seminar and practical experience. Conducted by certified trainers at UAB Sports Medicine Clinic.

674. **Sport Performance and Nutrition.** Nutrition, rest, and training research relating to coach-player-doctor-trainer relationship, legal implications relating to competitive athletics.

690. **Seminar in Sports Administration.**

694. **Special Projects in Physical Education.** Independent projects supervised by faculty. Prerequisite: Permission of advisor. 1, 2, 3, or 6 hours.

695. **Problems in Physical Education.** Contemporary topics in physical education (class meeting format). Prerequisite: Permission of advisor. 3 or 6 hours.

696. **Elementary/Secondary Physical Education Internship.** Clinical placement in approved school. Required in nontraditional 5th-Year Program. Prerequisite: Completion of appropriate coursework. 9 hours.

697. **Advanced Field Experience in Physical Education.** Clinical placement in approved sites. Prerequisite: PE 647 or 488. 3 or 6 hours.

698. **Coaching Internship (Individual Sport).** 100 clock hours of experience with veteran coaches. Prerequisite: PE 407 or 607.

* 699. **Thesis Research.** Supervised research project. Prerequisite: Admission to candidacy and permission of advisor. 1, 2, 3, or 6 hours.

710. **Special Topics in Physical Education.** Special courses offerings on contemporary topics. Prerequisite: Permission of instructor.

715. **Advanced Field Experience in Physical Education.** Supervised field experiences in public school clinical sites. Prerequisite: PE 488 or 647. 3 or 6 hours.

718. **Practicum in Exercise Physiology.** Practical experience and observations in human exercise physiology. Prerequisite: PE 641 and permission of advisor.

720. **Research Design and Methodology.** Measurements and research design in areas of biomechanics, motor learning, motor development, sport psychology, and exercise physiology. Prerequisite: EPR 692 or equivalent.

726. **Supervised Research in Physical Education.** Independent student research supervised by a full-time program faculty member. Prerequisite: Permission of advisor, and EPR 609 and 692. 3 or 6 hours.

728. **Ed.S. Thesis Research.** Prerequisite: Admission to candidacy, research methods and sufficient course work in area of emphasis to be able to formulate a problem, develop a research design, and write a thesis proposal. Permission of advisor and instructor. Pass/Fail. 3 or 6 hours.

729. **Seminar in Physical Education.**

Counseling Specializations

Counselor Education

Admission to graduate study in counseling will occur each term, and the completed packet of materials must have been received in the Department of Human Studies from the Graduate School by the dates shown:

<i>Term</i>	<i>Deadline</i>
Fall	August 1st
Spring	February 1st
Summer	April 1st

In addition to the transcripts and test scores required by the Graduate School, the file must include a statement of the applicant's goals or purposes to be accomplished by completing the program; an interview may also be required as a part of the admissions process. Admission is competitive and limited. Selection will be made by the counseling faculty after reviewing the applicant's credentials in their entirety, and some candidates meeting minimum requirements may not be admitted.

Evaluation of Candidates

Master's Level: Evaluation of student counselor is an ongoing process. The faculty reserves the right to determine candidate's appropriateness as a professional. A comprehensive examination will be given upon completion of Area I and Area II. Students who do not successfully pass this examination will be given the opportunity to take the exam. Students unsuccessful in passing the comprehensive exam will be dismissed from the program. In addition, students must have demonstrated

specific competencies in Area II (specifically ECG 638 and ECG 626) as evidenced by faculty approval in order to proceed in the program. This demonstrated competency is in addition to the grade received in the course.

Ed.S. Level: Students in the Ed.S. program will compile a professional portfolio and will make formal presentation of the portfolio to the faculty.

Clinicals

Prerequisites for the clinical experience include successful completion of required coursework, successful completion of comprehensive exams, and demonstration of required competencies in Areas I and II. The practicum experience requires a minimum of 100 hours on-site in an agency, school, or rehabilitation setting. The internship is 600 hours on-site. Grading for the clinical is on a Pass/Fail basis. To receive a Pass grade the student must attain a B or better. **If a student fails to pass any portion of the clinical experience, he or she will not be allowed to continue in the program.** Taking the clinical experience over will **not** be an option.

School Counseling

This specialization is designed to prepare individuals as counselors in grades K-12. The program leading to the Master of Arts in Counseling degree requires a minimum of 49 semester hours of prescribed coursework to meet the academic and field experience requirements for the SDE Class A Professional Certificate in school counseling.

The Educational Specialist (Ed.S.) degree in this field requires a minimum of 33 semester hours of prescribed coursework beyond the Master of Arts in Education degree and a terminal research project. This specialization meets the academic and field experience requirements for the SDE Class AA Professional Certificate in school counseling.

Community Counseling

The two specializations outlined below are intended to prepare graduates to work in agency and mental health settings and lead to recommendation by the department for licensure as a Licensed Professional Counselor (LPC). Applicants to these counseling specializations should carefully identify the counseling role they intend to fulfill and choose the appropriate training.

Agency Counseling

Designed to meet the needs of individuals interested in working as counselors in various community agencies, including private practice as LPC. The agency counseling specialization for the Master of Arts in Counseling degree requires 49 semester hours of planned course work. If Plan I is followed, up to 6 semester hours of thesis research credit are allowed. The program leading to the Ed.S. degree with the agency counseling major requires a minimum of 33 semester hours of planned coursework beyond the master's degree and a terminal research project.

Rehabilitation Counseling

Designed to prepare individuals to work as a rehabilitation counselor in private practice or public agencies with physically, mentally, and socially impaired persons. The Master of Arts in Counseling degree with this specialization requires a minimum of 49 semester hours of planned coursework and field experiences. The content of the specialization meets the academic requirements for LPC and Certified Rehabilitation Counselor (CRC). Students who wish to go beyond the reha-

bilitation counseling master's degree may continue toward the Ed.S. degree in agency counseling.

School Psychometry

The M.A. Ed. specialization is designed to train individuals to work as psychometrists in public schools. The program requires a minimum of 45 semester hours of planned coursework and field experiences, to include a one-term, full-time internship. This program also meets the requirements for the SDE class A Professional Certificate in school psychometry.

School Psychology

This Ed.S. specialization prepares graduates to function as school psychologists in public and private schools. The program requires a minimum of 33 semester hours of planned study beyond the M.A. degree, a terminal research project, and a one-term, full-time internship. This program meets the SDE requirements for the Class AA Professional Certificate in school psychology.

Course Descriptions

Unless otherwise noted, all courses are for 3 semester hours of credit. Course numbers preceded with an asterisk indicate courses that can be repeated for credit, with stated stipulations.

Counseling and Guidance (ECG)

522. **Strategies for Attitude Development.** Dynamics of both negative and positive attitudes. Methods for improving communications, developing empathy. Techniques for determining personal strengths, setting goals, managing time, developing strong positive attitudes and self-images.

523. **Strategies for Effective Interviewing.**

524. **Conflict Management.**

540. **Introduction to Rehabilitation.** Introduction and overview of rehabilitation process.

570, 670. **Crisis Intervention Techniques.** Overview of crisis counseling. Theory and practical application of crisis intervention.

574, 674. **Seminar on Death, Dying, and Bereavement.** Provides general knowledge of death, dying, and bereavement issues faced in today's society.

578. **Counseling the African American Client.** Dynamics of working with African American clients in counseling settings. Prerequisite: Admission to the Counseling Education Program.

612. **Professional, Ethical, and Legal Issues in Counseling.** Emphasis on understanding of professional roles and responsibilities; ethical and legal issues; historical perspectives; preparation standards; credentialing; trends and issues in the counseling profession.

619. **Special Issues for School Counselors.** Exposure to a variety of critical incidents that cover a variety of experiences will be presented in a seminar environment and will require the student counselor's expertise and proper response. Authorities from the various school systems, law enforcement agencies, counseling/mental health agencies, and child protective agencies will provide knowledge and insight from their perspectives.

620. **Foundations and Administration of Counseling Services in the Schools.** Social, psychological, economic, and philosophic trends leading to development of guidance programs in American schools. Organization and administration of guidance services.

621. Prepracticum: Theories and Techniques in Individual Counseling. Educational, vocational, and personal counseling. Observations and simulations.

623. Comprehensive Counseling and Guidance in Middle and High School. Offers an understanding of the nature of middle and high school children as related to their guidance and counseling needs. Identification of the developmental needs, problems, and issues of adolescents (ages 13-18). Identification, development, and practice of counselor interventions in individual counseling, small group counseling, large group guidance, peer facilitator training, consultation, and program coordination.

624. Assessment in Counseling. Using standardized tests in schools and related agencies. Prerequisites: 3 hours of statistics.

626. Theories and Processes of Group Counseling. Guidance and counseling in small groups. Prerequisites: ECG 621 and 638 or permission of instructor.

627. Counseling in Elementary School. Guidance services and activities appropriate for preschool and elementary grades; facilitating intellectual, psychological, and social development during early school years.

628. Societal Issues in Counseling. Survey of issues and principles for relating professionally to individuals from diverse backgrounds and lifestyles. Includes sensitivity to differences in values, beliefs, attitudes, and culture.

630. Career Development: Theory and Research. Career choice; theories of career development, vocational testing, and research.

631. Interpersonal Dynamics in Small Groups. Experiential group designed to increase understanding of interpersonal dynamics in small groups. Prerequisite: Permission of instructor.

632. Technology for Counselors: Case Management and Report Writing. Emphasis on using specialized software to enhance clinical report writing: intake interviews, diagnostic workups, psychological evaluation, assessments, psychosocial narratives and histories, treatment plans, progress notes, and genograms. Practice management programs are highlighted.

635. Medical Information for Counselors. Medical information, terminology, body systems, and vocational implications of disability; application to problems of disabled clients.

636. Psychological and Sociological Aspects of Rehabilitation Counseling. Psychological aspects of disabilities and sociological reactions to disabled persons. Rehabilitation counseling. Psychological aspects of disabilities and sociological reactions to disabled persons. Rehabilitation process and psychological adjustment within world of work.

637. Adlerian Family Counseling. Helping parents understand children. Parent-child relationship promoting responsibility, self-reliance, cooperation, mutual respect, and self-esteem.

638. Practicum I: Introduction to the Counseling Process. Skills and techniques for establishing effective interpersonal relationships. Prerequisite: ECG 621.

648. Case Management Process in Rehabilitation. Principles and processes of case management as outlined by State Department of Vocational Rehabilitation in case service manual.

650. Counseling the Client Who is Psychologically Impaired. Limitations placed by certain psychiatric disorders on

counseling and adjustment therapy; case management, vocational placement and stability, and family and other interpersonal relationships. Prerequisite: Course in personality theory, individual and group counseling, abnormal psychology, or advanced human development.

660. Dynamics of Child Sexual Abuse. Critical concerns and issues, effective techniques and practices.

673. Counseling Needs of Women. Women's development and needs; problems women bring to counselors and strategies for helping them; myths about women; and biases in psychological research.

691. Seminar: Special Topics in the Helping Professions. Emerging trends, techniques, and issues. Prerequisite: Permission of instructor. 1-3 hours.

* **692. Independent Readings in Counselor Education.** Prerequisite: Permission of advisor and instructor. May be repeated for total of 6 hours. 1-3 hours.

695. Practicum II: Supervised Field Experience. A 100-hour-minimum field placement in an agency school or rehabilitation setting. Focus is on developing counseling competencies. Prerequisite: Completion of Areas I and II, and comprehensive exams; permission of clinical coordinator.

697. Counseling Internship. Field experience in setting appropriate to student's program; participation in activities of school or agency counseling services, within constraints of ethical practice. 3 hours for 2 terms (600 clock hours).

698. Individual Nonthesis Research in Counseling and Guidance. Prerequisite: Permission of instructor.

726. Ed.S. Group Supervision.

795. Ed.S. Practicum Supervision. Experiential course in which Ed.S. students are assigned to assist in master's level practicum groups in the Counseling Education program. Applied knowledge of counseling supervision theories. Prerequisite: ECG 704.

797. Ed.S. Internship Supervision. An experiential course in which Ed.S. students are assigned to provide supervision under faculty direction to a section of the master's level internship. Applied knowledge of supervision theories and practices are highlighted. Prerequisites: ECG 704 and 795.

Education Psychology (EPR)

510. Introduction to Measurement and Evaluation in Education. Basic concepts and principles of measurement and evaluation of personal and academic progress in classroom. Emphasis on elementary descriptive statistics and measurement techniques used in student evaluation.

596. Introduction to Qualitative Methods in Educational Research. Qualitative research methods and techniques; their application to qualitative research design. Introduction to types of qualitative information, methods of data collection and analysis, and presentation of results; appropriateness of qualitative design. Prerequisite: EPR 692 or equivalent.

600. Introduction to School Psychology. Overview of professional practices and crucial issues in school psychology.

607. Microcomputer Applications to Statistical Analysis. Use of microcomputers in computations of descriptive statistics. Prerequisite or corequisite: EPR 608. 1 hour.

608. Statistical Methods and Action Research. Statistical methods for describing sets of data, differences and relationships infused in an action research paradigm. Included are conceptualizing, implementing action research with computer applications. Corequisite: EPR 607.

609. Statistical Methods and Research in Education: Intermediate. Basic inferential techniques including hypothesis testing, parametric and nonparametric techniques. Assumptions, rationale, and interpretation of analysis of variance techniques. Prerequisites: EPR 607 and EPR 608 or basic statistics course.

610. Child Psychology. Human development through infancy, preschool, and preadolescence.

611. Adolescent Psychology. Social, emotional, and cultural aspects of adolescence affecting classroom and school behavior.

614. Lifespan Human Development. Social-emotional, intellectual-language, and physical-motor development from conception to old age. Prerequisite: General psychology.

616. Personality Theories for the Helping Professions. Prerequisites: 3 hours of general psychology and 3 hours of graduate educational psychology or human development.

622. Learning Theories. Application to educational practice. Behavioral theories, information processing, biochemical basis of memory and learning.

627. Individual Testing in Guidance III (K-ABC). Administration, scoring, interpretation, and use of Kaufman Assessment Battery for Children (K-ABC). Prerequisite: EPR 629 and permission of instructor.

628. Individual Testing in Guidance I (Stanford-Binet). Administration, interpretation, and use of Stanford-Binet intelligence scale. Prerequisite: Permission of instructor.

629. Individual Testing in Guidance II (Wechsler Scales). Administration, interpretation, and use of Wechsler intelligence scales. Prerequisite: Permission of instructor.

630. Clinical Assessment in Education. Individual intelligence, personality, and projective tests used by school psychologists. Prerequisite: Permission of program coordinator.

688. Seminar on Current Issues in Measurement and Evaluation in Schools. Issues of standardized testing and classroom assessment for teachers and administrators.

689. Internship and Seminar in School Psychology I. Daily, one-semester participatory experience in school setting supervised by certified school psychometrist. Prerequisite: Completion of school psychometry major. 6 hours.

* **691. Independent Readings in Educational Psychology and Research.** Prerequisites: Permission of advisor and instructor. May be repeated for total of 6 hours. 1-3 hours.

692. Introduction to Educational Research Design. Literature of educational research. Rationale of library and empirical research. Research on current educational issues. Prerequisite: EPR 608.

696. Elementary/Secondary Physical Education Internship. Clinical placement in approved school. Required in nontraditional 5th-Year Program. Prerequisite: Completion of appropriate coursework. 9 hours.

697. Advanced Field Experience in Physical Education. Clinical placement in approved sites. Prerequisite: PE 647 or 488. 3 or 6 hours.

698. Coaching Internship (Individual Sport). 100 clock hours of experience with veteran coaches. Prerequisite: PE 407 or 607.

* **699. Thesis Research.** Supervised research project. Prerequisite: Admission to candidacy and permission of advisor. 1, 2, 3, or 6 hours.

710. Special Topics in Physical Education. Special courses offerings on contemporary topics. Prerequisite: Permission of instructor.

715. Advanced Field Experience in Physical Education. Supervised field experiences in public school clinical sites. Prerequisite: PE 488 or 647. 3 or 6 hours.

718. Practicum in Exercise Physiology. Practical experience and observations in human exercise physiology. Prerequisite: PE 641 and permission of advisor.

720. Research Design and Methodology. Measurements and research design in areas of biomechanics, motor learning, motor development, sport psychology, and exercise physiology. Prerequisite: EPR 692 or equivalent.

726. Supervised Research in Physical Education. Independent student research supervised by a full-time program faculty member. Prerequisite: Permission of advisor, and EPR 609 and 692. 3 or 6 hours.

728. Ed.S. Thesis Research. Prerequisite: Admission to candidacy, research methods and sufficient course work in area of emphasis to be able to formulate a problem, develop a research design, and write a thesis proposal. Permission of advisor and instructor. Pass/Fail. 3 or 6 hours.

Counselor Education

The graduate programs in counseling are designed to train students to make appropriate and ethical decisions as counseling professionals. The most important of these decisions is the selection of strategies that empower clients to make personal decisions leading to the resolution of problems and resulting in an improved quality of life. Clients represent the multicultural, multiethnic, and multivalued character of a diverse American society. Thus, counselors must understand human behavior in terms of its psychological, physiological, and sociological influences and make professional decisions within the legal and ethical constraints that are applicable.

Students in the counseling programs in the department are encouraged, aided, and expected to perceive themselves as professionals who work closely and cooperatively with other professionals, such as those in public and private school systems, colleges and universities, community and private programs and agencies, and government service agencies. Professionalism in this context means that students are aware of their own knowledge and skill levels, abilities, characteristics, and perspectives, and the respective limits thereof, and that they behave in accordance with the highest ethical and professional standards. Students are expected to demonstrate acquired knowledge and skills throughout the program. Through feedback and self-exploration, students will gain a better understanding of their responsibilities as counselors.

All counseling programs (agency, rehabilitation, school) are designed to meet the course-work and field experiences requirements outlined in the accreditation standards of the Council for Accreditation of Counseling and Related Educational Programs (CACREP). In addition, the rehabilitation counseling specialty area meets the Council on Rehabilitation Education (CORE) certification requirements. The school counseling program meets the course work and field experiences required by the Alabama State Department of Education for certification. All programs meet the academic requirements for licensure as professional counselors in Alabama. As a program strength, the faculty who teach the coun-

selling theory and skills courses are professional counselors who participate in limited practice in their specialty areas.

Agency Counseling Specialty

The role of professional counseling has become increasingly important as an effective source of personal assistance in dealing with a myriad of problems in a complex society. The counseling profession is alive with ideas and techniques based on developmental and behavioral theory and has established a rightful place among the helping professions. Counseling has a serious contribution to make toward the psychological, social, and physical well-being of members of the community. We welcome the interest and inquiry of persons who feel a dedication to helping others and who will commit to serious study of the theory, techniques, and related course work on which professional counseling practice is based.

The Master of Arts in Community Counseling is designed to prepare students to demonstrate knowledge and skills with several counseling modalities appropriate for a broad range of clients in a multicultural society; interact effectively with other helping professionals and referral resources; make appropriate counselor-client related decisions in the context of professional, ethical, and legal guidelines; and fill effectively entry-level positions of professional responsibility within the specialization of agency counseling.

Area I: Precandidacy Requirements (28 semester hours)

EPR 607	Microcomputer Applications to Statistical Analysis
EPR 608	Statistical Methods and Action Research
ECG 612	Professional, Ethical, and Legal Issues in Counseling
EPR 614	Life-Span Human Development
ECG 621	Prepracticum: Theories and Techniques of Individual Counseling
ECG 638	Practicum I: Introduction to the Counseling Process. Prerequisite: ECG 621
ECG 624	Assessment in Counseling. Prerequisites: ECG 607 and ECG 608
ECG 626	Theories and Processes of Group Counseling. Prerequisites: ECG 621 and ECG 638
ECG 628	Societal Issues
ECG 630	Career Development: Theory and Research

Comprehensive exams may be taken only upon completion of courses in Area I.

Area II: Precandidacy Requirements (12 semester hours)

EPR 616	Personality Theories
ECG 650	Development and Treatment of the Psychologically Impaired Client. Prerequisite: ECG 624

Electives: 6 semester hours—Graduate level courses related to the student's specialty area and/or interest, and approved by an advisor.

Note: Students may enroll in a maximum of 3 semester hours of independent study course work.

Admission to Candidacy Following Completion of Areas I & II

Upon completion of Areas I and II, students admitted to candidacy must pass the qualifying examination (comprehensive exam) and obtain the recommendation of the faculty.

Area III: Postcandidacy Requirements (9 semester hours)

ECG 695	Practicum II: Supervised Field Experience. Pre-
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requisites: Areas I and II; successful completion of comprehensive examination; admission to candidacy

ECG 697a Counseling Internship. Prerequisite: ECG 695. 30 hours/week for 2 terms

ECG 697b Counseling Internship (second term)

Note: Until the fall of 2001, students have the option of taking the internship over 3 terms, working 20 hours per week each term. After the fall of 2001, students will not have the option of a three-term internship.

Current standards require 100 clock hours minimum for practicum and 600 clock hours of supervised internship. ECG 697 may be taken for up to 9 semester hours (20 hours/week over 3 terms), which will extend program requirements to 51 semester hours.

Rehabilitation Counseling Specialty

The "State of the Art" in rehabilitation has changed as a result of to economic, social, and legal influences. The private rehabilitation sector, the holistic medical approach, along with the traditional rehabilitation program, have brought about a new mission to the rehabilitation program at UAB. The UAB Rehabilitation Counseling Training Program's mission includes a specific focus upon preparing students to meet the demands of private and public rehabilitation.

The teaching mission is to provide knowledge, develop skills, and influence attitudes of graduates who will work in private or public rehabilitation settings. This is accomplished through a multifaceted approach to learning that combines the many resources of a major university, medical center, and large urban area. The program is designed to accommodate a student's past work and academic experiences, present work experience, and future professional goals. In addition to the teaching mission, each member of the faculty performs a service function for area agencies, institutions, and facilities serving children and adults with disabilities.

The Rehabilitation Counseling Program is accredited nationally by the Council On Rehabilitation Education (CORE).

The program in Rehabilitation Counseling requires a *minimum* of **49 semester hours** of course work. This includes 3 semester hours (120 clinical hours) of practicum and 6 to 9 semester hours (600 clinical hours) of internship. In addition, students can specialize in areas such as Deafness, Substance Abuse Counseling, and Mental Health Counseling. *This would increase the number of required hours beyond the 49 credit hour minimum.*

The Rehabilitation Counseling faculty is committed to the enhancement of rehabilitation counselor effectiveness. The last decade has seen an increase in opportunity for those trained in rehabilitation. With the advent of the private rehabilitation sector, graduating students have opportunities to apply their skills and knowledge in both the private and public sector of service.

Students graduating from the UAB Rehabilitation Counseling Training Program find jobs in the following settings: Alabama Department of Rehabilitation Services, International Rehabilitation Associates (Private Rehabilitation), Sheltered Workshop Facilities, Higher Education—Disability Support Services, Independent Living Centers, Drug and Alcohol Treatment Centers, Correctional Facilities, Employee Assistance Programs, Mental Health Facilities, Disability Determi-

nation, Private Practice–Sole Practitioners, and Children's Hospital.

Area I: Precandidacy Requirements (22 semester hours)

- EPR 607 Microcomputer Applications to Statistical Analysis (must be taken with EPR 608)
EPR 608 Statistical Methods in Research and Education (must be taken with EPR 607)
ECG 628 Societal Issues in Counseling
EPR 614 Life-Span Human Development
ECG 621 Prepracticum: Theories and Techniques of Individual Counseling
ECG 638 Practicum I: Introduction to the Counseling Process (Prerequisite: ECG 621)
ECG 624 Assessment in Counseling (Prerequisite: 3 hours of statistics)
ECG 626 Theory and Processes of Group Counseling (Prerequisites: ECG 621 and ECG 638)

Area II: Precandidacy Discretionary Courses (12 semester hours)

- ECG 540 Introduction to Rehabilitation Counseling
ECG 635 Medical and Psychosocial Information for Counselors
ECG 630 Career Development: Theory and Research
ECG 650 Counseling the Psychologically Impaired Client

Area III: Postcandidacy Requirements (9 semester hours)

- ECG 695 Practicum II: Supervised Field Experience (Prerequisite: Areas I and II and faculty approval)
EGG 697 Counseling Internship* (Prerequisite: ECG 695 and approval of Internship Coordinator).

*Current societal standards require 600 clock hours of supervised internship. Case management skills are a part of the internship experience. ECG 697 may be repeated for up to 9 semester hours, which will extend program requirements to 52 semester hours. Internship requirements also include a research paper.

Area IV: Electives (6 semester hours)

School Counseling Specialty

According to the American School Counseling Association, "the purpose of a counseling program in a school setting is to promote and enhance the learning process." The goal of the program is to enable all students to achieve success in school and to develop into contributing member of our society.

- We believe that professional school counselors value and honor diversity, equity, and equality of all people.
- We believe that professional school counselors must be proactive change agents and advocates for all people.
- We believe that professional school counselors are obligated to confront their own beliefs and assumptions and change biased behavior regarding sexism, ageism, racism, and homophobia.
- We believe that professional school counselors are ethically obligated to strive toward optimum psychological health and to engage in self-care activities which attend to the physical, mental, spiritual, and psychological dimensions.

- We believe that academic preparation process must emphasize the application of theory to practice and encompass opportunities for experiential learning throughout the program.

The program of study will prepare students to

1. address student and family issues of concern that have adverse affect on student achievement and success.
2. promote, plan, and implement prevention programs regarding personal/social management and decision-making, college/career, and course selection and placement.
3. demonstrate leadership by promoting, planning, and implementing programs that are comprehensive, developmental, and integrated into the total school curriculum.
4. participate in the development for all students of follow-up activities that enhance personal growth and academic success.
5. consult and participate with teams and individuals to ensure responsiveness and equity to cultural diversity issues as well as learning styles of all students.
6. collaborate with other helping agents (parents, agencies, community members).
7. participate in coordinating resources for all students, families, and staff.
8. be seen as a leader by faculty, parents, and students in defining and carrying out the role and function of school counselor.
9. demonstrate appropriate documentation relating to student success and well-being.
10. establish and assess measurable goals for student outcomes from counseling programs, activities, interventions, and exercises.
11. collaborate with staff members in developing staff training regarding issues related to student academic, social, emotional, and developmental needs on a school-wide basis.

Prerequisites to Certification: The student must meet requirements for admission to the master's program in school counseling; however, to be certified in this field upon completion of the master's degree, he or she must also hold Alabama Class B certification in a teaching field. Additionally, any other certification prerequisites—such as special education requirements—must be met in addition to the master's degree requirements.

Area I: Precandidacy Requirements (28 semester hours)

- EPR 607 Microcomputer Applications to Statistical Analysis
EPR 608 Statistical Methods and Research in Education
EPR 614 Life-Span Human Development
ECG 620 Foundations and Administration of Guidance Services
ECG 621 Prepracticum: Theories and Techniques of Individual Counseling
ECG 638 Practicum I: Introduction to the Counseling Process (Prerequisite: ECG 621)
ECG 624 Assessment in Counseling (Prerequisite: EPR 608)
ECG 626 Theories and Techniques of Group Counseling (Pre: ECG 621 and 638)

- ECG 628 Societal Issues
 ECG 630 Career Development: Theory and Research

Comprehensive examinations may be taken upon completion of Area I.

Area II: Precandidacy Courses (12 semester hours)

- ECG 622 Group/Classroom Guidance in Schools (Prerequisite ECG 620)
 ECG 623 Comprehensive Counseling and Guidance in the Middle/High School
 ECG 619 Special Issues for School Counselors
 ECG 627 Comprehensive Counseling and Guidance in the Elementary School

Admission to Candidacy—Completion of Areas I and II; passing qualifying examinations (comprehensive exams); and recommendation of faculty

Area III: Postcandidacy Requirements (9 semester hours)

- ECG 695 Practicum II: Supervised Field Experience (Prerequisite Areas I & II; comps, approval of faculty)
 ECG 697a Counseling Internship* (Prerequisite: ECG 695)
 ECG 697b Counseling Internship* (second term)

* Current societal standards require 600 clock hours of supervised internship to include experiences at both elementary and secondary levels. ECG 697 may be repeated for up to 9 semester hours (200 clock hours per semester), which will extend program requirements to 51 semester hours.)

Note: School Counseling Internship sites are very limited during summer terms.

Note: Special Education requirement must be met.

Educational Specialist in Community Counseling (Agency/Rehabilitation)

The Educational Specialist (Ed.S.) degree is designed to assist counselors who wish to continue their professional development. Students can choose either a clinical or research track of study. Prerequisites for admission to the program: a Master's degree in counseling, including the following courses or their equivalent:

- ECG 650 Counseling the Psychologically Impaired Client
 ECG 607 Microcomputer Applications to Statistical Analysis
 ECG 608 Statistical Methods in Research and Education
 ECG 626 Theories and Processes of Group Guidance
 EPR 614 Lifespan Human Development
 EPR 616 Personality Theories

Students should meet with their advisor and discuss their professional plans before declaring a track of study. **All students will complete Area I, Core Area of Study.** In Area II, students and their advisor will map out a plan of study based on the professional needs of the student.

Area I: Counseling Core Area of Study (24 Semester Hours)

- EPR 609 Statistical Methods and Research in Education: Intermediate
 EPR 692 Introduction to Educational Research Design
 ECG 691 Seminar on Special Topics: Teaching in Higher Education

- ECG 704 Seminar on Current Issues in Counseling Supervision
 ECG726 Application of Small Group Theory
 ECG 795 Ed.S. Practicum
 ECG797 Ed.S. Internship (6 hours)

Area II: Clinical or Research Track (9 Semester Hours)

Research Track: Students interested in research and/or interested in pursuing a doctorate should consider the research track of study.

- EPR 696 Qualitative Research: Inquiry and Analysis
 EPR 710 Computer Applications and Advanced Statistical Methods

ECG 699 Individual Thesis Research in Counseling

Clinical Track: This course of study is designed to enhance one's clinical practice. Students may select courses that meet their unique needs and/or interests. There may be options of study outside the Counselor Education Program, such as the Gerontology Certificate Program (15 hours). Other examples might include areas of study in Health Education and Promotion, or other specially designed options.

- ECG 632 Technology for Counselors: Case Management and Report Writing
 ECG 637 Adlerian Family Counseling
 ECG 660 Dynamics of Child Sexual Abuse
 ECG 670 Crisis Intervention Techniques
 ECG 673 Counseling Needs of Women
 ECG 674 Seminar on Death, Dying, and Bereavement
 ECG 691 Seminar on Special Topics: Play Therapy I
 ECG 691B Seminar on Special Topics: Sign Language
 ECG 691C Seminar on Special Topics: Preparation for the NBCC Exam
 ECG 691D Seminar on Special Topics: Play Therapy II

Proposed Courses Pending

- ECG Counseling Families in a Multicultural Society
 ECG Seminar in Chemical Dependency
 ECG Family Counseling: Theories and Techniques
 ECG Nontraditional Lifestyles
 ECG Creative Counseling Techniques

Comprehensive Examination

Upon completion of the requisite course work, students are required to pass an oral examination, conducted by Counselor Education Faculty, to complete the Ed.S. degree.

Educational Specialist in School Counseling

The Educational Specialist (Ed.S.) degree is 36-hour program, designed to assist school counselors who wish to continue their professional and academic development. Obtaining an Ed.S. degree will qualify the student to receive an AA Certificate from the Department of Education. The Ed.S. degree requires the student to participate in a research and clinical (internship) track of study. Prerequisites for admission to the Ed.S. program in School Counseling are a master's degree in school counseling, admittance to the Graduate School, and participation in a formal application process to the Counselor Education Program.

A student's master's degree must have the following courses or their equivalent:

- ECG 607 Microcomputer Applications to Statistical Analysis

ECG 608	Statistical Methods in Research and Education
ECG 626	Theories and Processes of Group Guidance
EPR 614	Lifespan Human Development
ECG 620	Foundations and Administration of Guidance Services

Special Education

Students should meet with their advisor and discuss their professional plans **before** enrolling in classes.

Foundations of Professional Studies

Six (6) semester hours from the following courses are required:

EPR 610	Child Psychology
EPR 611	Adolescent Psychology
EPR 616	Personality Theory for Helping Professionals
EPR 622	Learning Theories
EDF 602	American School in Crisis
ECY 600	Introduction into Special Education
ECG 660	Dynamics of Child Sexual Abuse
ECG 670	Crisis Intervention Techniques

Instructional Support

Fifteen (15) semester hours from the following courses are required:

ECG 704	Seminar on Current Issues in Counseling Supervision
ECG 726	Application of Small Group Theory
ECG 795	Ed.S. Practicum

Research

Six (6) semester hours are required:

EPR 609	Statistical Methods & Research in Education: Intermediate
EPR 692	Introduction into Research Design

Instructor-approved Electives

Six (6) semester hours are required.

Internship, 300 Hours

ECO 797 Three (3) semester hours are required.

Course Electives

ECG 637	Adlerian Family Counseling
ECG 698	Individual Nonthesis Research in Counseling and Guidance
EGG 692	Independent Readings in Counselor Education
ECG 691	Special Issues for School Counselors
ECG 623	Comprehensive Counseling & Guidance in the Middle/High School
ECG 627	Comprehensive Counseling & Guidance in the Elementary School
ECG 622	Group/Classroom Guidance in Schools
EGG 673	Counseling Needs of Women
ECG 674	Seminar on Death, Dying, and Bereavement
ECG 691	Seminar on Special Topics: Teaching in Higher Education
EGG 691	Seminar on Special Topics: Play Therapy I
ECG 691	Seminar on Special Topics: Sign Language
EGG 691	Seminar on Special Topics: Preparation for the NBCC Exam
ECG 691	Seminar on Special Topics: Play Therapy II
EGG 691	Seminar on Special Topics: Adventure-based Counseling

EDL 704	Educational Law and Policy Development
ECG 522	Strategies for Attitude Adjustment

Proposed Electives: Pending

EGG	Counseling Families in a Multicultural Society
EGG	Seminar in Chemical Dependency
ECG	Family Counseling: Theories and Techniques
ECG	Nontraditional Lifestyles
EGG	Creative Counseling Techniques

Comprehensive Examination (Counseling)

The written comprehensive examination is an important screening review for the student after the completing Area I. The successful completion of the qualifying examination is prerequisite to admission to candidacy for the degree. The comprehensive is an examination that is broad in scope and requires the student to synthesize and apply concepts learned from relevant course work.

*Note: Although students are required to complete all of the classes in Area I, exceptions can be made if a student has completed **all but one** class and is enrolled in that class at the time of taking comprehensives.

Should a student not successfully pass the examination, he or she must rewrite the exam on the next scheduled date for the comprehensive examination. The comprehensive examination can be retaken a maximum of two times. If a student fails to successfully pass the comprehensive examination, he or she will be terminated from the program. Comprehensive examinations are scheduled for fall, spring, and summer semesters. The comprehensive examination should be scheduled at the time a student has met all the requirements of Precandidacy for Area I.

Educational Leadership and Special Education

Educational Leadership (Ph.D., Ed.D., Ed.S., M.A.Ed.)

Education, Special (Ed.S., M.A.Ed.)

Graduate program director at UAB: *Rogan*

UAB Faculty

Carol Allison, Instructor (Special Education); Visual Impairments

Loucrecia Collins, Assistant Professor (Leadership); Curriculum, Conflict Resolution

Karen Dahle, Assistant Professor (Special Education); Special Education Administration and Supervision, School Psychology, Autism, Counseling

J. Rudolph Davidson, Professor Emeritus (Leadership); Educational Finance, Politics of Education, Higher Education

Richard M. Gargiulo, Professor (Special Education); Conceptual Development of Mildly Handicapped Children, Teacher Education

Virginia D. Gauld, Assistant Professor (Leadership); Higher Education, Rehabilitation Counseling

Eugene L. Golanda, Associate Professor (Leadership); Educational Administration, Sociology, Psychology

Renitta Goldman, Associate Professor (Special Education); Learning and Behavioral Handicaps; Assessment; Physical, Emotional and Sexual Abuse; Suicide Among Minority Populations

Donald H. Henderson, Professor Emeritus (Leadership); School Law, Principalship, Attendance Supervision

Shirley Salloway Kahn, Assistant Professor (Leadership); Higher Education, Planning

Zachary Kelehear, Associate Professor (Leadership); Human Resource Management, Mentoring, Staff Development

Jennifer Kilgo, Professor (Special Education); Early Childhood

James M. Lee, Professor (Foundations of Education); Foundations of Education, Teaching Process, Religion and Education

Betty Nelson, Assistant Professor (Special Education); Low-Incidence and High-Incidence Disabilities, Administration Leadership, Collaboration in Schools

Jerry L. Patterson, Associate Professor (Leadership); Educational Leadership, Organizational Change, Supervision

William Boyd Rogan, Associate Professor (Leadership); Community Education, Educational Leadership

Mary Jean Sanspree, Research Professor (Special Education); Visual Impairments, Alabama Deaf-Blind Project

Foster Watkins, Professor (Leadership); Educational Administration, Higher Education

Edward L. Whigham, Professor Emeritus (Leadership); Educational Administration and Supervision, Administrative Theory, Superintendency

Lou Anne Worthington, Assistant Professor (Special Education); Emotional Conflict, Collaborative Teaching

Participating Faculty (Doctoral Program) from the University of Alabama (Tuscaloosa)

Harold L. Bishop, Associate Professor (Educational Leadership)

David L. Dagley, Associate Professor (Educational Leadership)

Educational Leadership Graduate Programs Information

Because admission to these programs is selective, prospective students should contact a departmental advisor to determine specific admission requirements for the degree or certificate in which they are interested.

The programs leading to the Doctor of Education (Ed.D.) and Doctor of Philosophy (Ph.D.) degrees in educational leadership are offered at UAB by the joint faculties of UAB and the University of Alabama (Tuscaloosa). Admission is highly selective and is open only once annually; application packets must be complete in the Graduate School office by **November** for the program of study beginning the following January (spring term).

Additional Information

For detailed information, contact Dr. Boyd Rogan, Chair, Department of Leadership, Special Education and Foundations, UAB School of Education, EB 213, 1530 3rd Avenue South, Birmingham, AL 35294-1250.

Telephone 205-934-4892

E-mail brogan@uab.edu

Web www.ed.uab.edu

Course Descriptions

Unless otherwise noted, all courses are for 3 semester hours of credit. Course numbers preceded by an asterisk indi-

cate courses that can be repeated for credit, with stated stipulations.

Educational Leadership (EDL)

611. School Organization and Law. Survey of selected theoretical and operational bases for decision making and leadership in organizational development and maintenance services for effective operation of schools. Legal framework established by local, state, and federal legislative and judicial requirements.

612. Leadership and Administration. Survey of selected theoretical and operational bases for decision making related to leadership, communication, and school-community relations. Prerequisite: EDL 611.

613. Supervision and Curriculum Development. Survey of selected theoretical and operational bases for decision making and leadership in curriculum, teaching, and learning. Prerequisites: EDL 611 and 612.

614. Planning for Change. Survey of selected theoretical and operational bases for decision making in problem identification and analysis, staff development, and assessment and evaluation of human and program effectiveness in grades N-12. Prerequisites: EDL 611, 612, and 613.

615. Nonthesis Research in Educational Leadership. Prerequisite: 12 hours in educational leadership.

617. Politics of Education. Education leaders learning to take action within the complex maze of political relations within schools, between school and their communities, and within levels of government. Prerequisite: Admission to master's program in educational leadership or approval by instructor.

618. Ethics and Leadership. An examination of ethical issues and dimensions of ethical decision making. Prerequisite: Admission to master's program in educational leadership or approval by instructor.

619. School-Based Problem Solving. An analysis and application of techniques for school-based problem solving. Prerequisite: Admission to master's program in educational leadership or approval by instructor.

620. Public School Organization and Administration.

621. The School Principalship. Changing role and responsibilities of school principal; organization, discipline, instructional supervision, and community relations.

622. Clinical Supervision for Administrators and Supervisors. Knowledge, skills, and competencies for assisting teachers in improvement of curriculum and instruction.

625. Education Management. An overview of education management techniques for the improvement of the education enterprise and student learning. Prerequisite: Admission to master's program in educational leadership or approval by instructor.

630. School and Community.

631. Education and the Political Environment. Educational policy making and governance as political process; political theory and structure.

635. Survey of School Law. Laws and court decisions affecting public education. Cases establishing mandates for public school practices.

637. Legal Liability and the Educator. Legal liability in administration and teaching. Cases pertaining to education.

640. Introduction to Community Education. Structure, purpose, and processes of community education and community schools.

641. **Community Education for School Administrators.**

642. **Operation and Administration of the Community Education Program.** Practical aspect.

643. **Community Resources Workshop.** Teaching-learning resources available in the local community.

660. **Administration Leadership I.** Practical applications in organizational management and leadership behavior.

685. **Workshop in Administration and/or Supervision.** Field workshop. 1-3 hours.

690. **Internship in Educational Leadership.** Field leadership experience; minimum of 300 clock hours of field experience in administration under direction of both field supervisor and university director. Prerequisite: Permission from director of internships. 1-6 hours.

691. **Practicum in Educational Leadership.** Field work on practical problem on project. Prerequisite: 9 hours in educational leadership at UAB. 3-6 hours.

692. **Individual Readings in Educational Leadership.** Prerequisite: Permission of instructor. 1, 3, 6 hours.

694. **Seminar in Educational Leadership I.** 1-3 hours.

695. **Seminar in Community Education.** 1-3 hours.

696. **Practicum in Community Education.** 3-6 hours.

* 698. **Nonthesis Research in Education Leadership.** 1, 3, or 6 hours.

* 699. **Thesis Research.** Prerequisites: Admission to candidacy and 9 hours in educational leadership.

701. **Organizational Leadership and Decision Making I.** Knowledge and skills related to educational leadership.

702. **Organizational Leadership and Decision Making II.** Knowledge and skills related to educational leadership.

703. **Theories and Practices for Supervision Leadership.**

704. **Education Law and Policy Development.**

705. **The Management of Educational Programs and Services.**

706. **Current Issues in Community Education.**

707. **International Aspects of Community Education.** Comparative analysis of community education worldwide.

708. **Administrative Leadership II.** Concepts and skills applied to educational administration and supervision.

709. **Theories of Educational Leadership.** Concepts and theoretical bases for practice in educational administration and supervision.

710. **Mentoring for Educational Leadership.** Preparing educational practitioners to become effective mentors for aspiring future leaders.

712. **School System Administration.**

713. **Leadership of Special Education Programs.** Comprehensive study of organization and leadership of special education programs; role of special education administrator, processes and structures for delivery of services to exceptional students.

714. **Advanced School Business Management.**

715. **Nonthesis Research in Educational Leadership.** Individual research on significant problem or development in educational leadership; proposed research plan must be approved by faculty member supervising the research.

716. **Workshop in Administration and/or Supervision.** Field workshop. 1-3 hours.

720. **Field Project in Educational Leadership.** Field work on practical problems and projects in educational leader-

ship; plan for actual project must be approved in advance by faculty member supervising the work. 1-6 hours.

721. **Administration of Staff Personnel.** Personnel administration in public education; practices, problems, and current developments.

722. **Current Issues in Educational Leadership.** Prerequisites: Graduate standing and permission of instructor.

723. **Administration of Educational Programs and Services.** Development, implementation, and evaluation of educational programs. Primarily for Ed.S. students continuing their preparation principalship.

724. **Seminar in Educational Leadership II.** 1-3 hours.

726. **Advanced Clinical Supervision for Administrators and Supervisors.** In-depth study of competence needed by administrators and supervisors providing leadership in improvement of instruction.

729. **Advanced Research in Educational Leadership.** Field or basic research. 1, 3, or 6 hours.

730. **Advanced Focus on the Principalship.** Advanced knowledge and skills related to school leadership.

748. **Current Issues and Problems in School Administration.** Prerequisite: Admission to doctoral studies.

750. **Issues and Problems in School Finance.**

752. **Advanced Educational Planning.**

755. **Advanced School System Administration.** Duties and responsibilities of superintendent of schools. Prerequisite: Admission to doctoral studies.

756. **Current Legal Problems in Alabama Education.** Prerequisite: Admission to doctoral studies.

762. **Futurism in Community Education.** Predicting and planning; what others say about future; developing personal predictions. Prerequisite: Admission to doctoral studies.

770. **Advanced Administrative Leadership.**

772. **Advanced Technology of Educational Planning.** Quantitative techniques. Prerequisite: Admission to doctoral studies.

792. **Directed Study in Educational Leadership.** Prerequisites: Admission to doctoral studies and advance permission of instructor. 3 hours.

796. **Individual Readings in School Law.** Prerequisite: Admission to doctoral studies. 3-6 hours.

797. **Doctoral Internship in Educational Leadership.** Field leadership experience. Prerequisite: Admission to doctoral studies. 1-12 hours.

* 798. **Nondissertation Research.** Prerequisite: Admission to doctoral studies. 1-12 hours.

* 799. **Dissertation Research.** Prerequisites: Admission to doctoral studies, admission to candidacy, and permission of faculty advisor. 1-12 hours.

University of Alabama (Tuscaloosa) Courses Offered at UAB in the Joint Doctoral Program in Educational Leadership

AEL 590. **Research Methods in Education.** Library familiarization, types of research, measurement, data collection, and basic statistical analysis.

AEL 602. **Advanced Educational Leadership.** Basic concepts, group interaction on selected presentation of assigned research.

AAP 634. **Legal Aspects of Personnel Administration.** Principles governing personnel management in public school systems.

AEL 651. **Educational Planning II.** Processes, concepts, and tools.

Educational Collaborative Teacher (ECT)

650. Master's Seminar in Collaborative Teaching. This is a diagnostic and evaluation course designed to ensure that students have acquired basic competencies in historical, philosophical, legal, and assessment foundations in special education. Competencies addressed in this course also include research, writing, speaking, and computer literacy.

651. Assessment Foundations in Special Education. This course is designed to prepare special education teachers to assess children and youth in a manner that reflects federal and state mandates and regulations. Students are prepared to appropriately select, administer, and interpret assessment instruments designed to answer questions related to eligibility determination and, to some extent, intervention programming.

652. Characteristics of Children and Youths with Learning and Behavioral Disabilities. This course details the characteristics, needs, and concerns related to children and youth with learning disabilities, mental retardation, and emotional-behavioral disorders. Additional issues addressed in the course are due process, inclusion, collaboration, and diversity as they pertain to these populations of students.

653. Physical, Health, Sensory, Communication. This course details the characteristics, needs, and concerns related to children and youth with physical, health, sensory, and communication disabilities. Additional topics covered include positioning and handling, assessment, development of health care plans, and transdisciplinary collaboration.

654. Instructional and Assistive Technology. The emphasis of this course is on identifying, designing, and implementing instructional and assistive technology devices and services. Topics covered include technologies for students with high- and low-incidence disabilities, general assistive technology adaptations, augmentative and alternative communication technologies, IEPs that incorporate assistive technology services and devices, and interagency collaboration.

655. Instructional Content and Methods. This course provides students with knowledge and skill in instructional content and methods. Issues related to designing, implementing, and evaluating instruction are presented. Additionally, the course provides critical information regarding the informal assessment of the teaching and learning processes. Specific methods for teaching, reading, writing, mathematics, and study skills are covered.

656. Transition of Adolescents from School to Adulthood. This course provides students with the information and skills necessary to assist youth with disabilities to make successful transitions from school to adulthood. The course explores the processes and products needed to assist students making this critical life transition.

657. Teaching in Inclusive Classrooms. This course provides an in-depth examination of inclusive schooling. Collaboration, ecological assessments, integrated therapies, modifications and adaptations, planning for inclusive programming, strategy instruction, and special curricular issues are topics addressed in this course.

658. Curriculum in General Education. This course is designed to prepare students to utilize the general education curriculum as the foundation for educational programming for children and youth with special needs. IEP writing, using the general education curriculum, team planning, state- and district-wide assessments, and curriculum accommodations and modifications are topics addressed in this course.

659. Planning and Managing the Teaching and Learning Environment. This course is designed to prepare students to plan and manage the teaching and learning environment effectively. The major emphasis of the course is on the elements of classroom design and preparation. Primary and secondary academic and behavioral interventions are presented. Outcomes expected for students are related to the creation and maintenance of positive, caring classroom communities that facilitate the academic and social development of children and youth with disabilities.

660. Providing Positive Behavior and Social Support. This course is designed to prepare students to plan and manage the teaching and learning environment effectively. The major emphasis of the course is on the elements of classroom design and preparation. Primary and secondary academic and behavioral interventions are presented. Outcomes expected for students are related to the creation and maintenance of positive, caring classroom communities that facilitate the academic and social development of children and youth with disabilities.

661. Communication and Collaborative Partnerships. This course is designed to prepare students to work with children and youth with disabilities who present complex emotional, behavioral, and social problems in the classroom. Topics in the course include conducting functional assessments, designing behavior management plans, conducting manifestation determinations, and implementing and evaluating the effects of interventions. Tertiary behavioral and social interventions are presented.

670. Practicum in Collaborative Teaching: Grades K-6. Students seeking Collaborative Teacher certification, Grades K-6, are required to complete a practicum experience in a collaborative setting that includes children who present a wide range of disabilities. This practicum experience is tailored to the unique needs and experiences of students seeking this certification.

671. Practicum in Collaborative Teaching: Grades 6-12. Students seeking Collaborative Teacher certification, Grades 6-12, are required to complete a practicum experience in a collaborative setting that includes children who present a wide range of disabilities. This practicum experience is tailored to the unique needs and experiences of students seeking this certification.

672. Internship in Collaborative Teaching: Grades K-6. Students in the 5th-year, nontraditional program are required to complete a 12-week internship that is to be divided between lower and upper elementary settings. This internship is designed to assist the prospective graduate in virtually all teaching responsibilities in collaborative settings.

673. Internship in Collaborative Teaching: Grades 6-12. Students in the 5th-year, nontraditional program are required to complete a 12-week internship that is to be divided between lower and upper secondary settings. This internship is designed to assist the prospective graduate in virtually all teaching responsibilities in collaborative settings.

674. Advanced Readings and Research in Special Education. This course allows the student to pursue an in-depth investigation of current and timely issues in the field of special education. The instructor and student design an individual program of study during the course, based upon student needs and interests.

675. Survey of Attention Deficit Hyperactivity Disorder. This course is designed to provide teachers with the knowledge and skills necessary to implement an optimal teaching-learning environment for students with attention deficit hyperactivity disorder who represent diverse backgrounds in grades K-12.

676. Survey of Pervasive Developmental Disorders. This course presents an in-depth examination of the characteristics, needs, and other concerns of children and youth with pervasive developmental disorders. Topics also include interventions, collaboration, and functional life-skill programming.

677. Combating Child Abuse and Neglect. What constitutes child abuse? Perspectives will be offered from those affected by the tragedy of abuse, including victims, perpetrators, and the community at large: the family, educational, medical, political and legal systems. Intervention and prevention strategies will be stressed.

679. Advanced Legal Aspects of Special Education. The purpose of this course is to provide students with an in-depth examination of legal information pursuant to individuals with disabilities. The Individuals with Disabilities Education Act and its related amendments, the Americans with Disabilities Act, and Section 504 of the Rehabilitation Act are major federal laws reviewed in this course. Special education litigation is also addressed during the course.

681. Remedial Math for Special Needs Learners. The purpose of this course is to prepare students in effective instructional procedures for students who exhibit deficiencies in mathematics.

Exceptional Children and Youth (ECY)

600. Introduction to Exceptional Learners. Educational programs for various fields of exceptionality.

601. Behavior Principles and Procedures. Operant paradigms and treatment plans; their use in classroom management. Prerequisite: ECY 600.

603. Transition and Career Planning. Development of adaptive social processes. Psychological, social, and medical influences in habilitation of exceptional children. Prerequisites: ECY 600, 622, and 672.

604. Speech and Hearing Disorders. Evaluation and treatment of communication disorders in infants, preschool children, and early elementary grade-school children. Prerequisite: ECY 600.

607. Counseling Parents of Exceptional Children. Dynamics of family life and parental and sibling reactions to handicapped individuals. Prerequisite: ECY 600.

613. Diagnosis and Prescriptive Assessment. Case studies; parent-teacher counseling and educational diagnostic test; summarization of findings and case reporting. Prerequisite: ECY 600.

621. Nature and Needs of the Mentally Retarded. Social, emotional, physical, and learning characteristics of mentally retarded children and youth. Prerequisite: ECY 600.

622. Methods and Materials for Teaching the Mentally Retarded. Development of curriculum for mentally retarded individuals, K-12. Prerequisites: ECY 600, 621.

624. Nature and Needs of the Severely Handicapped. Developmental of curriculum for mentally retarded individuals, K-12. Prerequisites: ECY 600, 621.

625. Methods and Materials for the Severely Handicapped. Motor, social, cognitive, and language skill programs for different age levels. Prerequisites: ECY 600, 624.

631. Nature and Needs of Children With Learning Disabilities. Classroom organization, instructional design, and behavior management. Diagnosis and remediation. Prerequisite: ECY 600.

632. Methods and Materials for Children With Learning Disabilities. Diagnosis and remediation of motor, perceptual, and language development disabilities. Prerequisites: ECY 600, 613, and 631.

635. Nature and Needs of the Young Atypical Child. Nature of exceptionalities relating to young children with special needs. Prerequisite: ECY 600.

636. Materials and Methods for Teaching the Young Child with Special Needs. Prerequisites: ECY 600 and 635.

637. Assessment and Remediation of Young Children with Special Needs. Evaluation and referral of young children with special needs; assessments for both instructional and individual family service plan (IFSP) needs. Prerequisites: ECY 600, 635, and 636.

653. Nature and Nurture of Creativity. Theories underlying creative process; assessing creative potential; techniques developing children's creativity. Prerequisites: ECY 650, 651, and 652.

654. Mild Learning Handicap: Consulting Teacher Role. Prerequisite: ECY 600.

661. Nature and Needs of the Visually Impaired. Historical perspectives; definition and characteristics of blind and partially sighted; educational consideration. Prerequisite: ECY 600.

662. Methods and Materials for Teaching the Visually Impaired. Principles and procedures for developing and implementing curricula for visually impaired students. Prerequisites: ECY 600 and 661.

663. Orientation and Mobility. Dog guide, sighted guide, and cane travel techniques. Prerequisites: ECY 600, 661, and 662.

664. Braille. Touch reading for the blind. Prerequisites: ECY 600, 661, and 663.

665. Anatomy and Educational Implications of the Eye. Anatomy and physiology of the eye, process of visualization, visual perception, refraction, ophthalmologic report; etiology and symptomology of major visual disorders. Prerequisites: ECY 600, 661, 663, and 664.

671. Nature and Needs: Seriously Emotionally Disturbed/Behaviorally Disordered. Definitions and characteristics of children with emotional conflicts; factors contributing to and strategies for dealing with such handicaps. Prerequisite: ECY 600.

672. Methods and Materials: Seriously Emotionally Disturbed/Behaviorally Disordered. Informal and formal assessment techniques, intervention strategies and classroom management, media and materials analysis. Prerequisites: ECY 600, 613, and 671.

674. Applied Theories of Classroom Management for Exceptional Students. Classroom dynamics, teacher's communication style, and behaviors of individual learner. Prerequisite: ECY 600.

675. Remedial Math for Special Needs Learners. Training for MLH teacher in effective instructional procedures for students exhibiting deficiencies in mathematics. Prerequisite: ECY 600.

676. **Technology of Teaching Special Needs Learners.** Microcomputer technology as applied to special needs population. Prerequisite: ECY 600.

677. **Legal Aspects of Special Needs Learners.** Litigation pertaining to the developmentally disabled. Rights and responsibilities of employees, residents, and guardians. Prerequisites: 9 hours at graduate level and approval of instructor.

682. **Practicum in Special Education: Mentally Retarded.** Curriculum development, programming, counseling, assessment, and teaching in structured situations. Prerequisites: ECY 600, 621, 622, and 623.

683. **Practicum in Special Education: Learning Disabled.** Resources and materials development, consultation, diagnostic-prescriptive programming. Prerequisites: ECY 600, 613, 631, and 632.

686. **Practicum in Special Education: Visually Impaired.** Resources and materials development, consultation, diagnostic-prescriptive programming. Prerequisites: ECY 600, 613, 661, 662, 663, 664, and 665.

687. **Practicum in Special Education: Seriously Emotionally Disturbed/Behaviorally Disordered.** Resources and materials development, consultation, diagnostic-prescriptive programming. Prerequisites: ECY 600, 613, 671, and 672.

688. **Collaboration and Consultation.** Prerequisite: ECY 600.

689. **Advanced Topics in Special Education.** Group seminars. Prerequisites: Permission of instructor, ECY 600. 1-6 hours.

690. **Seminar: Issues and Trends in Special Education.** Contemporary issues and trends affecting education of exceptional children. Prerequisite: ECY 600.

691. **Practicum: Mild Learning Handicapped.** Supervised working or alternative practicum experience. Prerequisites: ECY 600, 613, 694, 695, and 696.

694. **Nature and Needs: Mild Learning Handicapped.** Psychological, social, and emotional characteristics of learning disabled, emotionally conflicted, and educable mentally retarded students. Prerequisite: ECY 600.

695. **Mild Learning Handicapped: Elementary Methods and Materials.** Theories of learning applied to behavioral/learning characteristics of elementary learning disabled, emotionally conflicted, and educable mentally retarded. Prerequisites: ECY 600 and 694.

696. **Mild Learning Handicapped: Secondary Methods and Material.** Theories of learning applied to behavioral/learning characteristics of secondary learning disabled, emotionally conflicted, and educable mentally retarded. Prerequisites: ECY 600 and 694.

697. **Independent Study in Special Education.** Approved individual research by nonthesis student in area of specialization, supervised by advisor and/or committee. Prerequisite: ECY 600. 1-9 hours.

* 698. **Nonthesis Research in Special Education.** Individual readings and research in area of specialization, approved and supervised by advisor and/or committee. Prerequisite: ECY 600. 1-9 hours.

*699. **Thesis Research in Special Education.** Prerequisite: Admission to candidacy and ECY 600.

703. **Advanced Curriculum Development.** Development of teaching programs for all exceptionalities. Prerequisites: ECY 600 and admission to Ed.S. program.

704. **Advanced Assessment of Educational Needs.** Educational assessment of all types of exceptional learners. Prerequisites: ECY 600 and 703, and admission to Ed.S. program.

705. **Advanced Curriculum Development for the Learning Disabled.** Principles of curricular design; evaluation of curricula; transmission of information regarding curricula to other professionals and parents. Prerequisites: ECY 600, 703, 704, 726, admission to Ed.S. program, and permission of instructor.

706. **Advanced Topics in Instruction for the Learning Disabled.** Principles and evaluation of instruction; transmission of information regarding instructional principles to other professionals and parents. Prerequisites: ECY 600, admission to Ed.S. program, and permission of instructor.

708. **Mild Learning Handicapped Thesis Research Seminar.** Research in learning disabilities, emotional conflict and mental retardation and related areas, as well as techniques for interpreting and critiquing research. Prerequisites: ECY 600 and 707, and admission to Ed.S. program.

709. **Mild Learning Handicapped Thesis Field Project.** Principles and skills necessary to design, implement, and evaluate a significant question or problem in a specific area pertaining to learning disabilities, emotional conflict, and mental retardation. Prerequisite: ECY 600, admission to Ed.S. program, and permission of instructor.

710. **Advanced Practicum: Collaboration and Consultation.** Assisting individuals in programming for learning disabled, emotionally conflicted, and educable mentally retarded students. Prerequisites: ECY 600, admission to Ed.S. program, and permission of instructor.

711. **Mild Learning Handicapped: Advanced Topics in Instruction.** Advanced principles and instruction in learning disabled, emotionally conflicted, and mentally retarded. Prerequisites: ECY 600, admission to Ed.S. program, and permission of instructor.

712. **Mild Learning Handicapped: Curriculum Design.** Planning, implementing, and evaluating educational services for learning disabled, emotionally conflicted, and educable mentally retarded students. Prerequisites: ECY 600, admission to Ed.S. program, and permission of instructor.

713. **Advanced Curriculum Development and Instructional Procedures for the Visually Impaired.** Principles and the visually impaired. Principles and evaluation of instruction; transmission of information regarding instructional principles to other professional and parents. Prerequisite: ECY 600.

715. **Administration and Supervision of Programs for the Learning Disabled.** Prerequisites: ECY 600, admission to Ed.S. program, and permission of instructor.

716. **Advanced Topics in Instruction for Students With Emotional Conflicts/Behavior Disorders.** Seminar on interdisciplinary theoretical and therapeutic perspectives and practice. Prerequisites: ECY 600, admission to Ed.S. program, and permission of instructor.

717. **Advanced Curriculum Development of Children and Youth: Emotionally Conflicted and Behaviorally Disordered.** Prerequisites: ECY 600, admission to Ed.S. program, and permission of instructor.

718. **Advanced Theories and Techniques for Cognitive Modification.** Verbal mediation as cognitive and behavioral organizer. Prerequisites: ECY 600, admission to Ed.S. program, and permission of instructor.

719. **Field Project in Mental Retardation.** Design, implementation, and evaluation major project; investigation of a significant question or problem in specific areas of interest pertaining to moderate handicaps. Prerequisites: ECY 600, 721, 722, 723, admission to Ed.S. program, and permission of instructor.

720. **Field Project in Learning Disabilities.** Investigation of a problem in specific areas of interest pertaining to severe or profound handicaps. Prerequisites: ECY 600, admission to Ed.S. program, and permission of instruction.

721. **Advanced Curriculum Development for Mentally Retarded Students.** Curricular design; evaluation of curricula; transmission of information regarding curricula to other professionals and parents. Prerequisites: M.A. degree in special education, admission to Ed.S. program, and permission of instructor.

722. **Advanced Topics in Instruction for the Mentally Retarded Student.** Principles and evaluation of instruction; transmission of information regarding instructional principles to other professionals and parents. Prerequisites: ECY 721, admission to Ed.S. program, and permission of instructor.

723. **Administration and Supervision of Programs for the Mentally Retarded.** Principles of administration and supervision of educational programs for mentally retarded children. Prerequisites: ECY 703, 704, 721, admission to Ed.S. program, and permission of instructor.

725. **Thesis: Field Project in Emotional Conflict.** Demonstration by student of acquired skills, knowledge, and techniques as culminating training activity. Prerequisites: ECY 600, 671, 672, 687, 716, 717, 731, admission to Ed.S. program, and permission of instructor.

726. **Professional Seminar.** Professional behaviors and developmental sensitivity to past, current, and future needs, trends, and concerns of profession. Prerequisites: ECY 600.

727. **Research Seminar in Mental Retardation.** Techniques for interpreting and critiquing research. Prerequisites: ECY 600, admission to Ed.S. program, and permission of instructor.

728. **Research Seminar in Learning Disabled.** Techniques for interpreting and critiquing research. Prerequisites: ECY 600, admission to Ed.S. program, and permission of instructor.

730. **Research and Program Development, Management, and Evaluation.** Development, management, and evaluation of programs for visually impaired. Prerequisites: ECY 600, admission to Ed.S. program, and permission of instructor.

731. **Thesis Research Seminar in Emotional Conflict.** Research designs, evaluating research, adapting and replicating research. Prerequisites: ECY 600, 671, 672, 687, 716, 717, admission to Ed.S. program, and permission of instructor.

733. **Thesis Seminar in Visual Impairment.** Prerequisites: ECY 600 and permission of instructor.

740. **Early Childhood Education for the Handicapped.** Developmental and educational needs of young handicapped children. Prerequisites: ECY 600, admission to Ed.S. program, and permission of instructor.

Educational Foundations (EDF)

600. **The Urban School.** Social and psychological forces of urban ghetto and suburbia; implications for education. Problems of inner city school. Opportunities for field work.

601. **The History of Western Education.** Functions of and influences exerted upon school.

602. **The American School in Crisis.** Critical problems facing American public education; approaches to managing such problems.

603. **Contemporary Philosophies of Education.** Impact of three major schools of philosophical thought on American education.

604. **Social Philosophies and Education.** Socioeconomic class structure, ethnic heritage, and peer group as social theories; implications for educational programs.

606. **The Progressive Education Movement.** Influence of movement upon contemporary American educational developments.

608. **The Pursuit of Knowledge.** Education versus common sense; ways of knowing, esoteric and public knowledge; useful knowledge; possible worlds.

616. **Comparative Education.** Cultural forces influencing structure and function of educational system in selected countries.

620. **Race and Ethnicity in American Education.** Historical study of racial and ethnic group; race, ethnicity, assimilation, pluralism, community, and university.

624. **Moral Education.** Philosophical consideration of nature of value, morality, and moral judgment; problems and issues of moral education.

697. **Individual Readings in Foundations of Education.** Prerequisite: Permission of instructor. 1-3 hours.

698. **Individual Nonthesis Research in Foundations of Education.** Prerequisite: Permission of instructor. 1-3 hours.

703. **Advanced Philosophy of Education.** Educational implications of one of the following: etiology, ontology, epistemology, and logic. Prerequisite: Ed.S. or doctoral status.

706. **Progressive Education Movement.** Prerequisite: Ed.S. or doctoral status.

708. **Ethic Dilemmas in Educational Administration.** Relationships among disciplines; application of concepts in individual disciplines to interdisciplinary problems. Prerequisite: Ed.S. or doctoral status.

710. **Special Problems in the Foundations of Education.** Individual readings. Prerequisites: Master's degree and permission of advisor and educational foundations faculty member.

711. **Pursuit of Knowledge.** Prerequisite: Ed.S. or doctoral status.

713. **Modern Philosophy of Education.** Seminar on educational theories of seven outstanding educational philosophers: Comenius, Locke, Rousseau, Pestalozzi, Froebel, Herbart, and Spencer. Prerequisite: Ed.S. or doctoral status.

716. **Comparative Education.** Prerequisite: Ed.S. or doctoral status.

720. **Race and Ethnicity in American Education.** Prerequisite: Ed.S. or doctoral status.

724. **Moral Education.** Prerequisite: Ed.S. or doctoral status.

750. **Special Problems in the Foundations of Education.** Prerequisite: Doctoral status.

797. **Individual Readings in the Foundations of Education.** Prerequisite: Doctoral status and permission of instructor.

798. **Individual Research in the Foundations of Education.** Prerequisite: Doctoral status and permission of instructor.

Educational Technology (EDT)

610. Computer-Based Instructional Technologies. The first course in a series of three to familiarize classroom teachers with computer-based instruction technologies as they are applied to educational settings. Students are introduced to the historical and social context within which computer technologies are developed, as well as to the knowledge of computer hardware and software. Students will learn basic skills of microcomputer operation and applications.

620. Current and Emerging Instructional Technologies. The second course in a three-course series designed to provide inservice teachers with knowledge and skills in the use of computing and other new technologies. Prerequisite: EDT 610.

630. Curriculum Integration of Technology. This is the third course in a three-course series designed to provide inservice teachers with knowledge and skills in the use of computing and other new technologies. Prerequisites: EDT 610 and 620.

Engineering, Biomedical (Ph.D., M.S.B.M.E.)

Graduate program director: *Pollard*

Faculty

Rigoberto Advincula, Assistant Professor, (Natural Science and Math); Polymer Synthesis

Jorge E. Alonzo, Assistant Professor, (Orthopedic Surgery); Biomechanics of Orthopedic Trauma

Franklin Amthor, Associate Professor, (Psychology); Neurophysiology of Vision Computer Graphics

Andreas Anayiotos, Assistant Professor, (Mechanical Engineering); Biofluids, Dynamics of the Vascular System

Susan L. Bellis, Assistant Professor, (Physiology Biophysics); Integrin Biology/Implant Surfaces

Terry Bray, Research Assistant Professor, (Biomedical Engineering); Drug Design

David T. Curiel, Professor, (Pulmonary and Critical Care); Gene Therapy

John M. Cuckler, Professor, (Orthopedic Surgery); Skeletal Implants, Effects on Cells of Mechanical Stress

James Davidson, Assistant Professor (Civil and Environmental Engineering); Injury Mechanics

Lawrence J. DeLucas, Professor, (Optometry); Drug Design

Allan C. Dobbins, Assistant Professor, (Biomedical Engineering); Human and Machine Vision, Neural Computation, Brain Imaging, Scientific Visualization

Dennis Doblar, Assistant Professor, (Anesthesiology); Control of Ventilation, Cerebral Flow Monitoring, Anesthesiology

Joanne T. Douglas, Research Assistant Professor (Pulmonary and Critical Care); Gene Therapy

Mark Doyle, Associate Professor, (Cardiovascular Disease); Processing and Acquisition of Magnetic Resonance Images

Alan Eberhardt, Assistant Professor, (Biomedical Engineering); Solid Mechanics, Analytical and Numerical Methods in Biomechanics

Evangelos Eleftheriou, Assistant Professor, (Mechanical Engineering); Mechanical Systems, Automated Manufacturing, and Mechanical Design

Vladimir G. Fast, Research Assistant Professor (Biomedical Engineering); Cardiac Electrophysiology

Dale S. Feldman, Associate Professor, (Biomedical Engineering); Biomaterials, Soft-Tissue Biomechanics, Polymeric Implants

John Forder, Research Assistant Professor, (Cardiovascular Disease); Biomedical Imaging and Spectroscopy

Paul Gamlin, Professor, (Physiological Optics); Vision Research

Timothy J. Gawne, Assistant Professor, (Physiological Optics); Neural Dynamics of Form Perception

Richard A. Gray, Assistant Professor (Biomedical Engineering); Optical Mapping of Re-Entry Fibrillation and Defibrillation

Gary Grimes, Professor, (Electrical and Computer Engineering); Telecommunications and Fiber-Optic Data Transmission, Virtual Reality, Telemedicine

Richard Holl, Research Associate Professor, (Biomedical Engineering); Drug Delivery and Polymers

Raymond E. Ideker, Professor, (Cardiovascular Disease); Study of Cardiac Arrhythmia, Cardioversion and Electrical Ablation for Treatment Of Arrhythmia

Tom Jannett, Professor, (Electrical and Computer Engineering); Bioinstrumentation and Anesthesiology

Marjorie K. Jeffcoat, Professor, (Periodontics); Dental Implants

Robert Lee Jeffcoat, Research Assistant Professor, (Periodontics); Dentistry Biomaterials, Quantitative Diagnostic Techniques and Instrumentation

Kent T. Keyser, Associate Professor, (Physiological Optics); Physiology Optics

John S. Kirkpatrick, Assistant Professor, (Orthopedics); Orthopedic Surgery

Martin Klinger, Research Assistant Professor, (Biomedical Engineering); Cell-Biomaterial Interactions

Stephen B. Knisley, Associate Professor, (Biomedical Engineering); Myocardial Electrophysiology, Study Of Membrane Potentials Using Laser-Excited Fluorescent Dyes

Dennis F. Kucik, Assistant Professor, (Pathology); Laser Tweezers

William Lacefield, Associate Professor, (Dental Biomaterials); Ceramic Biomaterials and Coatings for Dental And Orthopedic Applications

Chris M. Lawson, Professor (Natural Science and Math, Physics); Nonlinear Optics, Fiber Optics, Optical Sensor

Jack E. Lemons, Professor, (Dental Biomaterials); Biological Tissue Reaction to Synthetic Materials, Biomechanics

Linda C. Lucas, Professor, (Chair, Biomedical Engineering); Biomaterials, Biocompatibility, Surgical Alloys, Corrosion Resistance of Implant Materials

Jimmy W. Mays, Professor (Chemistry); Polymer Synthesis Bone Cements

Stanley McClellan, Assistant Professor (Electrical and Computer Engineering); Telecommunication

Michael S. McCracken, Assistant Professor, (Dentistry); Dental Implants, Biomaterials

Martin J. McCutcheon, Professor, (Biomedical Engineering); Medical Instrumentation, Speech Physiology Signal Processing

Andrew E. Pollard, Associate Professor, (Biomedical Engineering); Simulation and Modeling of Electrical Signals of the Heart

Charles W. Prince, Professor, (Nutrition Sciences); Dental Nutrition, Bone Biochemistry, Vitamin D, Calcium and Phosphorus Metabolism

Firoz Rahemtulla, Professor, (Oral Biology); Connective Tissue Biochemistry

E. Douglas Rigney, Assistant Professor, (Materials and Mechanical Engineering); Coatings for Biomaterials, Ion-Beam Sputtering

Jack M. Rogers, Assistant Professor, (Biomedical Engineering); Computer Simulations of Re-Entry, Signal Analysis of Cardiac Arrhythmias

Rosalia N. Scripa, Professor, (Materials Science Engineering); Biomaterials, Ceramics and Glass, Extractive Metallurgy, Semiconducting Materials

William M. Smith, Professor, (Cardiovascular Disease); Bioinstrumentation, Multichannel Cardiac Mapping, ECG Mapping and Signal Analysis

Helen Southwood, Assistant Professor, (Speech and Hearing Sciences); Biocommunication

Ernest M. Stokely, Professor, (Biomedical Engineering); 3-D Medical Imaging, 3-D Computer Graphics, Digital Imaging

Murat M. Tanik, Professor, (Electrical and Computer Engineering); Software Engineering

Donald B. Twieg, Associate Professor, (Biomedical Engineering); Medical Imaging, Magnetic Resonance Imaging (MRI) Techniques, Functional MRI of Brain and Heart

Gregg L. Vaughn, Associate Professor, (Electrical and Computer Engineering); Imaging, Digital Signal Processing, Applications of Microprocessors

Ramakrishna Venugopalan, Research Assistant Professor, (Biomedical Engineering); Biocorrosion, Orthopedic and Cardiovascular Devices

Edward Walsh, Research Assistant Professor, (Biomedical Engineering); Medical Imaging (Brain, Muscle and Heart)

Dong Xie, Research Assistant Professor, (Biomedical Engineering); Biopolymer Synthesis

Program Information

M.S.B.M.E. Program

The Master of Science in Biomedical Engineering may be a terminal degree or pursued as part of the doctoral program. With the terminal degree, employment is usually found in medical centers or with manufacturers of medical products, government agencies, health care groups, or computer application groups. Doctoral candidates prepare for courses in industry or academics. Primary research areas are biomedical implants and devices, electrophysiology, and medical imaging. Other research areas available to students include biofluids, biocontrols, bioinstrumentation, injury biomechanics, and biomaterials-enhanced regeneration.

For admission to the program, a student should have earned a bachelor's degree in a field of engineering. Students with undergraduate degrees in the physical sciences, life sciences, or mathematics will also be considered for admission; however, such students will be required to demonstrate competence in engineering areas usually found in an undergraduate engineering curriculum. In most cases, preparatory courses in engineering are required, with specific recommen-

dations made by the student's Graduate Study Committee. Admission is competitive, and successful applicants will usually present scores of at least 600 on the verbal, quantitative, and analytical sections of the GRE General Test.

Applicants are strongly encouraged (but not required) to take the GRE subject test. Applicants are normally required to personally interview the Admissions Committee on campus before they can be considered for admission.

Program requirements include the following:

1. The student must complete three 1-hour seminar courses.

2. The student must complete an additional 24 hours of coursework. Course requirements vary depending on the research focus.

3. Plan I (thesis option) students must register for at least 6 semester hours of BME 699 (thesis research) and successfully defend a thesis based on independent research. Plan II (non-thesis option) students must take an additional 9 semester hours of graduate courses approved by the Graduate Study Committee and successfully defend an independent study project.

Ph.D. Program

All students entering the doctoral program will possess an M.S., D.M.D., or M.D. Degree. Admission is competitive, and successful applicants will usually present scores of at least 650 on the verbal, quantitative, and analytical sections of the GRE General Test. Applicants are normally required to interview the Admissions Committee on campus before they can be considered for admission. Coursework in engineering and related medical or life science areas is required (a minimum of 24 semester hours after completion of the master's degree, or 48 after the bachelor's degree). Additional coursework may be required in conjunction with the student's dissertation research. The program of study for each student is defined by the Graduate Study Committee during the student's first year of doctoral study. Near the completion of the course plan, a written and oral comprehensive qualifying exam will be administered by the Committee and a written proposal for the dissertation research must be presented before the student can be admitted to candidacy for the degree. A dissertation that presents the results of the student's original research must be successfully defended.

Additional Information

For detailed information, contact Director, UAB Department of Biomedical Engineering, Hoehn Bldg. Rm. 370, 1075 13th Street South, Birmingham, Alabama 35294-4440.

Telephone 205-934-8420

E-mail apollard@uab.edu

Web www.eng.uab.edu

Course Descriptions

Unless otherwise noted, all courses are for 3 semester hours of credit. Course numbers preceded with an asterisk indicate courses that can be repeated for credit, with stated stipulations.

Biomedical Engineering (BME)

605, 705. **Medical Device Industry Issues.** FDA requirements, medical product design and production, marketing, documentation requirements, product liability. Prerequisite: Permission of instructor. Variable credit.

640, 740. **Imaging Brain Function.** Introduction to functional MRI, introduction to imaging brain function in human subjects. Prerequisite: Permission of instructor. Variable credit.

641, 741. **Medical Imaging: Introduction to fMRI Principles of magnetic resonance imaging.** Overview of how fMRI images are made; limitations and advantages of MR imaging to image brain function. Prerequisite: Permission of instructor. Variable credit.

664, 764. **Neural Computation.** The principal theoretical underpinnings of computation in neural networks: understanding the relationship between the different approaches: dynamical systems, statistical mechanics, logic, Kalman filters, and likelihood/Bayesian estimation. Prerequisite: Permission of instructor. Variable credit.

665, 765. **Computational Vision.** Study of biological and artificial vision from a theoretical perspective. Begins with a comparative survey of visual systems and examines vision algorithms and architectures. Prerequisite: Permission of instructor. Variable credit.

601, 701. **Seminars in Biomedical Engineering.** Current topics in biomedical engineering technology and applications. Pass/Fail. 1 hour each.

603, 604. **Human Physiology I, II.** Human physiological systems and associated biomedical engineering applications; control systems approach to fundamental concepts. Prerequisite: permission of instructor. 3 hours each.

606, 706. **Introduction to Biomedical Instrumentation.** Instrumentation used in measurement of physiological parameters. Prerequisites: EE 351 and permission of instructor.

607, 608. **Biomedical Instrumentation and Signal Processing I, II.** Bioelectric signals. Transduction devices and processes; analog and digital signal processing; system response characteristics. Prerequisite: BME 630 and permission of instructor. Variable credit.

610-612. **Biomaterials. Metals, Ceramics, Polymers.** Introduction to a wide range of metallic, ceramic and polymeric materials used for biomedical applications. Cover physical, chemical, and mechanical properties of biomaterials. Prerequisite: Permission of instructor. Variable credit.

613, 713. **Biomaterials. Animal Research.** Ethics of animal research in biomaterials research. Prerequisite: Permission of instructor. Variable credit.

614, 714. **Biomaterials. Human Research.** Ethical considerations and issues related to human research, scientific integrity, and the FDA.

615, 715. **Biomaterials. Clinical Research.** Ethical considerations related to clinical trials and product liability. Prerequisite: Permission of instructor. Variable credit.

616, 716. **Biomaterials. Analytical Techniques.** Techniques for biomaterials research. Techniques used to evaluate biomaterials: FTIR, AES/XPS, AFM/STM, electrochemical corrosion evaluations, and mechanical testing. Prerequisite: Permission of instructor. Variable credit.

620, 720. **Biocompatibility. Introduction.** Basic concepts and principles of implant biocompatibility will be addressed. Prerequisite: Permission of instructor. Variable credit.

621, 721. **Biocompatibility. Biomaterials Enhanced Regeneration.** Study of implants used to regenerate tissue. Prerequisite: Permission of instructor. Variable credit.

622, 722. **Biocompatibility. Growth Factors.** Study of biological response modifiers used to augment implant response. Prerequisite: Permission of instructor. Variable credit.

623, 723. **Biocompatibility. Wound Healing.** Study of principles of healing, methods to enhance, and clinical applications. Prerequisite: Permission of instructor. Variable credit.

624, 724. **Biocompatibility. Histology.** Study of techniques to evaluate the tissue response to implants. Prerequisite: Permission of instructor. Variable credit.

625, 725. **Biocompatibility. Culture Systems.** An introduction to the use of in vitro cell culture systems for addressing the cellular response to implant materials and devices. Hands-on laboratory investigations. Prerequisite: Permission of instructor. Variable credit.

626, 726. **Biocompatibility. Tissue Evaluation.** Biocompatibility of implant materials (metals, ceramics, polymers). Standard analyses for evaluating the tissue response to biomaterials. Prerequisite: Permission of instructor. Variable credit.

630, 730. **Joint Mechanics.** Study of joint anatomy, joint biomechanics, joint repair, implant evaluation. Prerequisite: Permission of instructor. Variable credit.

633, 733. **Biomechanics: Tissue Mechanics I.** Fundamentals of hard and soft tissue mechanics. Introduction to biomechanical problems, with emphasis on bone, ligament, tendon and cartilage. Prerequisite: Permission of instructor. Variable credit.

636, 736. **Introduction to Biofluids.** Study modeling and analysis of the properties of biofluids. MRI and Doppler ultrasound measurement techniques. Prerequisite: Permission of instructor. Variable credit.

637, 737. **Biomechanics: Tissue Mechanics II.** Advanced topics in tissue mechanics, including structure-function analysis and modeling of trabecular bone, biphasic theory for articular cartilage.

642, 742. **Medical Imaging I. Physics of Ionizing Radiation.** For medical imaging energies: The principles and physics of the interaction of ionizing radiation with matter, bremsstrahlung, attenuation coefficients, Compton scatter, nuclear disintegration of radionuclides, generation of medical radionuclides. Prerequisite: Permission of instructor. Variable credit.

643, 743. **Medical Imaging: Principles of Nuclear Medicine.** Radionuclides used for medical imaging, positron-producing radionuclides: ionization chambers, scintillation, and solid-state detectors: principles of angier scintillation cameras and coincidence detection: collimators and collimator and collimator design issues: attenuation effects relating to image formation principles. Prerequisite: Permission of instructor. Variable credit.

644, 744. **Medical Imaging: Principles of Radiography.** X-ray production, basics of X-ray tubes, heat loading; generators; use of film and film-screen combinations for X-ray imaging; components of radiographic systems; digital X-ray techniques; issues affecting contrast; measuring resolution; fluoroscopy; observer performance using ROC curves. Prerequisite: Permission of instructor. Variable credit.

645, 745. **Medical Imaging: Computed Tomography.** Fourier slice theorem; back-projection-filtered back-projection, back-projection filtering, iterative algorithms (ART); X-ray CT systems; attenuation problems peculiar to SPECT; SPECT systems; PET systems and attenuation correc-

tion with PET. Prerequisite: Permission of instructor. Variable credit.

646, 746. **Medical Imaging: Principles of MRI.** Biomaterials experimental design. Prerequisite: Permission of instructor. Variable credit.

647, 747. **Medical Imaging: Advanced MRI.** Advanced MRI techniques, functional MRI methods including spectroscopy, perfusion and diffusion imaging. Prerequisite: Permission of instructor. Variable credit.

648, 748. **Advanced FMRI.** Study of advanced FMRI. Prerequisite: Permission of instructor.

650, 750. **Implants in Dentistry.** Biomechanics and biocompatibility of dental implant. Prerequisite: Permission of instructor.

651, 751. **Laboratory Methods in Biomaterials Research.** Casting, metallography, photography, electron microscopy mechanical testing, corrosion, and surgery technique. Prerequisite: Permission of instructor.

661, 761. **Bioelectric Phenomena: Membrane Action Potentials.** A derivation of the Nernst and Goldman equations relative to steady-state membrane transport phenomena and an examination of the Hodgkin and Huxley equations to study the time course in the generation of membrane action potentials. Prerequisite: Permission of instructor.

662, 762. **Bioelectric Phenomena: Propagation.** Numerical and analytical methods to study propagation of action potentials down fibers with a consideration of the generated potentials in the passive extracellular volume conductor.

663, 763. **Bioelectric Phenomena: Stimulation.** The response of fibers to external stimuli, including field stimulation and current injection in finite-length and infinite-length fibers.

670, 770. **Cardiac Electrophysiology I: Ionic Currents.** Examination of the membrane ionic currents responsible for the initiation and maintenance of cardiac action potentials and the changes to the membrane ionic currents with rate and during myocardial ischemia. Prerequisite: Permission of instructor.

671, 771. **Cardiac Electrophysiology I: Tissue Surface.** The role of the cellular architecture in the propagation of cardiac action potentials, and the influence of the membrane currents and the tissue structure on the electrical behavior of the heart under normal and pathophysiological conditions. Prerequisite: Permission of instructor.

672, 772. **Cardiac Electrophysiology I: Activation Detection.** The analysis of isochrone maps constructed from extracellular or transmembrane potential recordings, pattern analysis and the coherence/correlation of cardiac electrical activity with underlying membrane-level processes. Prerequisite: Permission of instructor.

673, 773. **Math Modeling in Cardiac Electrophysiology.** Propagation. Multidimensional solutions of the monodomain and bidomain problems, explicit and implicit solution techniques and the use of large-scale computing techniques to determine time-dependent potential distributions. Prerequisite: Permission of instructor.

674, 774. **Math Modeling in Cardiac Electrophysiology, Forward Solutions.** Matrix methods for the recovery of field potentials given a cardiac source potential distribution. Prerequisite: Permission of instructor.

675, 775. **Math Modeling in Cardiac Electrophysiology, Inverse Solutions.** Matrix methods for the recovery of

cardiac source potential distributions given a field potential distribution. Prerequisite: Permission of instructor.

680, 780. **Cardiac Electrophysiology II: Arrhythmias.** Reentry, automaticity, triggered activity, tachycardia and the decay into fibrillation. Prerequisite: Permission of instructor.

681, 781. **Cardiac Electrophysiology II: Stimulation and Defibrillation** Cardiac pacing, catheters, lead configurations and electrical waveforms for defibrillation.

682, 782. **Cardiac Electrophysiology II: Clinical Treatment.** Clinical trials for automatic implantable defibrillators and pacemakers, including design and implementation, follow-up, analysis of FDA requirements, and exposure to clinical treatment of arrhythmias through surgery and ablation.

690, 790. **Special Topics in (Area).** Course syllabus and grading policy required. 1-6 hours.

692, 792. **Journal Club in Computational Neuroscience.**

694, 695. **Journal Club in Cardiac Electrophysiology.**

695, 795. **Journal Club in Biomaterials Interface.**

696, 796. **Journal Club in Biomaterials-Enhanced Regeneration.**

697, 797. **Journal Club in Medical Imaging.**

698. **Nonthesis Research.** Pass/Fail, 1-6 hours.

699. **Thesis Research.** Prerequisite: Admission to candidacy. Pass/Fail. 1-6 hours.

703, 704. **Human Physiology I, II.** Human physiological systems and associated biomedical engineering applications; control systems approach to fundamental concepts. Prerequisite: Permission of instructor. 3 hours each.

707, 708. **Biomedical Instrumentation and Signal Processing I, II.** Bioelectric signals. Transduction devices and processes; analog and digital signal processing; system response characteristics. Prerequisite: BME 630. 3 hours each.

710-712. **Biomaterials.** Metals, ceramics, polymers, The objective of these courses is to introduce students to a wide range of metallic, ceramic and polymeric materials used for biomedical applications. These courses will cover physical, chemical, and mechanical properties of biomaterials. Prerequisite: Permission of instructor. Variable credit.

798. **Nondissertation Research.** Pass/Fail. 1-6 hours.

799. **Dissertation Research.** Prerequisite: Admission to candidacy. Pass/Fail. 1-6 hours.

Engineering, Civil (M.S.C.E., Ph.D.*)

* The Ph.D. is offered through a joint program with the University of Alabama in Huntsville.

Graduate program director: *Fouad*

Primary Faculty

Shen-en Chen, Assistant Professor (Civil and Environmental Engineering); Geotechnical Engineering, Soil Structure Interaction, Nondestructive Testing, Soil Dynamics, Foundation Design

Shirley E. Clark, Assistant Professor (Civil and Environmental Engineering); Environmental Engineering, Environmental Health Engineering and Research

James S. Davidson, Associate Professor (Civil and Environmental Engineering); Structural Engineering, Structural Mechanics, Numerical Methods, Structural Dynamics, Bridge Design

Norbert J. Delatte, Associate Professor (Civil and Environmental Engineering); Transportation Engineering, Structural Design and Analysis, Concrete and Construction Materials, Infrastructure Nondestructive Testing and Rehabilitation

Fouad H. Fouad, Chair and Professor (Civil and Environmental Engineering); Structural Engineering, Prestressed Concrete, Concrete Materials, By-Products Utilization, Computer Applications

Steven L. Jones, Jr., Assistant Professor (Civil and Environmental Engineering); Transportation Engineering, Traffic Engineering

Melinda M. Lalor, Associate Professor (Civil and Environmental Engineering); Environmental Engineering, Surface Water Quality, Watershed Management, Pollution Prevention, Sustainable Development

Robert W. Peters, Associate Professor (Civil and Environmental Engineering); Environmental Engineering, Water and Wastewater Treatment, Physical/Chemical Treatment, Soil and Ground Water Remediation, Sonication/Acoustic Cavitations, Advanced Oxidation Processes, Water Chemistry

Virginia P. Sisiopiku, Associate Professor (Civil and Environmental Engineering); Traffic Engineering, Intelligent Transportation Systems, Traffic Operations, Traffic Safety

Nasim Uddin, Assistant Professor (Civil and Environmental Engineering); Structural Engineering, Structural Dynamics, Infrastructure Rehabilitation, Hazard Mitigation

Jianmin Wang, Assistant Professor (Civil and Environmental Engineering); Environmental Engineering, Water and Wastewater Treatment, Water Chemistry and Interfacial Phenomenon, Fate and Transport of Pollutants in Natural and Engineered

Secondary Appointment Faculty

Joseph H. Appleton, Distinguished Service Professor (Civil and Environmental Engineering); Structural Engineering, Structural Mechanics, Computer Methods in Design

Heng Ban, Associate professor (Mechanical Engineering); Pollution Control, Combustion, Thermal-Fluid Science

Kenneth Dillon, Associate Professor (Environmental Health Sciences); Water Chemistry, Air Pollution

Alan Eberhardt, Associate Professor (Biomedical Engineering); Solid Mechanics, Biomechanics, Analytical and Numerical Methods

Jay Goldman, Professor (Engineering); Industrial Engineering, Injury Control, and Transportation Systems

Reidar K. Oestenstad, Associate Professor (Environmental Health Sciences); Industrial Hygiene

Loring Rue, Professor (Department of Surgery); Chief, Section of Trauma, Burns, and Surgical Critical Care (Injury and Crash Injury research)

Edmund P. Segner, Jr., Professor Emeritus, (Civil and Environmental Engineering); Structural Engineering, Structural Mechanics

Admission Requirements

In addition to the Graduate School admission requirements, requirements for admission to the program leading to the Master of Science in Civil Engineering degree include the following five criteria:

1. An undergraduate engineering degree from a program accredited by the Accreditation Board for Engineering and Technology. Applicants who do not meet this criterion but who have an outstanding academic record in an

engineering degree program not accredited by ABET, or in a baccalaureate degree program in a related field, may be admitted on probation. Students admitted in this category will be required to complete a sequence of undergraduate courses in addition to the normal requirements of the M.S.C.E. degree. This set of extra requirements will be specified in writing at the time of admission to the program.

2. 3.0 (A = 4.0) or better GPA in all undergraduate degree major courses attempted;
3. Three letters of evaluation concerning the applicant's previous academic and professional work; and
4. Submission of scores achieved on the GRE General Test. Admission to the program is competitive and is based on all available evidence; for admission in good academic standing, scores above 500 on each component of GRE General Test are preferred. Minimum scores of 550 on the TOEFL and a 3.5 on the TWE are also required for those applicants whose native language is not English. These test scores will be used primarily if an applicant fails to meet minimum standards for admission in good standing and is being considered for admission on probation.
5. Verification of registration by examination as a Professional Engineer (P.E.) will satisfy criteria 2, 3, and 4 above.

M.S.C.E. Program Requirements

The following minimum requirements apply to the plan of study for a student who has earned a baccalaureate degree in civil engineering. A student with an undergraduate degree in another field may also be accepted into the civil engineering program but will normally have to take additional preparatory coursework as part of an expanded plan of study. Continuous enrollment for at least 3 units per term is required. Enrollment in CE 641/741 is required during the academic year.

Plan I (Thesis Option)

In addition to the general Graduate School requirements, the student must successfully complete at least 24 semester hours of coursework, including:

1. A minimum of 18 semester hours in civil engineering; and up to 6 semester hours in disciplines outside civil engineering, such as other engineering disciplines, mathematics, earth science, physics, urban affairs, or public health.
2. The student must pass a comprehensive examination on the content of the program. This examination may be written, oral, or both and shall include an oral defense of a thesis. A student choosing this option must register for at least 9 semester hours of CE 699, Master's Thesis Research, in addition to the 24 semester hours of coursework.

Plan II (Nonthesis Option): Research/Design Emphasis

1. The student must successfully complete at least 33 semester hours of coursework, including:
 - a) A minimum of 24 semester hours in civil engineering;
 - b) Six semester hours in courses having mathematical or science emphasis. This may include courses from other engineering disciplines, such as mathematics, earth sciences, physics, chemistry, or public health; and

- c) A minimum 3 hours of independent study under the direction of the graduate study committee chair, resulting in an acceptable written report (this requirement may involve registration for CE 691 and/or CE 698).
2. The student must pass a comprehensive examination on the content of the program. This examination may be written, oral, or both and shall include an oral defense of the independent study project.

Plan II (Nonthesis Option):

Technology/Engineering Management Emphasis

1. The student must successfully complete at least 33 semester hours of coursework, including the following:
 - a) 12 semester hours in a specific specialization program area of civil engineering;
 - b) 6 semester hours in one of the following two mathematical application areas: MBA 660 and MBA 661 or MBA 660 and an advanced applied mathematics course;
 - c) 12 semester hours in the Engineering Management concentration area, which may be satisfied from among the following courses: CE 658, CE 631, MBA 609, MBA 610, MBA 611, MBA 632; MBA 640, or an approved course in Engineering Management; and
 - d) 3 semester hours in a nonthesis design project (usually undertaken after completion of all courses). This may be satisfied by registration in CE 691 or CE 698.
2. The student must pass a comprehensive examination on the content of the program. This examination may be written, oral, or both and shall include an oral defense of the independent study project.

Areas of Specialization

Specialization programs are available in the fields of environmental engineering, structural engineering/structural mechanics, and transportation engineering. Supporting courses are offered in geotechnical engineering, optimization, and other areas. Enrollment in the Civil and Environmental Engineering Seminar series (CE 641/741) will be expected of all graduate students.

Required Courses for Specialization in Environmental Engineering

In addition to the M.S.C.E. program requirements, the following undergraduate classes (plus all associated prerequisites) are generally required of all M.S.C.E. students specializing in environmental engineering:

- CE 236 Environmental Engineering
- CE 336 Hydraulics
- CE 344 Civil Engineering Analysis
- CE 480 Introduction to Water and Wastewater Treatment

Required Courses for Specialization in Structural Engineering/Structural Mechanics

In addition to the M.S.C.E. program requirements, the following undergraduate classes (plus all associated prerequisites) are generally required of all M.S.C.E. students specializing in structural engineering/structural mechanics:

- CE 332 Soil Engineering
- CE 344 Civil Engineering Analysis
- CE 360 Structural Analysis
- CE 450 Structural Steel Design

CE 455 Reinforced Concrete Design

Required Courses for Specialization in Transportation Engineering

In addition to the M.S.C.E. program requirements, the following undergraduate classes (plus all associated prerequisites) are generally required of all M.S.C.E. students specializing in transportation engineering:

- CE 344 Civil Engineering Analysis I
- CE 345 Transportation Engineering

Ph.D. Programs

The two following Ph.D. programs are offered by the Department of Civil and Environmental Engineering.

1. **Ph.D. Program in Civil Engineering**—This is a joint program with the University of Alabama in Huntsville. A typical student entering the program would already have a degree in Civil engineering. Students with outstanding records in related fields or from a nonaccredited engineering program will be considered for admission on conditional standing, and must remedy deficiencies in their preparation after the start of their academic program. They may then be granted unconditional standing in the doctoral program.

The program requires 48 credit hours of classroom work, plus 24 credit hours of dissertation research beyond the baccalaureate level.

A comprehensive examination is required of all doctoral candidates. This examination is given after (a) all course work is completed; and (b) the student's Supervisory Committee, which consists of faculty representatives from both campuses deems the student to have adequate preparation in the major and minor fields of study. The examination is conducted by the student's Supervisory Committee and administered on the resident campus. The Comprehensive Examination may only be taken twice.

2. **Ph.D. Program in Environmental Health Engineering**—This unique, interdisciplinary program takes advantage of UAB's diversified engineering school, and nationally renowned health sciences center, to produce Ph.D. candidates cross-trained in public health and environmental engineering from a variety of disciplines. The program provides students with an understanding of basic mechanisms through which agents alter environmental, human, and ecosystem health, and the skills needed to evaluate and implement remediation for environmental problems, in the context of engineering and public health.

For more detailed information, please refer to the listing under Engineering, Environmental Health, or contact Dr. Melinda M. Lalor, Program Director for Environmental Health Engineering, 210C Hoehn Engineering Building, 1075 13th Street South, telephone (205) 934-8438, e-mail mlalor@uab.edu

CEE Specialty Certificate Program

Category A certificates are offered by the Civil and Environmental Engineering Department. These certificates are listed on student transcripts and in the university graduation bulletin. Certificates can be earned in:

- Environmental Engineering
- Geotechnical Engineering

- Structural Engineering
- Transportation Engineering

Civil Engineering (BSCE) graduates who complete the Certificate Program will have greater depth in specific technical areas. The certificates also allow a means for practicing engineers to acquire expertise beyond a Bachelor degree, and have it formally recognized, without completing a program leading to a master's degree. This technical expertise will enhance their proficiency and marketability. Courses taken for a certificate may be applied to a MSCE degree.

Students must be admitted to the Department as either undergraduate or graduate students (BSCE or MSCE program).

Certificates require a minimum of 15 semester hours. They consist of one required course (which will also count toward the BSCE degree at UAB) and four elective courses.

For more information, please contact Dr. Norbert J. Delatte, Ph.D., P.E., Program Coordinator, 331C Hoehn Engineering Building, 1075 13th Street South, Telephone 205-934-8436, e-mail ndelatte@eng.uab.edu.

Additional Information

For detailed information, contact Dr. Fouad H. Fouad, Chair or Jennifer A. Vinson, Administrative Associate, UAB Department of Civil and Environmental Engineering, HOEN 140, 1530 3rd Ave. S., Birmingham, AL 35294-4440. Physical location: 140 Hoehn Building, 1075 13th Street South.

Telephone 205-934-8430

E-mail ffouad@eng.uab.edu

Web www.eng.uab.edu

Course Descriptions

Unless otherwise noted, all courses are for 3 semester hours of credit. Course numbers preceded with an asterisk indicate courses that can be repeated for credit, with stated stipulations.

Civil Engineering (CE)

Environmental Engineering

530. Water Supply/Drainage Design. Water requirements; wastewater characteristics. Hydraulics and design of sewers; distribution, and reuse of water. Development of water supplies; design considerations. Prerequisite: CE 336

531. Environmental Law. Law as it applies to the practicing environmental engineer. New and emerging regulations.

533. Solid and Hazardous Waste Management. Waste generation, characterization and regulations, waste reduction and recycling strategies, disposal and treatment options. 3 hours.

537. Environmental Experimental Design and Field Sampling. Experimental design, sensitivity analyses, water sampling, and flow monitoring. Receiving water chemical reactions. Field investigations. Lecture and laboratory. Prerequisite: CE 335.

539. Sediment Sources and Controls. Erosion and sediment transport in urban areas; design of common erosion control practices. Prerequisite: CE 333.

580. Introduction to Water/Wastewater Treatment. Physical unit operations, and chemical and biological unit processes for water and wastewater treatment. Design of facilities for treatment, treatment and disposal of sludge. Prerequisite: CE 336

581. Environmental Chemistry. Chemical equilibrium, acid/base, chemical concepts in pollutant behavior. Chemical kinetics, redox system, hydrolysis; pesticides, chemical wastes. Prerequisite: CE 638.

586. Engineering Hydrogeology. Groundwater movement, natural quality, contamination, and restoration. Well hydraulics and flow net analysis. Prevention of groundwater contamination. Prerequisite: CE 333.

632. Industrial Water and Wastewater Treatment. Solid wastes and wastewaters from various industries. Assessment of treatability, system design, and equipment selection. Prerequisite: CE 335.

634. Air Quality Modeling and Monitoring. Atmospheric pollutants; effects, reactions, and sources. Air pollution meteorology and dispersion modeling. Ambient monitoring. Prerequisite: ME 311

636. Stormwater Water Pollution Management. Quality and quantity of stormwater. Receiving water problems and sources of pollutants. Runoff quality and quantity characterizations. Erosion control. Selection and design of controls; regulations.

638. Water and Wastewater Chemistry. Aquatic chemistry. Chemical behavior of pollutants in receiving waters. Fate of common pollutants. Chemical kinetics in natural waters. Photochemical reactions. Modeling of wastewater discharges. Prerequisite: ENH 601 or CH 235.

639. Sediment Sources and Controls. Erosion and sediment transport in urban areas; design of common erosion control practices. Prerequisite: CE 333.

640. Wastewater Treatment Engineering. Wastewater sources and characteristics. Design and operation of wastewater treatment facilities, including grit removal, oil and grease removal, dissolved air floatation, activated sludge process, trickling filters, and rotating biological contactors, stabilization ponds and aerated lagoons, anacrobic processes for wastewater treatment and sludge digestion. Ultimate disposal of wastewater residues and considerations of discharge criteria. Prerequisite: CE 335.

681. Environmental Chemistry. Chemical equilibrium, acid/base, chemical concepts in pollutant behavior. Chemical kinetics, redox system, hydrolysis; pesticides, chemical wastes. Prerequisite: CE 638.

682. Water Treatment Engineering. Water sources and characteristics. Design and operation of water treatment facilities including lime softening operations, coagulation, flocculation, clarification, dissolved air floatation, filtration, disinfection, absorption, ion exchange, and sludge disposal. Prerequisite: CE 335 and CE 638.

683. Water and Wastewater Treatment Unit Processes Laboratory. Construction and evaluation of bench-scale treatment processes. Treatability of water and wastewater. Coagulation of sedimentation, settleability of biological sludges, aerobic biological treatment, chemical treatment, water softening toxicity, disinfection; and sludge treatment processes. Prerequisite: CE 640 or 682 (either as requisites or taken concurrently).

685. Engineering Hydrology. Hydrologic principles: hydrologic cycle, precipitation data, stream flow measurements. Applications to engineering problems: stream flow analysis, watershed management.

732. Industrial Water and Wastewater Treatment. Solid wastes and waste waters from various industries; as-

assessment of treatability, system design and equipment selection. Prerequisite: CE 335.

734. Air Quality Modeling and Monitoring. Atmospheric pollution phenomena, including transport and mixing, chemistry of gases and particles, and deposition. Methods for air quality management are described, including modeling and monitoring. Prerequisites: ME 311, ME 241, or permission of instructor.

736. Stormwater Pollution Management. Quality and quantity of urban stormwater. Receiving water problems and sources of pollutants. Runoff quality and quantity characterizations. Erosion control. Selection and design of controls; regulations. Prerequisite: CE 333.

738. Water and Wastewater Chemistry. Aquatic chemistry. Chemical behavior of pollutants in receiving waters. Fate of common pollutants. Chemical kinetics in natural waters. Photochemical reactions. Modeling of wastewater discharges. Prerequisite: ENH 601 or CH 235.

740. Wastewater treatment Engineering. Wastewater sources and characteristics. Design and operation of wastewater treatment facilities, including grit removal, oil and grease removal, dissolved air floatation, activated sludge process, trickling filters, and rotating biological contactors, stabilization ponds and aerated lagoons, anaerobic processes for wastewater treatment and sludge digestion. Ultimate disposal of wastewater residues and considerations of discharge criteria. Prerequisite: CE 335.

782. Water Treatment Engineering. Water sources and characteristics. Designs and operation of water treatment facilities including lime softening operations, coagulation, flocculation, clarification, dissolved air flotation, filtration, disinfection, adsorption, ion exchange, and sludge disposal. Prerequisite: CE 335 and CE 638.

783. Water and Wastewater Treatment Unit Processes Laboratory. Construction and evaluation of bench-scale treatment processes. Treatability of water and wastewater. Coagulation of sedimentation, settleability of biological sludges, aerobic biological treatment, chemical treatment, water softening toxicity, disinfection, sludge treatment processes. Prerequisite: CE 640 or CE 682 (either as requisites or taken concurrently).

Structural Engineering and Structural Mechanics

520. Advanced Mechanics. Variation of stress at a point, including determination of principal and maximum shear stress. Basic of symmetrical deformation; thick-wall cylinders, sphere, rotating disk. Noncircular torsion sections. Curved beams. Failure theories. Unsymmetrical bending, shear center. Prerequisites: CE 220.

526. Foundation Engineering. Application of principles of soil mechanics to determine bearing capacity and settlement of spread footings, mats, single piles and pile groups; site investigation, evaluate data from field and laboratory tests; estimate stresses in soil masses; lateral resistance of piles and pile group; retaining walls, sheetpiles and coffer-dams. Prerequisite: CE 332.

553. Design of Wood Structures. This course will address design and detailing of timber structures. Properties and specifications for dimension and glulam timbers. Design of beams, columns, beam-columns, connections (nails and bolts), roof diaphragms, and shear walls. Design of timber structures

to meet the requirements of the National Design Specification standards. Prerequisite: CE 360

554. Design of Masonry Structures. Design and detailing of masonry structures. Nomenclature, properties, and specifications for components. Design of assemblages, simple masonry structures, unreinforced and reinforced elements, and complex masonry structures.

556. Prestressed Concrete Design. Principles and concepts of design in prestressed concrete including elastic and ultimate strength analyses for flexural, shear, bond, and deflection. Principles of concordancy and linear transformation for indeterminate prestressed structures. Prerequisite: CE 455.

557. Concrete Technology. Properties of concrete in relation to specifying, purchasing and evaluating concrete materials. Fresh and hardened concrete properties. Concrete mix design procedures. Effects of finishing, curing, weather conditions, and various construction procedures. Ready mix concrete production and field placement techniques. Specification writing to ensure good quality concrete and field inspection procedures. Case studies of problems in concrete construction.

561. Introduction to the Finite Element Method. Concepts and applications of the finite element method. Development and applications of basic finite elements. Software use. Prerequisite: CE 220 and CE 360.

564. Structural Dynamics. Dynamic analysis of single and multiple degree-of-freedom systems. Lumped and consistent mass methods. Approximate design methods. Matrix methods of solution emphasizing earthquake design. Prerequisites: CE 215 and 360.

567. Wind and Seismic Loads. Methods of calculating loads on structures caused by extreme winds and earthquakes. Calculation of wind loads on various types of structures according to theory and code. Determination of earthquake loads on structures using structural dynamics and codes. Prerequisite: CE 360.

568. Bridge Engineering. Bridge loads, steel beam bridges, composite beam bridges, bridge bearings, reinforced and prestressed concrete slab and T-beam bridges, bridge evaluations and ratings, upgrade methodologies, computer applications. Prerequisites: CE 450 and CE 455.

612. Theory of Elasticity. Equations of linear reduction to plane stress, plane strain, and generalized plane strain. Airy and Love stress functions in solution of problems. Prerequisite: CE 220.

615. Theory of Elastic Stability. Static stability of bars, beams, trusses, and rigid frames. Dynamic stability of bars. Energy method applied to buckling problems. General theory of elastic stability. Prerequisite: CE 220.

616. Mechanical Vibrations. Free and forced single-degree-of-freedom systems. Multiple-degree-of-freedom systems. Damped, forced two-degree-of-freedom systems. Simple continuous systems. Prerequisites: CE 215 and CE 220.

617. Theory of Plates and Shells. Linear theory and solutions of plates of various shapes. Large deflection theory and solutions of rectangular and circular plates. Membrane and bending theories of shells. Solutions of problems in conical, cylindrical, and spherical shells. Prerequisite: CE 220.

650. Advanced Structural Steel Design. Beams, columns, tension members, and connections; current research. Prerequisite: CE 450.

655. Advanced Reinforced Concrete. Beam, column, and slab actions; current research. Prerequisite: CE 455.

660. Structural Mechanics. Elastic beam deflections, beam columns, lateral torsional buckling, column stability, plastic design, plate bending, yield line theory. Prerequisite: CE 360.

662. Advanced Structural Analysis. Analysis of indeterminate structures using classical and matrix methods. Use of large-scale computer programs. Prerequisite: CE 360.

663. Finite Element Methods. Theory and applications in structural mechanics. Plane stress, plane strain, axisymmetric problems, solids, plates, shells, nonlinear systems. Prerequisite: CE 561 or CE 661.

664. Structural Dynamics. Dynamic analysis of single and multiple degree-of-freedom systems. Lumped and consistent mass methods. Approximate design methods. Matrix methods of solution emphasizing earthquake design. Prerequisites: CE 215 and 360.

668. Bridge Engineering. Bridge loads, steel beam bridges, composite beam bridges, bridge bearings, reinforced and prestressed concrete slab and T-beam bridges, bridge evaluations and ratings, upgrade methodologies, computer applications. Prerequisites: CE 450 and CE 455.

712. Theory of Elasticity. Equations of linear reduction to plane stress, plane strain, and generalized plane strain. Airy and Love stress functions in solution of problems. Prerequisite: CE 220.

715. Theory of Elastic Stability. Static stability of bars, beams, trusses, and rigid frames. Dynamic stability of bars. Energy method applied to buckling problems. General theory of elastic stability. Prerequisite: CE 220.

716. Mechanical Vibrations. Free and forced single-degree-of-freedom systems. Multiple-degree-of-freedom systems. Damped, forced two-degree-of-freedom systems. Simple continuous systems. Prerequisites: CE 215 and CE 220.

717. Theory of Plates and Shells. Linear theory and solutions of plates of various shapes. Large deflection theory and solutions of rectangular and circular plates. Membrane and bending theories of shells. Solutions of problems in conical, cylindrical, and spherical shell. Prerequisite: CE 220.

750. Advanced Structural Steel Design. Beams, columns, tension members, and connections; current research. Prerequisite: CE 450.

755. Advanced Reinforced Concrete. Beam, column, and slab actions; current research. Prerequisite: CE 455.

763. Finite Element Methods. Theory and applications in structural mechanics. Plane stress, plane strain, axisymmetric problems, solids, plates, shells, nonlinear systems. Prerequisite: CE 561.

Transportation, Materials, and Supporting Courses

549. Engineering Liability. Laws related to liability for engineering design in the context of products liability and construction projects; roles and liabilities between various parties involved in construction projects.

557. Concrete Technology. Properties of concrete in relation to specifying, purchasing, and evaluating concrete materials. Fresh and hardened concrete properties. Concrete mix design procedures. Effects of finishing, curing, weather conditions, and various construction procedures. Ready-mix concrete production and field placement techniques. Specification writing to ensure good quality concrete and field inspection procedures. Case studies of problems in concrete construction. Prerequisite: CE 222.

558. Engineering Management. Management techniques for the practicing engineer.

611. Facilities Engineering. General engineering project planning, applying codes and standards, preliminary design, economic forecasting, environmental planning and reports, site selection, population displacement, spare cash flow, specifications and plans.

641. Civil and Environmental Engineering Graduate Seminar. Seminar focusing on student research and guest presentations of various topics of interest to Civil and Environmental Engineering students. 1 hour.

642. Highway Materials and Construction. Properties of materials used in highway construction. Construction methods and management. Prerequisite: CE 345.

643. Pavement Design and Construction. Analysis of stresses and strains in pavement systems. Design and construction of flexible and rigid pavement systems. Effects of loading on pavement life. Prerequisites: CE 345.

644. Civil Engineering Analysis II. Sampling and experimental design. Hypotheses testing. Decision analyses. Multiple regression analyses. Nonparametric methods. Analysis of experimental data in civil engineering research; hypothesis testing, regression, experimental design, nonparametrical analysis. Prerequisite: CE 344.

645. Traffic Engineering Characteristics. Characteristics of vehicle, driver, and traffic stream. Highway and intersection capacity, theory of traffic flow, traffic safety. Prerequisite: CE 345.

646. Traffic Engineering Operations. Traffic signal timing and phasing, coordination, signal networks, freeway operations, nonsignalized traffic control techniques. Prerequisite: CE 645.

647. Engineering Optimization and Modeling. Mathematical techniques for analysis of systems. Project scheduling, optimization, and simulation applied to civil engineering system analysis. Prerequisite: EE 132 or equivalent.

648. Urban and Transportation Planning. Land use planning for transportation systems; trip generation, trip distribution, and traffic assignment. Prerequisite: CE 345.

693. Applied Research in Civil and Environmental Engineering. Research tools, including elements of experimental design and proposal preparation. Effective communication, literature searches, and exploratory data analysis. Prerequisite: Permission of instructor.

741. Civil and Environmental Engineering Graduate Seminar. Seminar focusing on student research and guest presentations of various topics of interest to Civil and Environmental Engineering students. Mandatory enrollment for all Civil and Environmental Engineering students. 1 hour.

Other Courses

690. Special Topics in (Area). 1-4 hours.

691. Individual Study in (Area). 1-4 hours.

698. Nonthesis Research. 1-6 hours.

699. Thesis Research. Prerequisite: Admission to candidacy. 1-6 hours.

790. Special Topics in (Area). 1-4 hours.

791. Individual Study in (Area). 1-4 hours.

798. Nondissertation Research. 1-6 hours.

799. Doctoral Dissertation. Prerequisite: Admission to candidacy. 1-6 hours.

Engineering, Computer (Ph.D.)

Graduate program director: *Jannett*

Faculty

Dale W. Callahan, Assistant Professor (Electrical and Computer Engineering); Wireless Communications, Digital Signal Processing, Telecommunications.

David A. Conner, Professor Emeritus (Electrical and Computer Engineering); Electrical Networks, Electromagnetics, Mathematical Modeling of Electrical Phenomena

David G. Green, Instructional Associate Professor (Electrical and Computer Engineering); Computer Networking, Software Engineering, Computer Applications

Gary J. Grimes, Wallace R. Bunn Chair of Telecommunications and Professor (Electrical and Computer Engineering); Telecommunications, Optics, Photonics, Switching

Henry J. Holley, Professor Emeritus (Electrical and Computer Engineering); Electric Power Systems

Thomas C. Jannett, Professor (Electrical and Computer Engineering); Control Systems, Biomedical Instrumentation, Modeling and Simulation

James R. Jones, Associate Professor (Electrical and Computer Engineering); Commercial/Industrial and Utility Power Systems

Warren T. Jones, Professor (Computer and Information Sciences); Knowledge Discovery and Data Mining and Bioinformatics

Dennis G. Smith, Associate Professor (Electrical and Computer Engineering); Computer Systems, Computer Graphics, Neural Networks, Digital Control

Murat M. Tanik, Professor (Electrical and Computer Engineering); Software Systems Engineering, Integrated Systems Design, Process Engineering

Gregg L. Vaughn, Associate Professor and Chair (Electrical and Computer Engineering); Digital Signal Processing, Applications of Microprocessors, Digital Communications

See the graduate catalog of the University of Alabama at Huntsville (UAH) for the faculty of that university.

Program Information

The Ph.D. program in computer engineering is shared with the University of Alabama in Huntsville (UAH) allowing for both UAB and UAH to contribute to the program.

Admission Requirements

Each application will be reviewed on an individual basis in view of multiple factors including grades, GPA, prior academic experience, references, independent and supervised research, and test scores. Successful applicants are generally expected to present a combined score of over 1,800 on the verbal, quantitative, and analytical sections of the Graduate Record Examination (GRE).

Requirements for admission to the computer engineering Ph.D. program include the following:

1. A bachelor's degree in an accredited electrical or computer engineering program or a bachelor's degree in a related program acceptable to the graduate faculty in Electrical and Computer Engineering;
2. A score of at least 550 on each of the three sections (verbal, quantitative, and analytical) of the Graduate Record Examination (GRE);

3. A score of at least 500 on the TOEFL examination for international students whose native language is not English;
4. An overall GPA of at least 3.0 on a 4.0 point scale, or at least 3.0 for the last 60 semester hours completed; and
5. Three letters of evaluation concerning the applicant's previous academic and professional work.

Conditional admission may be given to students who fail to meet one or more of the requirements for unconditional admission. Students having a bachelor's degree in a field not related to electrical or computer engineering may be required to complete prerequisite courses.

Program Requirements

The course of study leading to the Ph.D. in computer engineering includes a minimum of 60 semester hours of course work beyond the bachelor's degree (excluding dissertation research). A student's advisory committee may allow appropriate course work pursued in completing a master's degree to be counted towards the 60 hour requirement, but a maximum of nine semester hours credit in thesis/ research work from the master's degree may be allowed to count toward the 60 hour requirement for the Ph.D. Requirements include the following:

1. A major consisting of a minimum of 18 semester hours of approved coursework in computer engineering;
2. A minor consisting of a minimum of 15 semester hours of approved coursework in mathematics, theoretical or formal methods as related to computer engineering;
3. A minor consisting of a minimum of 12 semester hours of approved coursework in electrical or computer engineering;
4. Additional coursework consisting of a minimum of 15 semester hours of approved coursework in supportive fields;
5. Successful completion of a preliminary examination;
6. Successful completion of a qualifying examination with a presentation of the dissertation topic;
7. A research dissertation consisting of a minimum of 18 semester hours in electrical and computer engineering; and
8. Successful completion of a final examination consisting of a presentation of the dissertation.

Additional Information

For detailed information, contact UAB Department of Electrical and Computer Engineering.

Telephone 205-934-8440

E-mail ecewebe@eng.uab.edu

Web www.eng.uab.edu

Course Descriptions

See the graduate catalog of the University of Alabama at Huntsville (UAH) for doctoral courses that university.

See the listing for the master's degree in electrical and computer engineering for courses at the 500 level.

Unless otherwise noted, all courses are for 3 semester hours of credit. Courses numbers preceded with an asterisk indicate courses that can be repeated for credit, with stated stipulations.

Electrical and Computer Engineering (EE)

601. **Electrical & Computer Engineering Seminar.** Consists of research presentations and colloquia delivered by faculty, research assistants, and invited guests in various state-of-the-art and popular topics related to Electrical and Computer Engineering. Maximum of 3 credit hours applicable toward M.S.E.E. degree. 1-3 hours.

610. **Technical Communication for Engineers.** Workshop-oriented course producing technical memoranda, proposals, and conference and/or refereed-journal papers with oral presentations related to these work products. Prerequisite: Graduate standing in Engineering and successful pretest performance.

621. **Random Variables and Processes.** Theory underlying analysis and design of communication, stochastic control, data gathering, and data analysis systems. Prerequisite: EE 421 or permission of instructor.

622. **Advanced Communication Theory.** Analysis of performance of analog modulation techniques in presence of noise. Prerequisites: EE 421 and 621, or permission of instructor.

624. **Digital Communications.** Design of digital communications systems. Prerequisites: EE 621 and 622.

625. **Coding and Information Theory.** Entropy, channels and channel capacity, RLL codes, error correcting codes, cyclic codes, cryptography, convolutional codes, trellis coded modulation. Prerequisite: graduate standing.

626. **Digital Image Processing.** Digital image processing fundamentals, image transformations, image enhancement, image restoration, image compression, image segmentation, and image presentation. Prerequisite: EE 423 or 523.

628. **Telecommunications I.** Advanced topics. Prerequisite: Permission of instructor.

629. **Telecommunications II.** Advanced topics. Prerequisite: Permission of instructor.

632. **Introduction to Computer Networking.** Computer networking and engineering standards related to networking. Network hardware, ethernet, token ring, ISDN, ATM, networking protocols including TCP/IP protocol suite, internet-working, LANs, and typical applications. Permission of instructor.

633. **Experiments in Computer Networking.** Detailed exploration of particular issues in network protocols and network application models. Development of series of programs to explore the details of network protocols and network application models. Prerequisite: EE 532 or permission of instructor.

634. **Introduction to Neural Networks.** Neural network topologies and learning algorithms with an emphasis on back propagation. Applications and limitations of networks. Designing networks for specific uses. Individual software project. Prerequisites: EE 210 or permission of instructor.

635. **Telecommunication Systems.** System organization and structure; data transmission. Prerequisite: Permission of instructor.

636. **Advanced Digital Design.** Large-scale class project. Sample topics include math coprocessors, text coprocessors, CRT controllers, and data encryption devices. Prerequisite: Permission of instructor.

637. **Computer Graphics I.** Graphic devices, drawing curves, interactive graphics, transforms, and three-dimensional

graphics. Projects involving hardware and software. Prerequisite: EE 337, or permission of instructor.

638. **Computer Graphics II.** Raster graphics, faces, coloring faces, hidden-surface elimination, ray tracing, and image enhancement. Projects involving hardware and software. Prerequisite: EE 637.

639. **Advanced Microprocessors.** Topics covering both hardware and software issues. Individual or group term project. Prerequisite: EE 438 or 538 or permission of instructor.

640. **Object-Oriented Design.** Study and practice of the object-oriented methodology for developing software designs. Implementation consequences. Application of object-oriented methodologies to specific problems using object-oriented language. Prerequisite: EE 233 or other software design experience using C, or permission of instructor.

641. **Modern Control I.** Sampled-data and discrete-time systems. State variable models, state feedback and estimation. Optimal control and estimation. Predictive control. Introduction to system identification. Prerequisite: EE 426 or permission of instructor.

642. **Modern Control II.** Selected advanced topics including intelligent and fuzzy control. Prerequisite: EE 641 or permission of instructor.

643. **System Identification and Adaptive Control.** Modeling of systems using structure identification, parameter estimation, and model validation. Controller design based on input-output models. Parameter adaptive control. Prerequisite: Permission of instructor.

650. **Software Engineering.** Introduces classical software lifecycles and software development paradigms. Proposal development and software design. Integrates experience from computer science, communication, systems engineering, and problem solving. Prerequisite: Permission of instructor.

651. **Software Engineering Large Systems I.** Notions of process and integrated system views. Software architecture and modeling are discussed and related to levels in Object Oriented Design. Java is used as the programming paradigm. Prerequisite: EE 650 or permission of instructor.

652. **Software Engineering Large Systems II.** Components are introduced as elements of software system implementations. Object-oriented design patterns and techniques are reviewed. Java components are used for programming. Prerequisites: EE 650 and EE 651 or permission of instructor.

657. **Enterprise Information Architecture Engineering.** Development and management of distributed computing including hardware, software, and communications. Prerequisite: Permission of instructor.

661. **Advanced Electrical Machinery I.** Synchronous machine theory. Prerequisites: EE 461 or 561, and 472 or 572, or permission of instructor.

662. **Advanced Electrical Machinery II.** Induction machine theory. Prerequisite: EE 661.

663. **Control of Synchronous Machines.** Prerequisite: Permission of instructor.

671. **Computer Applications in Power Systems.** Analysis of power systems operation. Prerequisite: Permission of instructor.

672. **Power System Overvoltages.** Events causing overvoltages; protection of system. Prerequisite: EE 472 or 572 or permission of instructor.

673. **Reliability of Power Systems.** Component reliability using standard industrial techniques. Prerequisite: EE 471 or 571 or permission of instructor.

674. **Economic Operation and Control of Power Systems.** Economic control of thermal generating stations and hydrothermal stations. Computer control of power systems. Prerequisite: EE 472 or 572, or permission of instructor.

682. **Multivariable Systems.** Analysis and design of multiple-output, multiple-input control systems. Prerequisite: Permission of instructor.

684. **Engineering Management of Information Resources.** Management of critical information and information intensive change, management of quality, information flow and use and process improvement. Permission of instructor.

685. **Advanced Engineering Operations.** Procedural, planning, and control aspects of engineering projects. Project management of teams. Prerequisite: Permission of instructor.

686. **Technical Entrepreneurship I.** Entrepreneurship and intrapreneurship in venture capital financed companies. Management teams are formed, and ventures are selected and simulated over an extended period of time. Prerequisite: Permission of instructor.

687. **Technical Entrepreneurship II.** Continuation of EE 686. Prerequisite: EE 686.

688. **Advanced Information Engineering.** Applications of information engineering in partnership with local industries. planning and problem solving or information engineering design. Prerequisite: Permission of instructor.

*690. **Special Topics in (Area).** Prerequisite: Permission of instructor. 1-12 hours.

*691. **Special Problems in (Area).** Prerequisite: Permission of instructor. 1-12 hours.

697. **Project. Project for Plan II Master's students.** Prerequisite: Permission of instructor. 3 hours.

*698. **Nonthesis Research.** 1-12 hours.

*699. **Thesis Research.** Thesis for Plan I Master's students. Prerequisite: Admission to candidacy. 1-12 hours.

701. **Electrical Engineering Seminar.** 1-3 hours.

724. **Digital Communications.** Design of digital communication systems. Prerequisites: EE 621 and 622.

725. **Coding and Information Theory.** Entropy, channels and channel capacity, RLL codes, error correcting codes, cyclic codes, cryptography, convolutional codes, trellis coded modulation. Prerequisite: graduate standing.

726. **Digital Image Processing.** Digital image processing fundamentals, image transformations, image enhancement, image restoration, image compression, image segmentation, and image presentation. Prerequisite: EE 623.

728. **Telecommunications I.** Advanced topics. Prerequisite: Permission of instructor.

729. **Telecommunications II.** Advanced topics. Prerequisite: Permission of instructor.

733. **Experiments in Computer Networking.** Detailed exploration of particular issues in network protocols and network application models. Development of series of programs to explore the details of network protocols and network application models. Prerequisite: EE 532 or permission of instructor.

734. **Introduction to Neural Networks.** Neural network topologies and learning algorithms with an emphasis on back propagation. Applications and limitations of networks. De-

signing networks for specific uses. Individual software project. Prerequisites: EE 210 or permission of instructor.

737. **Computer Graphics I.** Graphic devices, drawing curves, interactive graphics, transforms, and three-dimensional graphics. Projects involving hardware and software. Prerequisite: Permission of instructor.

738. **Computer Graphics II.** Raster graphics, faces, coloring faces, hidden-surface elimination, ray tracing, and image enhancement. Projects involving hardware and software. Prerequisite: EE 637 or 737.

740. **Object-Oriented Design.** Study and practice of the object-oriented methodology for developing software designs. Implementation consequences. Application of object-oriented methodologies to specific problems using object-oriented language. Prerequisite: EE 233 or other software design experience using C, or permission of instructor.

742. **Modern Control II.** Selected advanced topics including intelligent and fuzzy control. Prerequisite: EE 641 or permission of instructor.

743. **System Identification and Adaptive Control.** Modeling of systems using structure identification, parameter estimation, and model validation. Input/output models. Parameter adaptive control. Prerequisite: Permission of instructor.

747. **Distributed Control Systems.** Application of distributed control to process, integration, and operator interfaces. Prerequisite: Permission of instructor.

750. **Software Engineering.** Introduces classical software lifecycles and software development paradigms. Proposal development and software design. Integrates experience from computer science, communication, systems engineering, and problem solving. Prerequisite: Permission of instructor.

751. **Software Engineering Large Systems I.** Notions of process and integrated system views. Software architecture and modeling are discussed and related to levels in Object Oriented Design. Java programming is used as the programming paradigm. Prerequisite: EE 650 or 750 or permission of instructor.

752. **Software Engineering Large Systems II.** Components are introduced as elements of software system implementations. Object-oriented design patterns and techniques are reviewed. Java components are used for programming. Prerequisites: EE 650 or 750 and EE 651 or 751 or permission of instructor.

761. **Advanced Electrical Machinery I.** Synchronous machine theory. Prerequisites: EE 461 or 561 and 472 or 572, or permission of instructor.

762. **Advanced Electrical Machinery II.** Induction machine theory. Prerequisite: EE 661 or 761.

763. **Control of Synchronous Machines.** Prerequisite: Permission of instructor.

771. **Computer Applications in Power Systems.** Analysis of power systems operation. Prerequisite: Permission of instructor.

772. **Power System Overvoltages.** Events causing overvoltages, and protection of system. Prerequisite: EE 472 or 572, or permission of instructor.

773. **Reliability of Power Systems.** Component reliability using standard industrial techniques. Prerequisite: EE 471 or 571, or permission of instructor.

774. **Economic Operation and Control of Power Systems.** Economic control of thermal generating stations and

hydrothermal stations. Computer control of power systems. Prerequisite: EE 472 or 572, or permission of instructor.

782. **Multivariable Systems.** Analysis and design of multiple-output, multiple-input control systems. Prerequisite: Permission of instructor.

*790. **Special Topics in (Area).** 1-12 hours.

*791. **Individual Study in (Area).** 1-12 hours.

*798. **Nondissertation Research.** 1-12 hours.

*799. **Dissertation Research.** Prerequisite: Admission to candidacy. 1-12 hours.

Engineering, Electrical (Ph.D.*, M.S.E.E.)

* Degree awarded by either the University of Alabama or the University of Alabama in Huntsville.

Graduate program director: *Jannett*

Faculty

Dale W. Callahan, Assistant Professor (Electrical and Computer Engineering); Wireless Communications, Digital Signal Processing, Telecommunications.

David A. Conner, Professor Emeritus (Electrical and Computer Engineering); Electrical Networks, Electromagnetics, Mathematical Modeling of Electrical Phenomena

David G. Green, Instructional Associate Professor (Electrical and Computer Engineering); Computer Networking, Software Engineering, Computer Applications

Gary J. Grimes, Wallace R. Bunn Chair of Telecommunications and Professor (Electrical and Computer Engineering); Telecommunications, Optics, Photonics, Switching

Henry J. Holley, Professor Emeritus (Electrical and Computer Engineering); Electric Power Systems

Thomas C. Jannett, Professor (Electrical and Computer Engineering); Control Systems, Biomedical Instrumentation, Modeling and Simulation

James R. Jones, P.E., Associate Professor (Electrical and Computer Engineering); Commercial/Industrial and Utility Power Systems

Warren T. Jones, Professor (Computer and Information Sciences); Knowledge Discovery and Data Mining and Bioinformatics

Dennis G. Smith, Associate Professor (Electrical and Computer Engineering); Computer Systems, Computer Graphics, Neural Networks, Digital Control

Murat M. Tanik, Professor (Electrical and Computer Engineering); Software Systems Engineering, Integrated Systems Design, Process Engineering

Gregg L. Vaughn, Associate Professor and Chair (Electrical and Computer Engineering); Digital Signal Processing, Applications of Microprocessors, Digital Communications

Program Information

M.S.E.E. Program Admission Requirements

Requirements for admission to the electrical engineering master's degree program include the following:

1. A bachelor's degree in electrical or computer engineering. Applicants not holding an electrical or computer engineering B.S. degree will be considered for probationary admission on an individual basis. If admitted, student will be advised of measures necessary to correct deficiencies;

2. A 3.0 (A = 4.0) or better GPA in all junior and senior electrical and computer engineering and mathematics courses attempted;
3. Three letters of evaluation concerning the applicant's previous academic and professional work; and
4. An acceptable score on the GRE General Test and the TOEFL, if applicable.

(Verification of registration by examination as a Professional Engineer [P.E.] will satisfy Admission Criteria 3 and 4.)

M.S.E.E. Program Requirements

Assuming that a student possesses appropriate academic preparation for this degree, 33 semester hours of course work will be required beyond the bachelor's degree. This work must be distributed as follows:

Plan I (Thesis Option)

1. Twelve semester hours of graduate-level courses appropriate to the student's area of technical specialization;
2. Six semester hours of graduate-level courses in an area related to the student's area of technical specialization; and
3. Six semester hours of courses having a mathematical emphasis; and
4. Successful completion and oral defense of a thesis developed through registration for at least nine semester hours of EE 699.

Plan II (Nonthesis Option)

1. Twelve semester hours of graduate-level courses appropriate to the student's area of technical specialization;
2. Twelve semester hours of graduate-level courses in an area related to the student's area of professional emphasis (these courses may address technical subjects or subject matter appropriate to an emphasis in engineering management);
3. Six semester hours of courses having a mathematical emphasis;
4. Successful completion of a project developed through registration for at least 3 semester hours of EE 697; and
5. Successful completion of an examination on the project.

Ph.D. Program

UAB cooperates in programs leading to the Ph.D. in electrical engineering awarded by the University of Alabama (Tuscaloosa) or by the University of Alabama in Huntsville. The student's advisory committee will be composed of faculty from the UAB graduate program in electrical engineering, together with graduate faculty from the cooperating institution. In determining the student's program, the advisory committee will consider the student's academic objectives and background. Coursework may be taken at UAB, the cooperating institution, or both.

Cooperative Ph.D. Admission Requirements

Requirements for admission to the electrical engineering Ph.D. degree program include the following:

1. A bachelor's degree from an ABET-accredited electrical or computer engineering program or a program deemed by the Electrical and Computer Engineering graduate faculty to be equivalent *and* a master's degree in electrical or computer engineering that contains appropriate preparatory course work to pursue the Ph.D. Degree;

2. A 3.5 (A = 4.0) or better GPA in all master's degree course work attempted; and
3. An acceptable score on the GRE General Test. Verification of registration by examination as a Professional Engineer will satisfy this criterion.

Cooperative Ph.D. Program Requirements

A minimum of 74 semester hours of course work will be required beyond the bachelor's degree. Requirements include the following:

1. A minimum of 24 semester hours of graduate-level courses (with sufficient depth) appropriate to the student's area of technical specialization (defined as the Major);
2. A minimum of 12 semester hours for The University of Alabama program and a minimum of 15 semester hours for The University of Alabama in Huntsville program of graduate-level courses (with sufficient depth) in an area related to the student's area of technical specialization (defined as Minor 1);
3. A minimum of 12 semester hours of approved courses having a mathematical emphasis (defined as Minor 2);
4. Two semester hours of graduate seminar through registration for EE 701;
5. Successful completion of written and/or oral examinations, as required, encompassing all program coursework; and
6. Successful completion and oral defense of a dissertation developed through registration for at least 24 semester hours of EE 799.

Note: The above statements reflect minimum degree requirements for the cooperative Ph.D. program with the University of Alabama. The program associated with the University of Alabama in Huntsville carries the additional requirement of competency in a foreign language or demonstration of an alternate area of research competency.

Additional Information

For detailed information, contact UAB Department of Electrical and Computer Engineering.

Telephone 205-934-8440

E-mail ecewebe@eng.uab.edu

Web www.eng.uab.edu

Course Descriptions

Unless otherwise noted, all courses are for 3 semester hours of credit. Courses numbers preceded with an asterisk indicate courses that can be repeated for credit, with stated stipulations.

Electrical and Computer Engineering (EE)

511. Facilities Engineering. General engineering project planning, applying codes and standards, preliminary design, economic forecasting, environmental planning and reports, site selection, population displacement, cash flow, specifications and plans. Prerequisite: Permission of instructor.

518 Wireless Communications. Application and technologies of wireless networks including propagation, encoding, error control, and current technologies. Prerequisite: EE 318.

523. Digital Signal Processing. Digital filter analysis and design. FFT algorithms. Applications in engineering problems such as data acquisition, control, and I/O. Prerequisite: EE 318.

527. Industrial Control. Power control devices and applications. Relay logic and translation to other forms. Programmable logic controllers. Proportional-integral-derivative (PID) control. Additional topics from current literature. Prerequisites: EE 233 and 351.

531. Analog Integrated Electronics. Advanced analysis and design using op-amps, with emphasis on error analysis and compensation. Signal conditioning, instrumentation amplifiers, nonlinear circuits, filters, voltage regulators, and A-to-D and D-to-A conversion. Laboratory exercises emphasizing design techniques. Prerequisite: EE 316 and 351.

532. Introduction to Computer Networking. Computer networking and engineering standards related to networking. Network hardware, ethernet, token ring, ISDN, ATM, networking protocols including TCP/IP protocol suite, internet-working, LANs, and typical applications. Prerequisite: EE 210

533. Engineering Software Solutions. Project planning, specification, design, implementation and testing of software solutions for engineers. Design techniques based on state machines, object-orientated techniques, database, and multi-tasking. Use of software tools. Three projects. Prerequisite: EE 233.

538. Intermediate Microcomputers. Evolution of computer architecture, parallel processing, pipelined processors, branch prediction, superscalar processors, memory caches. Study of state-of-the-art processors like the Pentium 4 and PowerPC. Prerequisite: EE337 or permission of instructor.

546. Industrial Control Projects for Information Age. In-depth group and individual projects in industrial control with emphasis on information systems applications. Projects in areas such as programmable logic controllers, factory automation, and man-machine interface software and hardware. Prerequisite: EE 427/527 or permission of instructor.

547. Internet/Intranet Application Development. Focus on the development of applications and models using Internet/Intranet technologies such as Java, JavaScript, conferencing systems, dynamic HTML, server-side scripting, multitier models and XML. Prerequisite: EE 233 or permission of instructor.

548. Software Engineering Projects. Builds on the object-oriented concepts and Java covered in EE 333. Coverage for Unified Modeling Language is expanded and Java Design Patterns are incorporated. Provides a project environment for implementation of systems using object-oriented techniques. Prerequisite: EE 333.

551. Digital Electronics. Properties of CMOS, TTL, and ECL logic families. Semiconductor memory. IC fabrication. State machine and large-scale project techniques. Laboratory involves simulation and hands-on experiments. Lecture and lab. Prerequisites: EE 337 and 351.

552. VHDL Digital Systems Design. Introduction to computer design automation using VHDL. Architectural, behavioral, and logical descriptions of digital systems. Logic verification and simulation. Design of complex integrated circuits using modern DA tools. Prerequisite: EE 210.

558. Medical Instrumentation. Fundamental operating principles, applications and design of electronic instrumentation used in measurement of physiological parameters. Class design project. Prerequisites: EE 431 or permission of instructor.

561. Machinery II. Physical principles of DC machines. Mathematical analysis of generator designs using equivalent

circuits and magnetization curves. Calculation of motor speed, torque, power, efficiency, and starting requirements. Solid-state speed control systems. Prerequisite: EE 361.

571. **Power Systems I.** Components of power systems. Performance of modern interconnected power systems under normal and abnormal conditions. Calculation of inductive and capacitive reactances of three-phase transmission lines in steady state. Prerequisite: EE 361.

572. **Power Systems II.** Modeling of power systems. Symmetrical components. Fault analysis. Determination of interrupting ratings of circuit breakers. Transient stability. Design project. Prerequisite: EE 471 or 571.

573. **Protective Relaying of Power Systems.** Operating principles of protective relays. Protection of transmission lines, generators, motors, transformers, and buses. Prerequisite: EE 472 or 572.

574. **Industrial Power Systems.** One-line diagrams/load analysis. Medium and low voltage feeder design, voltage regulation, and short-circuit analysis. Selection of protective devices. Grounding and lighting protection. Term project. Prerequisite: EE 472 or 572.

585. **Engineering Operations.** Economic, procedural, planning, and control aspects of engineering projects. Prerequisite: Permission of instructor.

*590. **Special Topics in (Area).** Prerequisite: Permission of instructor. 1-12 hours.

*591. **Special Problems in (Area).** Prerequisite: Permission of instructor. 1-12 hours.

*595. **Integrated System Design.** Successful completion and oral defense of a team design project. Prerequisite: Permission of instructor.

601. **Electrical and Computer Engineering Seminar.** Consists of research presentations and colloquia delivered by faculty, research assistants, and invited guests in various state-of-the-art and popular topics related to Electrical and Computer Engineering. Maximum of 3 credit hours applicable toward M.S.E.E. degree. 1-3 hours.

610. **Technical Communication for Engineers.** Workshop-oriented course producing technical memoranda, proposals, and conference and/or refereed-journal papers with oral presentations related to these work products. Prerequisite: Graduate standing in Engineering and successful pretest performance.

621. **Random Variables and Processes.** Theory underlying analysis and design of communication, stochastic control, data gathering, and data analysis systems. Prerequisite: EE 421 or permission of instructor.

622. **Advanced Communication Theory.** Analysis of performance of analog modulation techniques in presence of noise. Prerequisites: EE 421 and 621, or permission of instructor.

624. **Digital Communications.** Design of digital communications systems. Prerequisites: EE 621 and 622.

625. **Coding and Information Theory.** Entropy, channels and channel capacity, RLL codes, error correcting codes, cyclic codes, cryptography, convolutional codes, trellis coded modulation. Prerequisite: graduate standing.

626. **Digital Image Processing.** Digital image processing fundamentals, image transformations, image enhancement, image restoration, image compression, image segmentation, and image presentation. Prerequisite: EE 423 or 523.

628. **Telecommunications I.** Advanced topics. Prerequisite: Permission of instructor.

629. **Telecommunications II.** Advanced topics. Prerequisite: Permission of instructor.

632. **Introduction to Computer Networking.** Computer networking and engineering standards related to networking. Network hardware, ethernet, token ring, ISDN, ATM, networking protocols including TCP/IP protocol suite, internet-working, LANs, and typical applications. Permission of instructor.

633. **Experiments in Computer Networking.** Detailed exploration of particular issues in network protocols and network application models. Development of series of programs to explore the details of network protocols and network application models. Prerequisite: EE 532 or permission of instructor.

634. **Introduction to Neural Networks.** Neural network topologies and learning algorithms with an emphasis on back propagation. Applications and limitations of networks. Designing networks for specific uses. Individual software project. Prerequisites: EE 210 or permission of instructor.

635. **Telecommunication Systems.** System organization and structure; data transmission. Prerequisite: Permission of instructor.

636. **Advanced Digital Design.** Large-scale class project. Sample topics include math coprocessors, text coprocessors, CRT controllers, and data encryption devices. Prerequisite: Permission of instructor.

637. **Computer Graphics I.** Graphic devices, drawing curves, interactive graphics, transforms, and three-dimensional graphics. Projects involving hardware and software. Prerequisite: EE 337, or permission of instructor.

638. **Computer Graphics II.** Raster graphics, faces, coloring faces, hidden-surface elimination, ray tracing, and image enhancement. Projects involving hardware and software. Prerequisite: EE 637.

639. **Advanced Microprocessors.** Topics covering both hardware and software issues. Individual or group term project. Prerequisite: EE 438 or 538 or permission of instructor.

640. **Object-Oriented Design.** Study and practice of the object-oriented methodology for developing software designs. Implementation consequences. Application of object-oriented methodologies to specific problems using object-oriented language. Prerequisite: EE 233 or other software design experience using C, or permission of instructor.

641. **Modern Control I.** Sampled-data and discrete-time systems. State variable models, state feedback and estimation. Optimal control and estimation. Predictive control. Introduction to system identification. Prerequisite: EE 426 or permission of instructor.

642. **Modern Control II.** Selected advanced topics including intelligent and fuzzy control. Prerequisite: EE 641 or permission of instructor.

643. **System Identification and Adaptive Control.** Modeling of systems using structure identification, parameter estimation, and model validation. Controller design based on input-output models. Parameter adaptive control. Prerequisite: Permission of instructor.

650. **Software Engineering.** Introduces classical software lifecycles and software development paradigms. Proposal development and software design. Integrates experience from

computer science, communication, systems engineering, and problem solving. Prerequisite: Permission of instructor.

651. Software Engineering Large Systems I. Notions of process and integrated system views. Software architecture and modeling are discussed and related to levels in Object Oriented Design. Java is used as the programming paradigm. Prerequisite: EE 650 or permission of instructor.

652. Software Engineering Large Systems II. Components are introduced as elements of software system implementations. Object-oriented design patterns and techniques are reviewed. Java components are used for programming. Prerequisites: EE 650 and EE 651 or permission of instructor.

657. Enterprise Information Architecture Engineering. Development and management of distributed computing including hardware, software, and communications. Prerequisite: Permission of instructor.

661. Advanced Electrical Machinery I. Synchronous machine theory. Prerequisites: EE 461 or 561, and 472 or 572, or permission of instructor.

662. Advanced Electrical Machinery II. Induction machine theory. Prerequisite: EE 661.

663. Control of Synchronous Machines. Prerequisite: Permission of instructor.

671. Computer Applications in Power Systems. Analysis of power systems operation. Prerequisite: Permission of instructor.

672. Power System Overvoltages. Events causing overvoltages; protection of system. Prerequisite: EE 472 or 572 or permission of instructor.

673. Reliability of Power Systems. Component reliability using standard industrial techniques. Prerequisite: EE 471 or 571 or permission of instructor.

674. Economic Operation and Control of Power Systems. Economic control of thermal generating stations and hydrothermal stations. Computer control of power systems. Prerequisite: EE 472 or 572, or permission of instructor.

682. Multivariable Systems. Analysis and design of multiple-output, multiple-input control systems. Prerequisite: Permission of instructor.

684. Engineering Management of Information Resources. Management of critical information and information intensive change, management of quality, information flow and use and process improvement. Permission of instructor.

685. Advanced Engineering Operations. Procedural, planning, and control aspects of engineering projects. Project management of teams. Prerequisite: Permission of instructor.

686. Technical Entrepreneurship I. Entrepreneurship and intrapreneurship in venture capital financed companies. Management teams are formed, and ventures are selected and simulated over an extended period of time. Prerequisite: Permission of instructor.

687. Technical Entrepreneurship II. Continuation of EE 686. Prerequisite: EE 686.

688. Advanced Information Engineering. Applications of information engineering in partnership with local industries. planning and problem solving or information engineering design. Prerequisite: Permission of instructor.

***690. Special Topics in (Area).** Prerequisite: Permission of instructor. 1-12 hours.

***691. Special Problems in (Area).** Prerequisite: Permission of instructor. 1-12 hours.

697. Project. Project for Plan II Master's students. Prerequisite: Permission of instructor. 3 hours.

***698. Nonthesis Research.** 1-12 hours.

***699. Thesis Research.** Thesis for Plan I Master's students. Prerequisite: Admission to candidacy. 1-12 hours.

701. Electrical Engineering Seminar. 1-3 hours.

724. Digital Communications. Design of digital communication systems. Prerequisites: EE 621 and 622.

725. Coding and Information Theory. Entropy, channels and channel capacity, RLL codes, error correcting codes, cyclic codes, cryptography, convolutional codes, trellis coded modulation. Prerequisite: graduate standing.

726. Digital Image Processing. Digital image processing fundamentals, image transformations, image enhancement, image restoration, image compression, image segmentation, and image presentation. Prerequisite: EE 623.

728. Telecommunications I. Advanced topics. Prerequisite: Permission of instructor.

729. Telecommunications II. Advanced topics. Prerequisite: Permission of instructor.

733. Experiments in Computer Networking. Detailed exploration of particular issues in network protocols and network application models. Development of series of programs to explore the details of network protocols and network application models. Prerequisite: EE 532 or permission of instructor.

734. Introduction to Neural Networks. Neural network topologies and learning algorithms with an emphasis on back propagation. Applications and limitations of networks. Designing networks for specific uses. Individual software project. Prerequisites: EE 210 or permission of instructor.

737. Computer Graphics I. Graphic devices, drawing curves, interactive graphics, transforms, and three-dimensional graphics. Projects involving hardware and software. Prerequisite: Permission of instructor.

738. Computer Graphics II. Raster graphics, faces, coloring faces, hidden-surface elimination, ray tracing, and image enhancement. Projects involving hardware and software. Prerequisite: EE 637 or 737.

740. Object-Oriented Design. Study and practice of the object-oriented methodology for developing software designs. Implementation consequences. Application of object-oriented methodologies to specific problems using object-oriented language. Prerequisite: EE 233 or other software design experience using C, or permission of instructor.

742. Modern Control II. Selected advanced topics including intelligent and fuzzy control. Prerequisite: EE 641 or permission of instructor.

743. System Identification and Adaptive Control. Modeling of systems using structure identification, parameter estimation, and model validation. Input/output models. Parameter adaptive control. Prerequisite: Permission of instructor.

747. Distributed Control Systems. Application of distributed control to process, integration, and operator interfaces. Prerequisite: Permission of instructor.

750. Software Engineering. Introduces classical software lifecycles and software development paradigms. Proposal development and software design. Integrates experience from computer science, communication, systems engineering, and problem solving. Prerequisite: Permission of instructor.

751. Software Engineering Large Systems I. Notions of process and integrated system views. Software architecture

and modeling are discussed and related to levels in Object Oriented Design. Java programming is used as the programming paradigm. Prerequisite: EE 650 or 750 or permission of instructor.

752. Software Engineering Large Systems II. Components are introduced as elements of software system implementations. Object-oriented design patterns and techniques are reviewed. Java components are used for programming. Prerequisites: EE 650 or 750 and EE 651 or 751 or permission of instructor.

761. Advanced Electrical Machinery I. Synchronous machine theory. Prerequisites: EE 461 or 561 and 472 or 572, or permission of instructor.

762. Advanced Electrical Machinery II. Induction machine theory. Prerequisite: EE 661 or 761.

763. Control of Synchronous Machines. Prerequisite: Permission of instructor.

771. Computer Applications in Power Systems. Analysis of power systems operation. Prerequisite: Permission of instructor.

772. Power System Overvoltages. Events causing overvoltages, and protection of system. Prerequisite: EE 472 or 572, or permission of instructor.

773. Reliability of Power Systems. Component reliability using standard industrial techniques. Prerequisite: EE 471 or 571, or permission of instructor.

774. Economic Operation and Control of Power Systems. Economic control of thermal generating stations and hydrothermal stations. Computer control of power systems. Prerequisite: EE 472 or 572, or permission of instructor.

782. Multivariable Systems. Analysis and design of multiple-output, multiple-input control systems. Prerequisite: Permission of instructor.

*790. **Special Topics in (Area).** 1-12 hours.

*791. **Individual Study in (Area).** 1-12 hours.

*798. **Nondissertation Research.** 1-12 hours.

*799. **Dissertation Research.** Prerequisite: Admission to candidacy. 1-12 hours.

Engineering, Environmental Health (Ph.D.)

Graduate program director: *Lalor*

Graduate program co-director: *Becker*

Faculty

Heng Ban, Associate Professor (Mechanical Engineering); Pollution Control, Combustion, Thermal-Fluid Science

Steven M. Becker, Assistant Professor (Environmental Health Sciences); Director, Social/Behavioral & Public Policy Unit, Center for Disaster Preparedness; Co-director, Environmental Health Engineering. Toxic Disasters (U.S. and overseas); Bioterrorism, Environmental Management, Environmental Health Policy

Gary Cheng, Assistant Professor (Mechanical Engineering); Combustion, Computational Fluid Dynamics, Multiphase Flow Transport, Rocket Engine System, Plume Dynamics.

Shirley E. Clark, Assistant Professor (Civil and Environmental Engineering); Environmental Health Engineering, Environmental Management, Surface Water Quality and Hy-

drology, Sustainable Development, Fate and Transport of Hazardous Materials

Martin Crawford, Emeritus Professor (Mechanical Engineering); Energy Systems, Fluid Mechanics

James S. Davidson, Assistant Professor (Civil and Environmental Engineering); Crash Injury Research and Engineering Network, Structural Engineering, Structural Mechanics, Numerical Methods, Structural Dynamics, Bridge Design, Structural Design and Analysis

Kenneth Dillon, Associate Professor (Environmental Health Sciences); Water Chemistry, Air Pollution

Alan Eberhardt, Associate Professor (Biomedical Engineering); Solid Mechanics, Biomechanics, Analytical and Numerical Methods

Evangelos Eleftheriou, Research Associate Professor (Mechanical Engineering); Manufacturing Methods, Biomechanics, Nonlinear Mechanics, Computer Aided Design

Fouad H. Fouad, Chair and Professor (Civil and Environmental Engineering); By-Products Utilization, Structural Engineering, Prestressed Concrete, Concrete Materials, Computer Applications

S. Gopalsamy, Research Assistant Professor (Mechanical Engineering); Computer Aided Geometric Design, Grid Generation, Computer Graphics, CAD standards-IGES and STEP

Steven L. Jones, Jr., Assistant Professor (Civil and Environmental Engineering); Urban Transportation Engineering, Air Quality, Public Transportation, Automobile Dependency, Traffic Engineering

Roy Koomullil, Assistant Professor (Mechanical Engineering); Computational Fluid dynamics, Parallel Computing, compressible and Incompressible Flows, Moving Body Field Simulations

Melinda M. Lalor, Associate Professor (Civil and Environmental Engineering); Program Director, Environmental Health Engineering. Environmental Engineering, Surface Water Quality, Watershed Management, Pollution Prevention, Sustainable Development

Anne S. McClain, Research Assistant Professor (Mechanical Engineering); Manufacturing Materials Science, Computational Solid Mechanics, Finite Element Analysis

Stephen T. McClain, Assistant Professor (Mechanical Engineering); Fluid and Thermal Sciences, Energy Systems Design, Experimental Design and Uncertainty Analysis

Reidar K. Oestenstad, Associate Professor (Environmental Health Sciences); Industrial Hygiene

Robert W. Peters, Associate Professor (Civil and Environmental Engineering); Environmental Engineering, Water and Wastewater Treatment, Physical/Chemical Treatment, Soil and Ground Water Remediation, Sonication/Acoustic Cavitations, Advanced Oxidation Processes, Water Chemistry

Edward M. Postlethwait, Professor and Vice Chair (Environmental Health Sciences); Director, Inhalation Exposure Facility; Senior Scientist, Center for Free Radical Biology. Environmental oxidative injury, pulmonary dosimetry, reactive gas interfacial transfer and reaction/diffusion.

Alan Shih, Associate Research Professor (Mechanical Engineering); Visualization, Mesh Generation and Adaptation, Computer Graphics, Virtual Reality, Computer Aided Engineering

Bharat Soni, Chair and Professor (Mechanical Engineering); High Performance Computing, Mesh Generation and Adaptation, Computational Field Simulation, Computer Aided

Geometry Design and Engineering, Adaptive Engineering Systems.

B. J. Stephens, Associate Professor (Mechanical Engineering); Machine Design, Engineering Mechanics, Computer Aided Design, Analysis, and Manufacturing

Nasim Uddin, Assistant Professor (Civil and Environmental Engineering); Hazard Mitigation, Infrastructure Rehabilitation, Structural Engineering, Structural Dynamics,

Peter M. Walsh, Research Professor (Mechanical Engineering); Formation and Evolution of Carbonaceous and Inorganic Particles in Flames, Characterization and Control of Particulate Matter Emissions from Combustion Systems

Jianmin Wang, Assistant Professor (Civil and Environmental Engineering); Environmental Engineering, Water and Wastewater Treatment, Water Chemistry and Interfacial Phenomenon, Fate and Transport of Pollutants in Natural and Engineered Environments

Program Description

This unique, interdisciplinary program takes advantage of UAB's diversified engineering school, and nationally renowned health sciences center, to produce Ph.D. candidates cross-trained in public health and environmental engineering from a variety of disciplines. The program provides students with an understanding of basic mechanisms through which agents alter environmental, human, and ecosystem health, and the skills needed to evaluate and implement remediation for environmental problems, in the context of engineering and public health.

Admission Requirements

Students applying to the Environmental Health Engineering program must submit official transcripts and GRE scores. In general, a combined GRE score of at least 1100 (verbal and quantitative) or 1500 (verbal, quantitative and analytical), and a minimum undergraduate GPA of 3 on a 4 point scale are required for admission. Students for whom English is a second language should have a TOEFL score no less than 600. Admission on probation may be possible in some circumstances for students not meeting these requirements.

Admission decisions will be made by the admission committee, comprised of the EHE program director and co-director. The steering committee will appoint a faculty mentor for each student accepted. Based on their expressed area of interest. Students may change faculty mentors as their research interests develop. The faculty mentor will assist the student in selection of coursework until a dissertation topic is selected, and a dissertation committee established.

Enrollment

Students are expected to remain continuously enrolled (fall and spring semesters) in the EHE program until the completion of their dissertation.

Coursework and Dissertation Research Requirement

Students entering the Ph.D. degree program with a baccalaureate degree must complete the following credit hours of coursework and research:

Environmental Health Engineering core	9 hours
Additional Coursework*	30 hours
Dissertation Research**	18 hours
Environmental Health Engineering Seminar	3 hours

Total Credit Required:

60 hours

*6 hours must be from the student's nonhome school

**an approved internship may be substituted for 6 hours

Transfer of Credit

Courses of full graduate-level credit earned in an accredited institution where a student was enrolled in the graduate school may be submitted for review for inclusion in the doctoral program. It is the student's responsibility to assure that an official transcript of the credit concerned is received by the graduate school.

Acceptance of credit requires the approval of the Environmental Health Engineering admission committee and the Graduate School Dean. Credit will not be accepted for transfer from any institution at which the student failed to achieve a "B" average on all graduate work attempted. With approval, up to one-half of the required coursework for the doctoral degree may be transferred from another institution.

Exams and Dissertation

Qualifying Exam

A Qualifying Exam is required of all doctoral candidates. The exam may include both written and oral components, and will include presentation of the student's dissertation proposal. The exam will be administered by the student's dissertation committee, which will include at least one faculty member each from the School of Public Health and the School of Engineering, and one faculty member from outside the Environmental Health Engineering program.

Dissertation

A dissertation showing ability to conduct independent research, organizational and presentation skills must be prepared on a topic in the major field. Dissertation results are expected to be submitted for refereed scholarly publication. The dissertation must comply with the regulations set forth in the UAB dissertation preparation guide, which is available from the Graduate school office.

Final Exam

When the dissertation has been completed, doctoral candidates will present and defend their work before their dissertation committee. This defense will constitute the candidate's final exam. The results of the examination must be reported to the Office of the Graduate School at least six weeks before the commencement at which the degree is to be conferred.

Additional Information

For detailed information, contact Dr. Melinda Lalor, Program Director, UAB Department of Civil and Environmental Engineering, HOEN 140, 1530 3rd Ave. S., Birmingham, AL 35294-4440. Physical location: 140 Hoehn Building, 1075 13th Street South.

Telephone 205-934-8430

E-mail mlalor@uab.edu

or

Dr. Steven M. Becker, Program Co-director, UAB Department of Environmental Health Sciences, School of Public Health, 1665 University Boulevard, Birmingham, AL 35294-0022

Telephone (205) 934-6089

E-mail smbecker@uab.edu

Course Descriptions

Students in this interdisciplinary program work closely with their faculty advisors to select courses that support their interests and research activities. Typically, appropriate courses are selected from the Departments of Civil and Environmental Engineering, Mechanical Engineering, Environmental Health Science, International Health, Epidemiology, Biostatistics, Biology and Chemistry.

Engineering, Materials (Ph.D., M.S.Mt.E.)

Graduate program director: *Andrews*

Faculty

J. Barry Andrews, Professor (Materials Science and Engineering); Solidification, Microgravity Processing, Physical Metallurgy, Intermetallic Materials, Electronic Properties

Charles E. Bates, Research Professor (Materials Science and Engineering); Casting and Solidification Processes of Iron and Steel, Machinability, Environment

Krishan K. Chawla, Professor (Materials Science and Engineering); Metal, Ceramic, and Polymer Matrix Composite Materials; Fibers, Interfacial Phenomena

Zoe E.B. Dwyer, Instructor (Materials Science and Engineering); Metal Casting and Defects, Physical Metallurgy, Thermodynamics

Robin D. Griffin, Research Assistant Professor (Materials Science and Engineering); Electron Microscopy, Physical Metallurgy, Metals Casting

Gregg M. Janowski, Associate Professor (Materials Science and Engineering); Electron Microscopy, Composite Materials, Physical Metallurgy, Structure-Processing-Property Relationships

Burton R. Patterson, Professor (Materials Science and Engineering); Powder Processing, Physical Metallurgy, Quantitative Microscopy

Rosalia N. Scripa, Professor (Materials Science and Engineering); Ceramics and Glass, Extractive Metallurgy, Semiconductor Crystal Growth, Electronic-Magnetic Materials

Uday Vaidya, Associate Professor (Materials Science and Engineering); Polymer Matrix Composites, Processes & Process Modeling, Nondestructive Evaluation and Dynamic Response.

Secondary and Adjunct Faculty

Rigoberto Advincula, Assistant Professor (Chemistry); Synthesis, Fabrication and Characterization of Ultrathin Films

Dale S. Feldman, Associate Professor (Biomedical Engineering); Porous Polymeric Soft Tissue Implant Biocompatibility, Biodegradable Composites, Biomechanics

Fouad Fouad, Professor (Civil and Environmental Engineering); Structural Engineering; Prestressed Concrete; Concrete Materials; Computer Applications

William Lacefield, Professor (Dentistry); Bonding of Ceramics, Glass, and Composite Resins to Metallic Implants, Dental Alloys

Christopher M. Lawson, Professor (Physics); Nonlinear Optics and Optical Sensing/Imaging

Jack E. Lemons, Professor (Biomedical Engineering); Design of Ligament and Tendon Prostheses, Development of Synthetic Bone Products, Biocompatibility, Corrosion

Linda C. Lucas, Professor (Biomedical Engineering); Corrosion Evaluation of Implant Alloys, Biocompatibility of Dental and Orthopedic Biomaterials

E. Douglas Rigney, Academic Associate Professor (Biomedical Engineering); Corrosion, Biomaterials, Metal, Ceramic Interfaces, Surface Modification, Wear

David L. Shealy, Professor (Physics); X-ray Telescopes, Microscopes and Lithography; Optics, Free Electron Lasers, Microelectronic Packaging Materials

Raymond G. Thompson, Adjunct Professor (Materials Science and Engineering); Joining, Microstructure-Property Relationships, Mechanical Metallurgy, High Temperature Alloys, Phase Transformation Kinetics

Yogesh K. Vohra, Professor (Physics); Laser and X-ray Characterization of Materials at Extreme Conditions

Participating Faculty from the University of Alabama (Tuscaloosa)

Viola L. Acoff, Associate Professor (Metallurgical and Materials Engineering); Physical Metallurgy, High Temperature Materials, Electron Microscopy, Welding

Richard C. Bradt, Professor (Metallurgical and Materials Engineering); Ceramic Materials

Nagy H. El-Kaddah, Professor (Metallurgical and Materials Engineering); Materials Process Modeling, Magnetic Field Effects on Molten Metals

Ramana G. Reddy, ACIPCO Professor (Metallurgical and Materials Engineering); Thermodynamics and Kinetics of Metallurgical Reactions; Phase Stability; Fused Salt Electrolysis; Synthesis of Ceramics and Intermetallics; Modeling; Waste Metal Recovery

Doru M. Stefanescu, Professor (Metallurgical and Materials Engineering); Nucleation and Growth in Solidification Processes, Physical Chemistry of Surface and Interface Reactions

Garry W. Warren, Professor (Metallurgical and Materials Engineering); Corrosion and Surface Electrochemistry

Mark Weaver, Assistant Professor (Metallurgical and Materials Engineering); Microstructure-Property Relations; Intermetallic Compounds; Structural Materials; Thin Films; Materials Characterization

Giovanni Zangari, Assistant Professor (Metallurgical and Materials Engineering); Electrochemical and Autocatalytic Deposition of Thin Films; Magnetic Films

Admission Requirements

In addition to the general Graduate School admission requirements, requirements for admission to the M.S.Mt.E. and Ph.D. graduate programs include the following criteria:

1. A 3.0 (A = 4.0) or better GPA on all undergraduate degree major courses attempted;
2. For international applicants from non-English speaking countries, minimum scores of 580 on the TOEFL and 3.5 on the TWE.

M.S.Mt.E. Program

The following minimum requirements for a Master of Science in Materials Engineering apply to a student who has earned a baccalaureate degree in an ABET-accredited program in materials or metallurgical engineering or in a similarly named engineering program. A student with an undergraduate degree in another field of engineering or in the physical sciences may also be accepted into the Materials Engineering

program. However, such a student will be required to demonstrate competence in fields of study that emphasize the interrelationship among structure, processing, performance, and properties of materials. This can be accomplished by one of the methods described later in this section under "Preparatory Courses." All full-time master's students must take MSE 601-Materials Science and Engineering Seminar every term.

Plan I (Thesis Option)

1. The student must successfully complete at least 24 semester hours of graduate course work, 9 of which may be at the 500 level, including

- 18 semester hours in materials science and engineering;
- 3 semester hours in an approved course in mathematics, physical sciences, or other engineering discipline; and
- 3 semester hours either in (1) materials science and engineering, (2) an approved course in mathematics, physical sciences, or another engineering discipline, or (3) an approved course in management.

2. The student must successfully complete and defend a thesis. The student must register for and successfully complete at least 9 semester hours of MSE 699-Master's Degree Thesis in addition to the 24 semester hours of course work.

Plan II (Nonthesis Option): Research/Design Emphasis

1. The student must successfully complete at least 33 semester hours of graduate credit, 9 of which may be at the 500 level, including

- 24 semester hours of materials science and engineering course work;
- 3 semester hours of course work in an approved mathematics, physical science, or other engineering discipline;
- 3 semester hours either in (1) materials science and engineering, (2) an approved course in mathematics, physical sciences, or another engineering discipline, or (3) an approved course in management; and
- 3 semester hours of MSE 698-Nonthesis Research involving an on-site design or research project (usually undertaken after completion of all course work).

2. The student must successfully complete a written comprehensive examination on all course work taken in the program or a comprehensive examination on the on-site research project topic. The latter option requires a publication-quality manuscript and oral presentation (with questions) deemed acceptable by the graduate committee.

Plan II (Nonthesis Option):

Technology/Engineering Management Emphasis

1. The student must successfully complete at least 33 semester hours of graduate credit, including

- 12 semester hours of course work in a specific area of materials science and engineering (at least 6 of these 12 hours must be at the 600 level);
- 6 semester hours of approved management course work: MBA 660-Quantitative Methods I and either EC 520-Applied Forecasting or another approved advanced management course;
- 9 semester hours of engineering-oriented management coursework. Approved courses include CE 558-Engineering Management, EE 585-Engineering Operations, EE 686-Technical Entrepreneurship I, EE 687-Technical Entrepreneurship II, and ME 601-Design, Measurement, and Enhancement of Work Systems;

- 3 hours of MBA 631-Administrative Theory and Practice; and
- 3 semester hours of MSE 698-Nonthesis Research involving an on-site design or research project (usually undertaken after completion of all course work).

2. The student must successfully complete a written comprehensive examination on all course work taken in the program or a comprehensive examination on the on-site research project topic. The latter option requires a publication-quality manuscript and oral presentation (with questions) deemed acceptable by the graduate committee.

Ph.D. Program

The Ph.D. program in Materials Engineering is offered jointly with the Department of Metallurgical and Materials Engineering at the University of Alabama (Tuscaloosa). Each student is required to earn an M.S.Mt.E. as a step toward a doctoral degree. This requirement can be waived for a student entering the program with a master's degree in Materials Engineering or closely related field. The Ph.D. program requires a minimum of 18 hours of course work after the master's degree, successful completion of comprehensive examinations, and successful defense of a Ph.D. dissertation. All full-time doctoral students must take MSE 701-Materials Science and Engineering Seminar every term.

The requirements for a Ph.D. for a student with a master's degree are

- A minimum of 18 hours of approved graduate course work in metallurgical engineering, materials engineering, or fields supportive of these (6 hours may be at the 500 level and at least 3 semester hours but no more than 6 must be in supportive fields). Additional course work may be required at the discretion of the mentor and program director.
- Successful completion of a comprehensive examination covering both undergraduate and graduate course work.
- Successful defense of a research dissertation in metallurgical/materials engineering (minimum of 24 semester hours in MSE 799-Dissertation Research).

Preparatory Courses

A student seeking a graduate degree in materials engineering without a baccalaureate degree in Materials Engineering or similarly named engineering field from an ABET-accredited school must demonstrate competence at the undergraduate level in the areas of physical behavior of materials, thermodynamics, mechanical behavior of materials, transport phenomena, and characterization. He or she may do this by passing an examination set by the Materials Engineering faculty or by passing all or some of the following courses, depending on the student's academic background. The program director will decide which courses the student can be exempt from taking. The preparatory courses must be taken on a pass/fail basis, with a "pass" being equivalent to a grade of B or better in the course. The courses that fulfill the preparatory requirement are

MSE 280-Engineering Materials
 MSE 281-Physical Materials I
 MSE 363-Characterization of Materials
 MSE 380-Thermodynamics of Materials
 MSE 381-Physical Materials II
 MSE 382-Mechanical Behavior of Materials.

Additional Information

For detailed information, contact Dr. J. Barry Andrews, Graduate Program Director, The University of Alabama at Birmingham, Department of Materials Science and Engineering, BEC 254, 1530 3rd Avenue South, Birmingham, AL 35294-4461.

Telephone 205-934-8450

E-mail mseuab@eng.uab.edu

Web www.eng.uab.edu

Course Descriptions

For doctoral courses at the University of Alabama (Tuscaloosa), see the graduate catalog of that university.

Unless otherwise noted, all courses are for 3 semester hours of credit.

Materials Science and Engineering (MSE)

501. Materials Processing. Processing of metals, glasses, ceramics, and composites. Powder processing, casting, welding, rapid solidification, and other advanced methods. Prerequisite: MSE 281 or permission of instructor.

502. Frontiers of Materials. Recent advances in materials technology and application. Novel processing, structures, properties, and performance issues. Prerequisite: MSE 281 or permission of instructor.

503. Degradation of Materials. Issues in long-term utilization of materials. Corrosion, high temperature oxidation, creep, fatigue, and their interactions. Prerequisite: MSE 281 or permission of instructor.

504. Ferrous Casting Production and Inspection. Production and evaluation of cast ferrous metals (gray iron, ductile iron and carbon steel). Major casting techniques, gating and risering, solidification, phase formation, and inspection. Laboratories will include experiments and plant trips. Prerequisite: MSE 280 or permission of instructor.

506. Aluminum Casting Production and Inspection. Production and evaluation of cast aluminum, especially alloys 319, 356 and 357 and 380. Major casting techniques, gating and risering, degassing, pouring, solidification, phase formation, and inspection. Laboratories will include experiments and plant trips. Prerequisite: MSE 280 or permission of instructor.

513. Composite Materials. Processing, structure, and properties of metal-, ceramic-, and polymer-matrix composite materials. Roles of interfacial bond strength, reinforcement type and orientation, and matrix selection in physical and mechanical properties of composite materials. Prerequisite: MSE 281 or permission of instructor. MSE 382 is recommended.

530. Polymeric Materials. (Also CH 580.) Processing methods, structure-engineering-property relationships, and applications of polymeric materials. Prerequisite: MSE 281, CH 117, and CH 118 or permission of instructor.

533. Nondestructive Evaluation of Materials. Principles, applications and limitation of ultrasonic, vibration, acoustic emission, radiographic, magnetic particle, eddy current and other nondestructive testing methods. Intelligent sensors and health monitoring of real structures. Prerequisite: MSE 363 or permission of instructor.

564. Metals and Alloys. Microstructures, properties, heat treatment, and processing of ferrous and nonferrous materials. Prerequisite: MSE 281 or permission of instructor

570. Ceramic Materials. Structure, processing, properties, and uses of ceramic compounds and glasses. Mechanical,

thermal, and electrical behavior of ceramic materials in terms of microstructure and processing variables. Prerequisite: MSE 281, CH 117, and CH 118 or permission of instructor.

584. Electronic, Magnetic and Thermal Properties of Materials. Mechanisms behind rectifying junctions, transistors, paramagnetism, diamagnetism, and ferromagnetism. Prerequisite: MSE 280, PH 222, and PH 232 or permission of instructor.

601. Materials Science and Engineering Seminar. Required of all full-time M. S. students. 1 hour.

603. Thermodynamics of Materials. Atomistic and classical approaches to the understanding of the thermodynamics of solids, phase transformations, chemical reactions, and alloy systems. Prerequisite: MSE 380 or permission of instructor.

613. Mechanical Behavior of Materials. Microstructural effects on the deformation mechanisms responsible for mechanical behavior of engineering materials. Prerequisite: 382 or permission of instructor.

615. Nucleation and Growth. Nucleation, growth, and phase transformations in materials. The roles of heterogeneities, boundaries, temperature, and free energy are addressed. Prerequisites: MSE 381 and 603 or permission of instructor.

616. Microstructural Processes. Theory and application of the principal microstructural processes in materials, including recrystallization, grain growth, coarsening, and sintering. Prerequisite: MSE 615 or permission of instructor.

617. Kinetics. Transformation rate theory associated with diffusional transformations; the physical phenomena involved and appropriate numerical and analytical techniques to describe the phenomena. Prerequisite: MSE 616 or permission of instructor.

618. Surfaces, Interfaces and Thin Films. The fundamental structural and chemical aspects of surfaces and interfaces. Physical vapor deposition technologies and applications and structure processing-property relationships for thin films. Prerequisite: MSE 615 or permission of instructor.

623. Solidification. Plane-front, cellular, and dendritic growth of single and polyphase alloys as applied to normal and directional solidification. Influence of epitaxy and convection on solidification structures. Prerequisites: MSE 381 or permission of instructor.

637. Quantitative Microscopy. Quantitative description of microstructural features. Relationships between microstructural characteristics and properties. Prerequisite: MSE 381 or permission of instructor.

643. Materials Characterization I. Fundamentals of materials characterization using electron and X-ray techniques. Topics include advanced crystallography, electron optics, and interactions of energetic electrons with solids. Some applications of X-ray diffraction will be addressed. Lecture and laboratory. Prerequisite: MSE 363 or permission of instructor.

644. Materials Characterization II. Applications of materials characterization using electron and X-ray techniques. Topics include imaging and X-ray spectroscopy using scanning electron microscopy; imaging, diffraction, and X-ray spectroscopy using transmission electron microscopy; and advanced X-ray diffraction techniques. Lecture and laboratory. Prerequisite: MSE 643 or permission of instructor.

653. Phase Diagrams. Analysis and interpretation of binary, ternary, and more complex phase diagrams including thermodynamic basis and construction. Prerequisite: MSE 381 or permission of instructor.

667. **Process Modeling and Simulation.** Theory and practice of analytical methods and computational modeling for manufacturing processes of metals, ceramics, polymers and composites. Applications on processes such as metal cutting, welding, casting, massive forming, solidification, rapid prototyping, injection molding, and resin transfer molding. Prerequisite: MSE 405/ME 405, MA 227 or permission of instructor.

690. **Special Topics in (Area).** Prerequisite: Permission of graduate study committee. 1-6 hours.

691. **Individual Study in (Area).** Prerequisite: Permission of graduate study committee. 1-6 hours.

698. **Nonthesis Research.** Prerequisite: Permission of mentor. 1-12 hours.

699. **Thesis Research.** Prerequisite: Admission to candidacy and permission of mentor. 1-12 hours.

701. **Materials Science and Engineering Seminar.** Required of all full-time Ph.D. students. 1 hour.

703. **Thermodynamics of Materials.** Atomistic and classical approaches to the understanding of the thermodynamics of solids, phase transformations, chemical reactions, and alloy systems. Prerequisite: MSE 380 or permission of instructor.

713. **Mechanical Behavior of Materials.** Microstructural effects on the deformation mechanisms responsible for mechanical behavior of engineering materials. Prerequisite: MSE 382 or permission of instructor.

715. **Nucleation and Growth.** Nucleation, growth and phase transformations in materials. The roles of heterogeneities, boundaries, temperature, and free energy are addressed. Prerequisite: MSE 381 and 603 or 703, or permission of instructor.

716. **Microstructural Processes.** Theory and application of the principal microstructural processes in materials, including recrystallization, grain growth, coarsening, and sintering. Prerequisite: MS 615 or 715, or permission of instructor.

717. **Kinetics.** Transformation rate theory associated with diffusional transformations; the physical phenomena involved and appropriate numerical and analytical techniques to describe the phenomena. Prerequisite: MSE 616 or 716, or permission of instructor.

718. **Surfaces, Interfaces, and Thin Films.** The fundamental structural and chemical aspects of surfaces and interfaces. Physical vapor deposition technologies and applications and structure processing-property relationships for thin films. Prerequisite: MSE 615 or 715, or permission of instructor.

723. **Solidification.** Plane-front, cellular, and dendritic growth of single and polyphase alloys as applied to normal and directional solidification. Influence of epitaxy and convection on solidification structures. Prerequisite: MSE 381 or permission of instructor.

737. **Quantitative Microscopy.** Quantitative description of microstructural features. Relationships between microstructural characteristics and properties. Prerequisite: MSE 381 or permission of instructor.

743. **Materials Characterization I.** Fundamentals of materials characterization using electron and X-ray techniques. Topics include advanced crystallography, electron optics, and interactions of energetic electrons with solids. Some applications of X-ray diffraction will be addressed. Lecture and laboratory. Prerequisite: MSE 363 or permission of instructor.

744. **Materials Characterization II.** Applications of materials characterization using electron and X-ray techniques.

Topics include imaging and X-ray spectroscopy using scanning electron microscopy; imaging, diffraction, and X-ray spectroscopy using transmission electron microscopy; and advanced X-ray diffraction techniques. Lecture and laboratory. Prerequisite: MSE 643 or 743, or permission of instructor.

753. **Phase Diagrams.** Analysis and interpretation of binary, ternary, and more complex phase diagrams including thermodynamic basis and construction. Prerequisite: MSE 381 or permission of instructor.

767. **Process Modeling and Simulation.** Theory and practice of analytical methods and computational modeling for manufacturing processes of metals, ceramics, polymers and composites. Applications on processes such as metal cutting, welding, casting, massive forming, solidification, rapid prototyping, injection molding, and resin transfer molding. Prerequisite: MSE 405/ME 405, MA 227, or permission of instructor.

790. **Special Topics in (Area).** Prerequisite: Permission of graduate study committee. 1-6 hours.

791. **Individual Study in (Area).** Prerequisite: Permission of graduate study committee. 1-6 hours.

798. **Nondissertation Research.** Prerequisite: Permission of mentor. 1-12 hours.

799. **Dissertation Research.** Prerequisite: Admission to candidacy and permission of mentor. 1-12 hours.

Engineering, Mechanical (Ph.D.*, M.S.M.E.)

*Degree awarded by The University of Alabama and The University of Alabama in Huntsville.

Graduate program director: *Bharat Soni*

Faculty

Andreas Anayiotos, Associate Professor, (Biomedical Engineering); Biofluids, Dynamics of the Vascular System

Heng Ban, Associate Professor (Mechanical Engineering); Pollution Control, Combustion, Thermal-Fluid Science

Charles Bates, Research Professor (Materials Engineering); Casting and Solidification Processes

Krishan K. Chawla, Professor (Materials Engineering); Metal, Ceramic, and Polymer Matrix Composite Materials; Fibers, Interfacial Phenomena

Gary Cheng, Assistant Professor (Mechanical Engineering); Computational Fluid Dynamics, Multi-phase Combustion

Martin Crawford, Professor Emeritus (Mechanical Engineering); Heat Transfer, Fluid Mechanics, Thermodynamics, Air Pollution Control

Alan Eberhardt, Associate Professor, (Biomedical Engineering); Solid Mechanics, Analytical and Numerical Methods in Biomechanics

Evangelos C. Eleftheriou, Research Associate Professor (Mechanical Engineering); Mechanical Systems, Automated Manufacturing, Mechanical Design

Jay Goldman, Professor (Engineering); Administrative Organization and System Design for Productivity and Quality Enhancement in Manufacturing and Service Industries

Roy P. Koomullil, Assistant Professor (Mechanical Engineering); Computational Fluid Dynamics, Turbulence and Flow Modeling Using Generalized Grids.

Anne McClain, Research Assistant Professor, (Mechanical Engineering); Computational manufacturing, Crash Worthiness Simulations, Materials Analysis

Stephen T. McClain, Assistant Professor, (Mechanical Engineering); Energy Systems, Boundary Layer Flow, Conduction and Convection Heat Transfer

Robert H. Nichols, Research Associate Professor (Mechanical Engineering); Computational Fluid Dynamics, Turbulence Modeling, Grid Generation Software

Ralph W. Noack, Research Associate Professor (Mechanical Engineering); Computational Fluid Dynamics, Grid Generation, Visualization Methods, Parallelizing Software

Alan Shih, Research Associate Professor (Mechanical Engineering); Computational Fluid Dynamics, Mesh Generation, Visualization Systems and Software

Bharat Soni, Chair and Professor, (Mechanical Engineering); Computational Structures and Fluid Dynamics, Mesh Generation.

B. J. Stephens, Associate Professor (Mechanical Engineering); Mechanical Systems, Machine Design, Vibration Control, Advanced Stress Analysis

Thomas F. Talbot, Professor Emeritus (Mechanical Engineering); Mechanical Systems, Metallurgical Failure Analysis, Manufacturing Processes

M.S.M.E. Program Requirements

A bachelor's degree from an accredited (or equivalent) program in engineering or the physical sciences is required for admission to graduate study in mechanical engineering. The usual criteria for admission in good standing follow:

Not less than B-level scholarship overall or over the last 60 semester hours of earned credit; and

The GRE aptitude test scores must meet a quantitative portion score of 700 and a minimum score of 500 on the verbal portion. In addition, for foreign nationals, a minimum score of 550 (245 for computer version) on the TOEFL is required. Other standardized examination scores will also be considered.

A student not meeting these requirements may also be admitted, perhaps on probationary status, provided, other information indicating likely success in the program is provided.

A student with an undergraduate degree in a field of engineering other than mechanical or in the physical sciences may also be accepted into the mechanical engineering program. However, such a student will normally have to take additional, preparatory coursework as part of an expanded plan of study (see "Preparatory Courses" later in this section).

PLAN I (Thesis Option)

1. The student must successfully complete at least 24 semester hours of coursework, including (in addition to the general Graduate School requirements)

- Six semester hours in the following required courses: ME 650, Transport Phenomena and ME 670, Advanced Mechanical Design;
- Six semester hours in approved mathematics courses;
- A minimum of 12 semester hours in committee-approved mechanical engineering courses or approved related courses.

2. The student must successfully complete and defend a thesis. The thesis student must register for at least 9 hours of ME 699 (Master's Thesis Research) in addition to the 24 semester hours of coursework.

PLAN II (Nonthesis Option): Research/Design Emphasis

The election of Plan II must be approved by the student's graduate study committee. Generally, Plan II will be approved for students working full time and attending UAB on a part-time basis, or when the student demonstrates that Plan II offers superior educational benefits.

1. The student must successfully complete at least 33 semester hours of coursework, including

- Six semester hours in the following required courses ME 650, Transport Phenomena and ME 670, Advanced Mechanical Design;
- A minimum of 21 semester hours of approved mechanical engineering courses or approved related courses (the 21 hours must include at least 3 semester hours of ME 698, Nonthesis Research, involving design or research);
- Six semester hours in approved mathematics courses.

2. The student must pass a written comprehensive examination on coursework taken in the program.

PLAN II (Nonthesis Option): Technology/Engineering Management Emphasis

1. The student must successfully complete at least 33 semester hours of coursework, including

- Six semester hours in the following required courses: ME 650, Transport Phenomena and ME 670, Advanced Mechanical Design;
- Six semester hours in one of the following two management applications areas: MBA 660, Quantitative Methods I, and either EC 520, Applied Forecasting, or another approved advanced management course;
- Three semester hours in MBA 632, Organizational Behavior;
- Three semester hours in ME 698, Nonthesis Research, involving design or research.
- Nine semester hours of engineering-oriented management coursework. Approved courses include CE 558, Engineering Management; EE 585, Engineering Operations; EE 686, Technical Entrepreneurship I; EE 687, Technical Entrepreneurship II; and ME 601, Design Measurement and Enhancement of Work Systems.
- Three semester hours in an approved mathematics course.

2. The student must pass a written comprehensive examination on coursework taken in the program.

Ph.D. Program

UAB cooperates in programs leading to the Ph.D. degree in mechanical engineering awarded by the University of Alabama (Tuscaloosa) or by the University of Alabama in Huntsville. The student's advisory committee will be composed of faculty from the UAB graduate program in mechanical engineering, together with graduate faculty from the cooperating institution. In determining the student's program, the advisory committee will consider the student's academic objectives and background. Coursework may be taken at UAB and/or the cooperating institution. More detailed information can be obtained from the cooperative program agreement with the degree-granting institution.

Ph.D. Program in Environmental Health Engineering

This unique, interdisciplinary program takes advantage of UAB's diversified engineering school, and nationally renowned health sciences center, to produce Ph.D. candidates

cross-trained in public health and environmental engineering from a variety of disciplines. The program provides students with an understanding of mechanisms through which agents alter environmental, human, and ecosystem health, and the integrated experimental and simulation based technology skills needed to evaluate, manage, and mitigate environmental problems, in the context of engineering and public health.

The program requires at least 42 credit hours of classroom work, plus 18 credit hours of dissertation research beyond the baccalaureate level. Courses of full graduate-level credit earned in an accredited institution where a student was enrolled in the graduate school, may be submitted for review for inclusion in the doctoral program. With approval, up to one-half of the required classwork for the doctoral degree may be transferred from another institution or another program. Successful completion of a qualifying exam, dissertation, and final defense is required of all doctoral candidates.

For more detailed information, please refer to the listing under Engineering, Environmental Health, or contact Dr. Melinda M. Lalor, Program Director for Environmental Health Engineering, 210C Hoehn Engineering Building, 1075 13th Street South, telephone 205-934-8438, e-mail mlalor@uab.edu.

Preparatory Courses

Students admitted to the graduate program in mechanical engineering without an undergraduate degree in mechanical engineering or who have not had the courses listed below must take the following courses or present equivalent prior coursework. Additional coursework may be required depending on the student's undergraduate degree.

ME 241 Thermodynamics I

ME 321 Fluids and Heat Transfer I

ME 322 Fluids and Heat Transfer II

ME 360 Controls

ME 370 Kinematics and Dynamics of Machinery

ME 371 Machine Design I

CE 220 Mechanics of Solids

Additional Information

For detailed information, contact Dr. Ernest M. Stokely, Department of Materials and Mechanical Engineering, BEC 254, 1530 3rd Avenue South, Birmingham, Alabama 35294-4461.

Telephone 205-934-8450.

E-mail estokely@eng.uab.edu

Web www.eng.uab.edu

Course Descriptions

Unless otherwise noted, all courses are for 3 semester hours of credit.

Mechanical Engineering (ME)

506. Jigs and Fixture Design. Design considerations of jigs and fixtures for variety of manufacturing processes. Prerequisite: Permission of instructor.

507. Fundamentals of Tool Design. Aspects of tool design rapid prototyping and rapid tooling for die design, machining, inspection, and gauging presented through lectures and projects. Prerequisite: Permission of instructor.

508. Metrology and Quality Control. Aspects of precision measurement, inspection and gauging, and design of experiments. Short lectures and experiments with modern-day

quality-control instrumentation. Prerequisite: Permission of instructor.

514. Introduction to Computational Fluid Dynamics. Basic numerical analysis techniques; quasi-linearization, consistency, convergence, accuracy, and Von Neumann error analysis. Prerequisites: ME 130 and 321.

515. Compressible Fluid Flow. Application of thermodynamics and fluid mechanics to perfect gas flow. Prerequisites: ME 322.

520. Fluid Measurements. Theory and techniques for measurement of static and dynamic fluid and flow properties. Prerequisite: ME 322.

521. Fluid Machinery. Fluid mechanics of fluid machinery such as turbines, pumps, compressors, fans, blowers, and gas turbine engines. Prerequisite: ME 322.

525. Air Pollution Principles. Theory of operation, design, and application of various methods of air-pollution control. Prerequisite: Graduate standing.

547. Solar Energy. Applications of solar energy to heating, cooling, and power generation. Solar radiation effects, thermodynamic and heat transfer effects in solar power equipment. Prerequisite: ME 322 or permission of instructor.

548. Internal Combustion Engines. Reciprocating internal combustion engines, emphasizing chemical, thermodynamic, and fluid dynamic processes. Stress on 4-stroke engines; some study of 2-stroke engines included. Prerequisite: ME 322 or permission of instructor.

549. Steam Power Generation. Application of thermodynamic principles to steam power systems with both fossil and nuclear fuels. Prerequisite: ME 242.

555. Heat Transfer Equipment. Regenerative, recuperative and direct-contact heat exchangers, heat pipes, and insulation theory. Applications to energy conversion and conservation. Prerequisites: ME 322.

564. Introduction to Finite Element Method. Concepts and applications of the finite element method. Development and applications of basic finite elements. Software use. Prerequisite: CE 220.

566. Optimal Design Techniques. Optimization of both single and multiple variable functions, constrained and unconstrained. Prerequisites: Graduate standing; knowledge of a computer language desirable.

573. Friction and Wear. Mechanisms; bearing analysis and design; lubrication theory and applications; damage analysis. Prerequisite: Graduate standing in engineering.

576. Failure Analysis. Failure mechanism; service failures and methods employed to prevent failures. Prerequisites: MSE 280, CE 220, and CE 221.

577. Design Synthesis. Integration of ideas, concepts, and fundamentals of science and engineering into preliminary design; synthesis of technical, human, and economic actors. Mathematical modeling and design optimization. Prerequisites: ME 370 and 471.

579. Advanced Mechanics. Variation of stress at point; determination of principal and maximum shear stresses. Symmetrical deformation; thick-wall cylinders and rotating disks. Torsion of noncircular sections; curved beams. Prerequisites: CE 220 and 221.

601. Design, Measurement, and Enhancement of Work Systems. Systems involving human performance. Prerequisite: CE 220 or permission of instructor.

610. **Inviscid Fluid Mechanics.** Kinematics and dynamics of real and perfect fluids. Potential flow around bodies. Flow-field solution techniques.

611. **Advanced Fluid Mechanics I.** Fundamental laws of motion for a viscous fluid. Laminar boundary layers.

612. **Advanced Fluid Mechanics II.** Turbulent flow study, turbulent flow modeling, numerical solutions. Prerequisite: ME 611.

614. **Computational Fluid Dynamics of Incompressible Flow.** Mathematics of viscous, incompressible NS equations, numerical treatment of advection and diffusion, grid systems, and survey of algorithms for solving NS equations. Prerequisites: ME 414 or 514, or permission of instructor.

615. **Introduction to Turbulent Flows.** Computational aspect of modeling; Reynolds-averaged equations, turbulent boundary layers, turbulence simulation. Prerequisite: Permission of instructor.

640. **Classical Thermodynamics I.** Macroscopic thermodynamics, first- and second-law formulation, entropy generation and energy, general relations for single-phase and multi-phase systems.

641. **Classical Thermodynamics II.** Classical treatment of chemically reactive systems, power generation, solar energy, refrigeration and thermodynamic design principles. Prerequisite: ME 641.

642. **Statistical Thermodynamics.** Application of statistical mechanics to thermodynamic processes.

650. **Transport Phenomena.** A fundamental introduction to heat, momentum, and mass transfer. Derivation of governing equations. Discussion of fundamental assumptions and simplifications.

651. **Radiation Heat Transfer.** Laws of thermal radiation, geometrical and spectral characteristics, electrical analogy, gaseous radiation.

652. **Conduction Heat Transfer.** General conduction equation; methods of solution. Steady-state, transient, and periodic heat flow; internal heat generation.

653. **Convection Heat Transfer.** Convection problems, including boundary layer problems in laminar and turbulent flow.

656. **Boiling and Condensation Heat Transfer.** Thermodynamic and heat transfer details of boiling and condensation phenomena. Prerequisites: Graduate standing and permission of instructor.

670. **Advanced Mechanical Design.** Design of special machines. Strength and stiffness of machine components. Modern industrial techniques for selection of drive systems, keys, pins, shafts, gears, bearings, and brakes. Prerequisite: Permission of instructor.

671. **Computer-Aided Dynamic Analysis.** Numerical methods and computer-aided design; analysis of both plane and spatial systems. Prerequisite: ME 370 or permission of instructor.

672. **Rotor Bearing Dynamics.** Rigid and nonrigid models; coupled motion between rotating and stationary structures. Prerequisite: ME 370 and 371, or permission of instructor.

674. **Advanced Lubrication.** Journal bearings. Hydrostatic/hydrodynamics theories. Stability and operating characteristics. Prerequisite: Permission of instructor.

676. **Fracture Mechanics.** Linear elastic fracture mechanics. Griffith energy balance. Airy and Westergaard solu-

tions. Elastic-plastic fracture mechanics. Materials testing and applications. Prerequisite: Graduate standing.

678. **Theory of Elasticity.** Continuum mechanics; stress/strain tensors; 2-D elasticity; Airy methods, polar coords, Lamé's problem, singularities, Green's functions. Prerequisites: CE 220 and 221.

690. **Special Topics in (Area).** 1-4 hours.

691. **Individual Study in (Area).** 1-4 hours.

693. **Journal Club in Mechanical Engineering.** 1 hour.

694. **Seminars in Mechanical Engineering.** 1 hour.

698. **Nonthesis Research.** 1-8 hours.

699. **Master's Thesis Research.** Prerequisite: Admission to candidacy. 1-8 hours.

English (M.A.)

Graduate program director: *Whitaker*

Faculty

Rebecca A. Bach, Associate Professor (English); Shakespeare, Renaissance Drama

Tracey A. Baker, Associate Professor (English); Rhetoric and Composition

David A. Basilico, Associate Professor (English); Linguistic Theory, Syntax and Semantics, Cognitive Science

Mary Flowers Braswell, Professor (English); Chaucer, Medieval Studies, Fourteenth-Century English, Arthurian Legend, Bibliography

Alison Chapman, Assistant Professor (English); Renaissance Poetry and Prose

Robert J. Collins, Associate Professor (English); American Literature, Creative Writing

Dennis R. Covington, Professor (English); Creative Writing

Tony Crunk, Assistant Professor (English); Creative Writing

Amy J. Elias, Associate Professor (English); Post-1945 United States Literatures, Literacy Theory, Native American Literatures

Linda Frost, Associate Professor (English); Early and Nineteenth-Century American Literature, Feminist Theory, Creative Writing

Stephen O. Glosecki, Associate Professor (English); Old English Language and Literature

Lila Graves, Associate Professor (English); Prose Fiction, Eighteenth-Century British Literature

Kyle Grimes, Associate Professor (English); British Romanticism, Eighteenth- and Nineteenth-Century English Literature, Poetry, Bibliography

William Hutchings, Professor (English); Modern British Fiction, Modern Drama, World Literature

Mark Jeffreys, Associate Professor (English); Modernist Poetry and Poetics, Disability Studies

Peggy B. Jolly, Associate Professor (English); Rhetoric and Composition

Marilyn J. Kurata, Associate Professor (English); Nineteenth-Century British Novel, Victorian Poetry

Katherine Leffel, Associate Professor (English); Syntactic Theory, Traditional Grammar, General Linguistics

Ada W. Long, Professor (English); Eighteenth-Century Literature, Women's Studies

Bruce McComiskey, Associate Professor (English); History and Theory of Rhetoric, Discourse Analysis, Composition

P. Kieran Quinlan, Associate Professor (English); American Literature

Cynthia Ryan, Assistant Professor (English); Composition, Professional Writing, Public Discourse, Gender Theory

Virginia Whatley Smith, Associate Professor (English); African American Literature, American Literature

Gale Temple, Assistant Professor (English); Early American Literature

Lawrence G. Wharton, Associate Professor (English); American Literature, Fiction Writing

Elaine E. Whitaker, Associate Professor (English); Late Medieval Studies, Literature and the Other Arts, Pedagogy

Jacqueline E. Wood, Assistant Professor (English); African American Literature, American Literature

Admission Requirements

For admission in good standing, applicants must meet the Graduate School's requirements for scholarship and test (GRE General Test or MAT). The applicant should normally have finished the requirements for an undergraduate degree in English, including satisfactory completion of at least eight semester hours in a foreign language. A generally well-prepared applicant who is lacking in some part of the undergraduate preparation may be admitted with the provision that any deficiencies be removed by a time specified by the graduate program director.

Program Description

Students in the graduate program can concentrate their studies in any of three areas: Literature, Composition and Rhetoric, or Creative Writing. The requirements for each of these concentrations are explained below.

Concentration in Literature

Most literature courses can be considered to fall into one of the following areas, each of which has its own reading list.

Group I:

- British Lit before 1500
- British Lit 1500-1660
- British Lit 1660-1790
- British Lit 1790-1900
- British Lit 1900-present

Group II:

- American Lit before 1800
- American Lit 1800-1900
- American Lit 1900-present
- African American Lit 1746-present
- African Diaspora Lit

Group III:

- Composition Pedagogy
- Rhetorical Theory
- Linguistics
- Critical Theory

Plan I.

1. Students who write a thesis must take 3 hours in Bibliography & Methods, 3 hours of linguistics, 6 hours of thesis work, 12 hours of British/American literature, and 6 hours of electives. They must take at least 6 hours in Group I and 6 hours in Group II.

2. 15 hours of course work must be at the 600 seminar level in English. A maximum of 3 of these required 15 hours can be taken as EH 699, Thesis Research.

3. Students must choose a member of the English faculty to chair their Graduate Study Committee (GSC). In consultation with this chair, students must select at least two other faculty members to complete their GSC. All members of the GSC must be graduate faculty, and one must come from outside the UAB English Department. Once constituted, membership of the GSC cannot be changed without the approval of the departmental graduate program committee.

4. Before students can be admitted to candidacy, they must have passed 18 hours of course work and had a thesis proposal accepted by their GSC and the departmental graduate program committee.

5. Students must pass a Thesis Defense.

Plan II.

1. Nonthesis students must take 3 hours in Bibliography & Methods, 3 hours of linguistics, 12 hours of British/American literature, and 12 hours of electives.

2. 15 hours of course work must be at the 600 seminar level in English.

3. Students must pass individual tests in 5 areas, but 1 of these tests may be replaced by earning a cumulative 3.5 or better G.P.A. in two English graduate courses in one of the listed areas OR by passing two creative writing courses at the 500 level.

4. All students must choose at least one test area from each Group.

5. By the time students have earned 24 credit hours toward the M.A., students must secure the agreement of a graduate faculty member to serve as chair of their Graduate Study Committee (GSC). Students are encouraged to secure this faculty mentor as early as possible since the chair of a student's GSC has primary responsibility for mentoring the student through the exam process. The Committee chair must coordinate the composition, administration, and evaluation of all area tests for that student. The chair is also responsible for informing the student (and graduate program director) of the criteria for evaluation of the subject area tests; for notifying the student of the results; and for meeting with the student afterwards to review the tests. The chair is also responsible for keeping the graduate program director informed of the student's progress and maintaining a complete exam file on the student.

6. In consultation with the student and the graduate program director, the Committee chair will appoint at least two other faculty to serve on the student's GSC. All members of the GSC must be graduate faculty. Once constituted, membership of the GSC cannot be changed without the approval of the departmental graduate program committee.

7. Each two-hour area test must follow a standard format that allows students to demonstrate their ability to read closely and to synthesize ideas.

a. Area tests in literature and critical theory will give the following instructions based on selections from the area reading list:

Choose one of the following passages and write an essay that (1) establishes—based on the chosen passage—some significant literary, intellectual, and/or cultural context and presents a thesis having to do with that context; (2) explains, by a close

reading of the text, why the chosen passage is important both to the work from which it is taken and to the thesis of the present essay; and (3) discusses the context and thesis in relation to at least two other works from the area reading list.

b. Area tests for Composition Pedagogy or Rhetorical Theory will give the following instructions based on selections from the area reading list:

Choose one of the following passages or set of passages and write an essay that (1) indicates your understanding of the passage(s) and the work from which it is taken; (2) identifies and explains the specific issues in rhetorical theory or composition pedagogy that are addressed by or related to the selection(s); and (3) discusses these issues in a broader context by drawing on at least two other works from the area reading list.

c. See the Director of the Linguistics Program for a sample area test in Linguistics.

8. Students must provide their GSC with a minimum of three weeks' notice in scheduling area tests, which must be taken Monday-Friday during the tenth week of each semester. Unless a single area test remains to be taken, students should arrange to take at least two area tests during the same semester.

9. Students are limited to three attempts at passing a test for the same area.

10. The GSC will hold a group grading session to evaluate individual tests as Failing, Passing, or High Pass (the latter designation must be a unanimous decision of the GSC). If a student earns four High Passes, this student will be passed "With Distinction."

11. Students may be admitted to candidacy after they have completed 24 hours of course work and satisfied at least three of the area test requirements either by passing the relevant tests or by fulfilling the necessary course work as outlined in item 3.

12. There is no oral examination for nonthesis students.

Concentration in Composition/Rhetoric

Plan I.

1. Students who write a thesis must take 3 hours in Bibliography & Methods of Research, 3 hours of linguistics, 9 hours of literature electives, 6 hours of thesis research, 3 hours of rhetorical theory, and 6 additional hours of courses in the areas of Rhetorical Theory, Composition Pedagogy, or Professional Writing (total of 30 hours).

2. 15 hours of course work must be at the 600 seminar level in English. A maximum of 3 of these required 15 hours can be taken as EH 699, Thesis Research.

3. Students must choose a member of the English faculty to chair their Graduate Study Committee (GSC). In consultation with this chair, students must select at least two other faculty members to complete their GSC. All members of the GSC must be graduate faculty, and one must come from outside the UAB English Department. Once constituted, membership of the GSC cannot be changed without the approval of the departmental graduate program committee.

4. Before students can be admitted to candidacy, they must have passed 18 hours of course work and had a thesis proposal accepted by their GSC and the departmental graduate program committee.

5. Students must pass a Thesis Defense.

Plan II.

1. Nonthesis students must take 3 hours in Bibliography & Methods of Research, 3 hours of linguistics, 9 hours of literature

electives, 3 hours of rhetorical theory, and 12 additional hours of courses in the areas of Rhetorical Theory, Composition Pedagogy, or Professional Writing (total of 30 hours).

2. Guidelines 2-12 under Concentration in Literature, Plan II, apply to these students.

Concentration in Creative Writing (Plan I only)

1. Creative writing students are required to take 9 hours of creative writing courses, 6 hours of thesis research, 9 hours of literature, and 6 hours of English electives.

2. 15 hours of course work must be at the 600 seminar level in English. A maximum of 3 of these required 15 hours can be taken as EH 699, Thesis Research.

3. Students must choose a member of the English faculty to chair their Graduate Study Committee (GSC). In consultation with this chair, students must select at least two other faculty members to complete their GSC. All members of the GSC must be graduate faculty, and one must come from outside the UAB English Department. Once constituted, membership of the GSC cannot be changed without the approval of the departmental graduate program committee.

4. Before students can be admitted to candidacy, they must have passed 18 hours of course work, including at least 3 hours in creative writing, and had a thesis proposal accepted by their GSC and the departmental graduate program committee.

5. Students must pass a Thesis Defense.

Additional Information

For detailed information, contact Dr. Elaine E. Whitaker Associate Chair, Department of English HB 214 1530 3rd Avenue South, Birmingham, AL 35294-1260. Telephone 205-934-8577

E-mail EnglishGrad@uab.edu

Web www.uab.edu/english/grad

Course Descriptions

Unless otherwise noted, all courses are for 3 semester hours of credit. Course numbers preceded with an asterisk indicate courses that can be repeated for credit, with stated stipulations.

English (EH)

501. **Tutoring Writing.** Examines the theory and practice of one-to-one writing instruction.

502. **The Rhetoric of Popular Periodicals.** Explores the production and consumption of magazine discourse.

503. **Business Writing.** Advanced writing focused on letters, resumes, and professional reports.

504. **Technical Writing.** Advanced writing focused on short informal and long formal reports.

505, 506. **Poetry Writing Workshop.** Advanced work in poetry through student's own writing. Pass/Fail.

507, 508. **Creative Writing Workshop: Special Projects.** Advanced work in genres outside of poetry and fiction through student's own writing. Pass/Fail.

509, 510. **Fiction Writing Workshop.** Advanced work in prose fiction through students' own writing. Pass/Fail.

511. **Novel.** Techniques of prose fiction. Authors vary.

512. **Poetry: Lyric and Shorter Forms.** The evolution and generic influences of the small poem in English from the early Renaissance to the present.

513. **Drama.** Techniques and problems of drama, classical through contemporary.

514. **Modern British and European Drama.** Techniques and problems of modern European drama from Ibsen to the present.
515. **Form of Fiction: The Short Story.** American, Russian, and European short stories, emphasizing aesthetics of form.
516. **Modern American Poetry.** Focus on writers from 1900-1945 such as Frost, Stein, Stevens, Williams, H.D., Pound, Moore, Eliot, Toomer, Crane, and Hughes.
520. **World Literature I (to 1600).** Survey of monuments mainly in the Western tradition (Sumerian, Hebraic, Hellenic, continental) with emphasis on the epic.
521. **World Literature II (1600 to present).** Selections in translation from Europe, Africa, and South America.
542. **Literary Theory and Criticism.** Introduction to explanations of what literary art is and what literary scholars and critics do. Focus on theoretical schools and issues relating to literary production.
543. **Archetype and Myth.** Recurring images, underlying patterns, and shapes-of-meaning in poetry, fiction, and fairy tales.
544. **Women's Literature and Theory.** Literary works and theoretical perspectives of Angelou, Chopin, Hong Kingston, Hurston, Walker, Woolf, Plath, and others.
545. **Special Topics in African American Studies.** Literary and theoretical explorations of a specific topic.
550. **Advanced Grammar.** Present-day English grammar.
551. **Generative Grammar.** Advanced analysis of English grammar with emphasis on Chomskyan generative grammar. Prerequisite: permission of instructor.
552. **Grammar and Usage for English Teachers.** Intensive review of the structure of English; emphasis on usage, punctuation, and style as these relate to grammar.
553. **Advanced History of the English Language.** Advanced topics.
554. **The Biology of Language.** Vocal tract and neuroanatomical specializations for language, language acquisition, genetic language disorders, language and other primates, and the evolution of language.
557. **Writing and Medicine.** Public discourse focusing on health, illness, and medical practice. Production of texts as health consumers and health practitioners.
559. **Discourse Analysis.** Public discourse, with emphasis on social politics of linguistic choices.
561. **American Literature, 1620-1820.** Representative American writing from the colonial period to Washington Irving.
562. **American Literature, 1820-1870.** Representative writers such as Alcott, Dickinson, Douglass, Emerson, Fern, Fuller, Harper, Hawthorne, Jacobs, Melville, Poe, Spofford, Stowe, Thoreau, Whitman, and Whittier.
563. **American Literature, 1870-1914.** Realism and naturalism as represented in works by Twain, James, Howells, Crane, Jewett, Wharton, Dreiser, Norris, Chopin, and others.
564. **American Literature, 1914-1945.** Selected works by Eliot, Frost, Faulkner, Hemingway, Cather, O'Neill, Williams, and others.
565. **American Literature 1945-Present.** Selected fiction and poetry in the context of postwar cultural trends and literary movements.
566. **African American Literature.** Representative writers from Gustavus Vassa to Alice Walker, with emphasis on periods and movements.
567. **Black Women Writers.** Evolution of the Afrocentric feminist consciousness through early and contemporary writings.
568. **The Harlem Renaissance.** Black writers during Harlem Renaissance movement. Includes Johnson, Toomer, Murray, Larsen, McKay, Thurman, Reed, and Morrison.
569. **Medieval Culture: Literature and Society.** Exploration through art, literature, and history of the dominant themes of the English Middle Ages.
570. **Arthurian Legend.** King Arthur and his knights in literature from 6th-century history and formulation of the legend in the Middle Ages to its use in the 20th century.
573. **Chaucer: Pilgrimage to Canterbury.** Selections from *Canterbury Tales* and the 14th-century milieu.
574. **English Renaissance Drama Excluding Shakespeare.** Survey of the Elizabethan and Jacobean theater. Authors vary, but may include Jonson, Webster, Dekker, and Heywood.
575. **English Renaissance Poetry and Prose.** Focus varies from broad survey of period to close analysis of genre, theme, or author.
576. **Shakespeare.** Intensive study of seven plays, focusing on the interactions between culture and the theater.
578. **Age of Milton.** Selected prose and poetry, including *Paradise Lost*.
580. **The Restoration.** Dryden, Butler, Rochester, Marvell, Bunyan, Congreve, Wycherley, and Etherege.
581. **The Eighteenth Century: Literature and Culture.** An interdisciplinary exploration of texts that focuses on social, economic, and political backgrounds.
582. **The Eighteenth Century: Theory and Interpretation.** Formal and philosophical implications of selected texts. Authors and topics vary.
583. **British Romanticism.** Study of works by British writers, 1785-1834. Authors will likely include Blake, Smith, Wordsworth, Coleridge, Byron, P.B. and Mary Shelley, Keats, and others.
585. **British Victorian Poetry.** Study of Tennyson, Browning, Arnold, and others with a focus on the cultural context of their poetry.
586. **Eighteenth-Century British Novel.** Fielding, Defoe, Sterne, Smollet, and Richardson.
587. **Nineteenth-Century British Novel.** Study of Writers like Austen, Dickens, Thackeray, the Brontes, George Eliot and Hardy with an emphasis on the relationship between cultural changes and the development of the novel.
588. **British Novel: The Modern Age.** Study of Conrad, Lawrence, Joyce, Woolf, Ford, and others, focusing on narrative technique and the transformation of traditional literary forms.
589. **James Joyce.** A study of Joyce's writings through *Ulysses*.
- *591. **Major Writers.** See class schedule for announcement of subjects. May be repeated for total of 9 hours credit if focus is on different subjects.
- *592. **Special Topics.** See class schedule for announcement of subjects. May be repeated for total of 9 hours credit if focus is on different subjects.

597. **Individual Studies.** Prerequisite: proposal must be submitted to the Graduate Director before the last two weeks of the semester preceding the semester in which the student intends to register. 1-3 hours.

601. **Classical Rhetorical Theory.** Review of rhetoric from classical period through Renaissance with emphasis on the works of Plato and Aristotle.

602. **Modern Rhetorical Theory.**

603. **Literacy in Communities.** Examines the theory and practice of literacy instruction in varied cultural contexts.

604. **Research Methods in Composition and Rhetoric.** Develops skills in planning and implementing research designs in composition.

610. **Prosody, Poetics, and Close Reading.** Fosters an ability to read poetry closely and analytically; examines traditional descriptions of poetic form and meter; introduces recent work in poetic theory and philosophy of poetic composition.

635. **Middle English Literature.** Study of writers other than Chaucer, with a concentration on the writings of the Gawain Poet, the *lais* and lyrics, and some female writers.

636. **Chaucer.** Emphasis on the importance of Chaucer as a poet, his contributions to literature, and his cultural setting. *Canterbury Tales* and selected earlier poetry. 3 hrs.

637. **English Renaissance Literature.** Topics vary. Analysis of a group of texts within a genre, with a common theme, or by a single author or group of authors, as well as the discursive and social contexts in which these texts were produced.

638. **Eighteenth-Century British Literature.**

639. **Nineteenth-Century British Literature.** Intensive exploration of a particular aspect of literature and culture from the Romantic or Victorian period. Focus varies.

640. **Twentieth-Century British Literature.**

645. **Bibliography and Methods of Research.** Emphasis on how materials in Sterne Library may be used effectively. Includes computer searching, listserve, and the internet. Field trips to special collections.

646. **Practicum in Teaching Writing.** Theory and practice of teaching writing at the postsecondary level.

647. **Practicum in Tutoring.** English grammar review and effective tutoring strategies. Prerequisites: students must have been awarded an assistantship and be scheduled to tutor in the Writing Center. 1 hour.

648. **Introduction to Old English.** Part one of an in-depth study of Anglo-Saxon English culminating in interpretation of *The Dream of the Rood* and *The Wanderer* in the original alliterative verse. Satisfies the M.A. linguistics requirement.

649. **Beowulf.** Part two in the Old English sequence, exploring a few shorter works as well as the epic in close detail. Prerequisite: EH 648.

655. **History of the English Language.**

656. **American Literature, 1620-1820.** Focus on texts reflecting the evolution of American culture from its early colonial period to the early national period.

657. **American Literature, 1820-1870.** Centering on writers from the American Romantic Movement to explore such themes as their use of symbolism, transcendentalism, feminist approaches, or connections with American landscape art.

658. **American Literature, 1870-1914.**

659. **American Literature, 1914-1945.**

660. **American Literature, 1945-Present.** Selected postmodern works in the context of U.S. cultural trends and literary movements since the Cold War.

677. **Shakespeare: The Body, Gender, and Sexuality.** Investigates languages of the body, sexuality, and gender in seven plays, as well as historical materials and current criticism and theories of the body.

*690. **Major Writers.** See class schedule for announcement of subjects. May be repeated for total of 9 hours credit if focus is on different subjects.

*693. **Special Topics.** See class schedule for announcement of subjects. May be repeated for total of 9 hours credit if focus is on different subjects.

694. **British Literary Themes from the Middle Ages Through the Early Eighteenth Century.**

695. **British Literary Themes from Jane Austen to the Present.** Recent themes include effects of industrialism, role of women, the concept of the gentleman, loss of faith, and relation of the artist and audience. Writers vary.

696. **American Literary Themes from the Puritans to the Present.** Writers and themes vary.

698. **Directed Studies.** See the departmental description of the M.A. program for the special restrictions on this course. Prerequisite: Permission of Graduate Director. 1-3 hours.

*699. **Thesis Research.** Prerequisite: Admission to candidacy and approval of thesis proposal by departmental Graduate Committee. 1-6 hours. May be repeated for a total of 9 hours credit.

Environmental Health Sciences (Ph.D.)

Graduate program director: *Postlethwait*

Faculty

H. Kenneth Dillon, Associate Professor (Environmental Health Sciences); Industrial Hygiene, Environmental Chemistry

Henry Jay Forman, Professor and Chair (Environmental Health Sciences); Environmental Toxicology, Glutathione Transport and Synthesis Defects in Cystic Fibrosis and AIDS

Brian G. Forrester, Assistant Professor (Family Medicine); Occupational Medicine

Mark S. Garfinkel, Research Assistant Professor (Environmental Health Sciences); Environmental toxicology, *Drosophila* developmental biology and genetics

Robert R. Jacobs, Professor (Environmental Health Sciences); Industrial Hygiene

Timothy J. Key, Assistant Professor (Family Medicine); Occupational Medicine

Melinda M. Lalor, Assistant Professor (Civil and Environmental Engineering); Environmental Engineering

Rui-Ming Liu, Assistant Professor (Environmental Health Sciences), Environmental Toxicology, Glutathione Transport and Synthesis Defects in Aging and Neurodegenerative Diseases

Xiangyi Lu, Research Associate Professor (Environmental Health Sciences), *Drosophila* Developmental Biology and Genetics

R. Kent Oestenstad, Associate Professor (Environmental Health Sciences); Industrial Hygiene

Robert E. Pitt, Assistant Professor (Civil and Environmental Engineering); Environmental Engineering

Ronald O. Rahn, Professor (Environmental Health Sciences); Environmental Chemistry

Deodutta Roy, Professor (Environmental Health Sciences); Environmental Molecular Toxicology

Douglas M. Ruden, Associate Professor (Environmental Health Sciences); Environmental Toxicology, *Drosophila* Genetics and Developmental Biology

Program Information

Environmental health scientists work for industry, government, and academia to estimate and mitigate environmental exposures to chemical, biological, and physical stressors. The department is committed to education and research in the identification, evaluation, and control of these human health hazards. The Ph.D. program in environmental health sciences focuses on the toxicology, toxicogenomics, and proteomics of gene-environment interactions. The Ph.D. degree is designed to prepare scientists for careers in environmental health research. Interactions between environmental agents and the functions of tissues and cells are the focus of this department. Taking advantage of the rapid developments in genetics and signal transduction in combination with the traditional areas of environmental health sciences, the department is developing new approaches to environmental toxicology and occupational health. Graduates are qualified to assume upper-level positions in the public or private sector in management, teaching, research, or consulting. Graduates are particularly qualified for teaching or research positions in academic institutions that require sound research training.

Specific research interests of faculty in the department include effects of chemicals and environmental oxidants on DNA and proteins, the effects of environmental toxins on developmental processes using *Drosophila* as a model, risk assessment, biological methods for treating hazardous wastes, and biological monitoring tools for assessing chemical exposures.

Admission

Applicants should have a bachelor's or higher degree in one of the natural sciences from an accredited college or university. This should include a minimum of a one-year sequence in biology, organic, inorganic, and physical chemistry; and a one-year physics sequence requiring calculus. Applicants are required to take the GRE General Test. A score of 550 on each of the verbal, quantitative, and analytical sections of the examination is required, as well as a GPA of 3.0. Deadline for applications to be admitted into the program is May 1.

Curriculum

Ph.D. students are expected to complete the department core course requirements as well as those courses necessary to prepare them to conduct their dissertation research. The required core courses include Integrative Biomedical Sciences (IBS) 701 and 702 the first year, an advanced, computer-based statistics course, ENH 764 (Signal Transduction in Environmental Health and Toxicology), and either EPI 616 (Environmental Epidemiology) or EPI 617 (Occupational Epidemiology) the second year. Other courses preparatory to dissertation research will be determined by the student in consultation with his or her academic advisors..

Additional Information

For detailed information, contact Ms. Cherie Hunt, 1665 University Boulevard, University of Alabama at Birmingham, School of Public Health, Room 317, Birmingham, Alabama 35294-0022.

Telephone 205-934-8488

E-mail ehs@crl.soph.uab.edu

Course Descriptions

Unless otherwise noted, all courses are for 3 semester hours of credit. Course numbers preceded with an asterisk indicate courses that can be repeated for credit, with stated stipulations.

Environmental Health Sciences (ENH)

700. Advanced Environmental Health Sciences. Environmental problems encountered by public health professionals, including water pollution, water resources, air pollution, industrial hygiene and occupational safety, and toxicology. Case studies used in examining environmental problems.

705. Special Topics (Readings) in Environmental and Occupational Health. Topics taught on request on individual basis: radiological health, air pollution, systems safety, advanced toxicology, toxicokinetics, environmental science related to risk assessment process. Prerequisites: ENH 750.

710. Grant Proposal Writing in the Biomedical Sciences. Introduction to writing grant proposals and fellowship applications. Topics include scientific ethics, funding sources, electronic databases, organization and format of proposals and applications, submission and review processes, use of secondary sources, and guidelines for effective proposal writing. (Ruden)

711. Risk Assessment of Environmental Hazards. Principles of risk assessment and management as applied to various environmental issues. Examination of theoretical aspects of epidemiology, toxicology, and environmental science related to risk assessment process. (Roy, Roseman)

750. Doctoral-Level Essentials of Environmental and Occupational Toxicology. Toxicology principles, including dose-response, toxicokinetics, factors modifying toxicity, organ system responses to toxic insult, and toxicity testing. (Roy)

752. Biochemical and Molecular Toxicology. In-depth study of events at cellular and molecular level where toxic chemicals interact with living organisms, including the interactions between toxicants and DNA/RNA, proteins, and lipids. Prerequisites: Biochemistry and ENH 750 or permission of instructor. (Liu)

753. Systemic Toxicology of Environmental Agents. Biochemical and molecular toxicological concepts used to discuss mechanisms of action of endogenous and exogenous chemicals; how toxic effects are produced and how toxicants selectively damage various organs. Receptor-nonreceptor actions of toxicants to target organs. Prerequisite: ENH 752 (Roy)

755. Experimental Methods in Biochemical Toxicology. Lectures and hands-on experience with laboratory methods as applied to toxicology, including animal dosing, obtaining biological samples, biochemical assays (enzymes, protein, DNA), high-pressure liquid chromatography, gas chromatography, mass spectrometry, use of radioisotopes, and cell culture techniques. Prerequisites: Biochemistry and ENH 750 or permission of instructor. (Roy)

761. **Pulmonary and Dermal Risk Management.** Focus on lung and skin as primary routes for exposure to environmental and occupational toxins and assessment of the anatomical, biochemical, and physiological characteristics of each organ system as both target and portal organ. Current methods evaluated, including in vitro bioassays, in vivo animal studies, and human exposure challenge studies. Prerequisites: ENH 620 and 651. (Jacobs)

762. **Gas Adsorption Kinetics and Thermodynamics as Applied to Air Sampling and Cleaning Devices.** Underlying principles of adsorption of gas phase compounds by solid sorbents, including absorption isotherms, kinetics of sorption process, and effects of environmental conditions. Prerequisites: ENH 661-662. (Dillon)

763. **Aerosol Technology.** Properties and behavior of aerosols from industrial hygiene and environmental perspectives. Fundamental particle descriptions and critical fluid properties affecting particle behavior. Methods of defining particle size and size distribution and theories of particle kinetics and their application to particle deposition and collection. Prerequisite: ENH 661-662. (Oestenstad)

764. **Signal Transduction in Environmental Health and Toxicology.** One of the major challenges in environmental health is determination of the underlying mechanisms through which toxicants act. Many of the adverse effects of toxicants are mediated through interaction with the processes whereby tissues and cells communicate with each other or respond to external stimuli. Some toxicants may interfere with normal signaling while others may mimic endogenous stimulants and mediators. Another major mechanism for the action of toxicants is the stimulation of inflammatory processes (Forman).

791. **Advanced Toxicology Seminar.** Facilitates critical review of recent referred publications in toxicology and presentation of research data. Students exposed to advanced knowledge and diverse subjects. Prerequisite: ENH 750 or permission of instructor. (Roy)

796. **Environmental Toxicology Laboratory Rotation.** (Roy)

798. **Doctoral-Level Directed Research.** Prerequisite: Permission of graduate program director. 1-6 hours.

799. **Dissertation Research.** Prerequisite: Admission to candidacy. 1-6 hours.

Epidemiology (Ph.D.)

Graduate program director: *Funkhouser*

Faculty

Susan Allen, Associate Professor (Epidemiology); Infectious Disease Epidemiology, Reproductive Epidemiology, International Health

Fabio Barbone, Associate Professor (Epidemiology); Occupational Epidemiology, Epidemiologic Methods, Pharmacoepidemiology

Colleen Beall, Assistant Professor (Epidemiology); Occupational Epidemiology, Cancer Epidemiology

Philip Cole, Professor Emeritus (Epidemiology); Cancer Epidemiology, Epidemiologic Methods, Ethics, History of Public Health

Elizabeth Delzell, Professor (Epidemiology); Occupational Epidemiology, Chronic Disease Epidemiology Including Cancer

Ellen Funkhouser, Associate Professor (Epidemiology); Cancer Epidemiology, HIV/AIDS, Epidemiologic Methods

Rodney Go, Professor (Epidemiology); Population Genetics, Chronic Disease Epidemiology, Molecular Epidemiology

Mary Hovinga, Associate Professor (Epidemiology); Environmental Epidemiology, Epidemiology of Mental Health and Development

Richard Kaslow, Professor (Epidemiology); Infectious Disease Epidemiology, Immunogenetics

H. Michael Maetz, Professor (Epidemiology); Infectious Disease Epidemiology; Surveillance

Gerald McGwin, Assistant Professor (Epidemiology); Injury Epidemiology

Martha Phillips, Assistant Professor (Epidemiology); Cardiovascular Epidemiology

Jeffrey Roseman, Professor Emeritus (Epidemiology); Chronic Disease Epidemiology Including Diabetes and Heart Disease; Injury Epidemiology

Nalini Sathiakumar, Associate Professor (Epidemiology); Occupational Epidemiology, Chronic Disease Epidemiology Including Cancer

Sten Vermund, Professor, (Epidemiology); HIV/AIDS and Infectious Disease Epidemiology, International Health

John Waterbor, Associate Professor (Epidemiology); Chronic Disease Epidemiology, Cancer Control

Program Information

Admission Requirements

Applicants to the Ph.D. program in epidemiology must have earned a Master of Public Health degree or the equivalent, with a strong background in epidemiology and statistics.

Curriculum

One biostatistics course, three epidemiologic methods courses, two specialty courses, three doctoral seminars, one teaching practicum, and one outside elective are required (in addition to several master's level courses if they were not taken while earning an M.P.H.).

Additional Information

For detailed information, contact Dr. Ellen Funkhouser, Department of Epidemiology and International Health UAB School of Public Health, Ryals Building, Room 230P, 1665 University Boulevard, Birmingham, AL 35294-0022.

Telephone 205-934-1120

Fax 205-934-8665

E-mail emfunk@uab.edu

Course Descriptions

For additional courses in epidemiology and other public health areas, see the catalog of the School of Public Health. Unless otherwise noted, all courses are for 3 semester hours of credit. Courses numbers preceded with an asterisk indicate courses that can be repeated for credit, with stated stipulations.

Epidemiology (EPI)

703. **Special Topics in the Epidemiology of Chronic Disease.** To provide the student with information about grant writing and practice in preparing a grant proposal for submis-

sion. The proposal must relate to an epidemiologic topic. Human subjects issues are discussed. (Faculty)

705. The Epidemiology of Cardiovascular Disease. An exploration of the breadth and depth of the epidemiology of cardiovascular disease including history, classification, surveillance, frequency, distribution, etiology, natural history, and control. It will also address the programmatic details of large-scale epidemiologic studies in cardiovascular disease and discuss in detail CVD epidemiologic papers relating to the use of various study designs. Prerequisite: EPI602 or permission of instructor. (Howard/Canto)

709. Theoretical Basis of Epidemiology. Statistical concepts underlying analysis of epidemiologic studies; interrelationship of epidemiologic measures; principles and analysis of matched study designs and of standardized ratio measures. Computer simulations and class presentations. Prerequisites: EPI625. (Funkhouser)

710. The Analysis of Case-control Studies. This course is designed to provide doctoral students in epidemiology with the theoretical basis of and practical experience in the analysis and interpretation of data from case-control studies. Prerequisites: BST603, BST655, EPI709. (Barbone)

711. Nosocomial Disease Control Practicum. Exposure to and involvement in hospital infection control. Student assigned to infection control practitioner at a local hospital. Project required. Prerequisites: Permission of instructor, EPI610 and EPI605. (Maetz)

712. Infectious Disease Epidemiology Practicum. On-site exposure to epidemiology as applied in health department setting with emphasis on infectious disease control. Project required. Prerequisites: Permission of instructor, EPI610 and EPI605. 2 credit hours. (Maetz)

713. Risk Assessment of Environmental Hazards. Principles of risk assessment and management as applied to various environmental issues. Examination of theoretical aspects of epidemiology, toxicology, and environmental science related to risk assessment process. Prerequisite: ENH750-751. (Roy)

720. The Analysis of Follow-up Studies. Designed to provide doctoral students in epidemiology with the theoretical basis of and practical experience in the analysis and interpretation of data from follow-up studies. Prerequisite: EPI710. (McGwin)

730. Introduction to Human Population Genetics Theory. Basic concepts, theory, and mathematical principles underlying population genetics, i.e., mechanisms affecting distribution of genes in populations. Prerequisite: Permission of instructor. (Go)

740. Cancer Epidemiology. Methodologic and substantive issues in cancer epidemiology. The course will consist of a series of lectures by the instructors and other faculty and of a series of presentations by students. Prerequisites: EPI625. 2 credit hours (Delzell)

750. Issues in the Control of Chronic Diseases. Disease control by prevention, early detection, and improving access to treatment. Model for health risk assessment, interventions for risk modifications. Role of screening in controlling chronic disease. Access to medical evaluation and delivery of treatment. Ethical, political, and legal aspects of disease control. Prerequisites: EPI602, EPI610 or permission of instructor. (Waterbor)

788 Principles and Methods in Molecular Epidemiology. Molecular biology and its relevance to the epidemiology of human diseases, and the ability to apply this new molecular knowledge to epidemiologic research. The course will develop knowledge and skills in molecular biology and genetics, and demonstrate ways to apply this information in evaluating susceptibility, etiology, symptomatology, treatment, and eventual prevention of diseases. 4 credit hours. (Go)

790. Doctoral Seminar in Epidemiology. In depth study of several areas of epidemiologic methodology. Students responsible for selecting and presenting topics. Considerable reading and outside preparation required. Prerequisite: Permission of instructor. 2 hours. (Faculty)

797. Analysis and Presentation of Epidemiologic Data. To gain experience with the analysis, interpretation, and presentation of epidemiologic data by successfully analyzing a data set and presenting the results in the form of a publication quality manuscript. Restricted to PhD students in Epidemiology. Prerequisites: BST 655 and EPI625. 2 credit hours (Funkhouser/McGwin)

798. Doctoral-Level Directed Research, Epidemiology. Independent study with guidance of appropriate public health faculty. 1-6 hours.

799. Dissertation Research, Epidemiology. Research for dissertation under direction of dissertation committee. 1-6 hours.

Foreign Languages

Faculty

Serge Bokobza, Associate Professor (French); Nineteenth- and Twentieth-Century French Literature, Literature and Ideology, Civilization.

William C. Carter, Professor (French); Nineteenth- and Early Twentieth-Century French Literature, Fin-de-Siècle French Novel, Proust

Catherine F. Daniélou, Associate Professor (French); Sixteenth- and Seventeenth-Century French Literature, Gender Studies

Sheri Spaine Long, Associate Professor (Spanish); Contemporary Spanish Peninsular Literature, Post-Civil War Novel, Second Language Acquisition/Teaching Methodology

Dellita L. Martin-Ogunsola, Professor (Spanish); Contemporary Latin American Literature, Caribbean Literature, Afro-Hispanic Fiction and Poetry

Carlos L. Orihuela, Associate Professor (Spanish); Nineteenth- and Early Twentieth-Century Latin American Literature, Andean novel

Lourdes Sanchez-Lopez, Assistant Professor (Spanish); Second Language Acquisition, Foreign Language Pedagogy, Spanish and TESOL

Program Information

UAB does not currently offer a graduate degree in foreign languages and literatures. However, there is a program leading to the degree of Master of Arts in Education, with a teaching specialization in French, German, or Spanish, and a program leading to the Educational Specialist degree with a specialization in the same languages. Requirements for the M.A.Ed. and Ed.S. degrees are listed with the "Education (General Information)" section of this catalog. Courses in foreign languages and literatures at the graduate level are listed below.

Additional Information

For additional information, contact Dr. Sheri Spaine Long, Interim Chair, UAB Department of Foreign Languages and Literatures, Room 407-A, 900 South 13th Street, Birmingham, AL 35294-1260.
Telephone: 205-934-4651

Course Descriptions

French (FR)

FR 501. **Pre-Revolutionary France, 1610-1789.** Literature, culture and civilization of seventeenth- and eighteenth-century France reflecting the historical and literary ambience in which Ancien Régime writers, philosophes, and artists worked. 3 hours.

FR 502. **Post-Revolutionary France, 1789-1913.** Literature, culture and civilization of late-eighteenth-, nineteenth-, and twentieth-century France illustrating the impact of the French Revolution on the historical and literary ambience of Europe and the Americas. 3 hours.

FR 503. **Fin-de-Siècle France, 1895-1918.** Major literary and artistic movements of fin-de-siècle France from La Belle Époque period through World War I. 3 hours.

FR 504. **French Literature since 1940.** Cultural trends and literary movements from World War II to the present, including existentialism and the nouveau roman. 3 hours.

FR 505. **Francophone Literature.** French-speaking literature outside France that developed through colonization, decolonization, revolution and emigration. Representative writers from Francophone countries with emphasis on Africa and the Caribbean.

FR 510. **Special Topics in French.** Seminar on individual authors, specific genres, important literary movements, or literary discourse/theory. May be repeated for credit. 3 hours.

FR 512. **French Civilization before 1789.** Historical and cultural foundation of France from its conquest by Julius Caesar to the French Revolution. 3 hours.

FR 513. **French Civilization after 1789.** Historical and cultural development of France from the French Revolution to the present, including the student revolts of May 1968. 3 hours.

FR 590. **Study Abroad.** Fifth-year level of approved program in a French-speaking country. Prerequisite: Permission of department chair. 1 to 6 hours.

FR 599. **Independent Studies.** Prerequisite: Permission of department chair. 3 hours.

German (GN)

GN 580. **Special Topics in German Literature.** Emphasis on particular authors, genres, or topics. May be repeated for credit. 3 hours.

GN 590. **Study Abroad.** Fifth-year level of approved program in a German-speaking country. Prerequisite: Permission of department chair. 1 to 6 hours.

GN 599. **Independent Studies.** Prerequisite: Permission of department chair. 3 hours.

Spanish (SPA)

SPA 501. **Discourse of Imperial Spain, 1492-1898.** Civilization of Imperial Spain from the end of the Reconquest to the late-nineteenth century. Includes art, history, music, oral traditions and literature of the Spanish people. 3 hours.

SPA 502. **Discourse of Colonial Latin America, 1492-1920.** Civilization of Colonial Latin America from the advent

of European dominance to the decades following the Spanish-America War and Mexican Revolution. Focus on the blending of Spanish, Amerindian and African cultural forms and their diverse literary expressions. 3 hours.

SPA 503. **Discourse of Contemporary Spain, 1898-Present.** Cultural and literary trends of Spain from the transformation of Spanish society in the late-nineteenth century to the post-Franco era. Focus on impact of the Spanish Civil War. 3 hours.

SPA 505. **U.S. Latino Writers.** Literary trends of the Spanish-speaking cultures within the borders of the United States. Focus on discourse of exile, migration, bilingualism, and hybridity. 3 hours.

SPA 507. **Indigenous and Indigenist Latin America.** Cultural and literary forms of Amerindian, Hispanic or mixed descent writers of Latin America. Focus on the concepts of hybridity, syncretism and mestizaje. 3 hours.

SPA 509. **Spanish-Speaking Nobel Laureates.** Literary masterpieces of the Spanish-speaking world. 3 hours.

SPA 511. **Cervantine Discourse.** Civilization of Golden Age Spain as reflected in Miguel de Cervantes's *El ingenioso hidalgo don Quixote de la Mancha*. Development of the modern novel and importance of Don Quixote as national hero and recurring figure in international art, music, film and literature. 3 hours.

SPA 512. **Discourse of Contemporary Latin America, 1920-Present.** Cultural and literary trends of Latin America from la nueva narrativa through the Boom and post-Boom periods. Focus on Mexico, Northern Latin America, and the Southern Cone. 3 hours.

SPA 514. **Afro-Hispanic Discourse.** Cultural and literary forms of African-descended writers in the Spanish-speaking world. Focus on the African presence in Medieval and Golden Age Spain, contemporary Spain, Ecuatorial Guinea, Latin America and/or the Caribbean. 3 hours.

SPA 516. **Special Topics in Spanish.** Seminar on individual authors, specific genres, literary movements, literary discourse/theory, or transatlantic studies. May be repeated for credit. 3 hours.

SPA 590. **Study Abroad.** Fifth-year level of approved program in a Spanish-speaking country. Prerequisite: Permission of department chair. 1 to 6 hours.

SPA 599. **Independent Studies.** Prerequisite: Permission of department chair. 3 hours.

Forensic Science (M.S.F.S.)

Graduate program director: *Liu*

Faculty

Gregory Davis, Assistant Professor (Pathology); Forensic Pathology

Charles A Lindquist, Associate Professor (Justice Sciences); Administration

Ray H. Liu, Professor (Justice Sciences); Forensic Drug Chemistry, Mass Spectrometry, Application of Instrumental Methods of Analysis to Forensic Science

Allen E. Shealy, Clinical Professor (Psychiatry); Forensic Psychology

Frederick P. Smith, Professor (Justice Sciences); Forensic Analysis of Trace Evidence, Forensic Drug Chemistry, Laboratory Certification

Amrik S. Walia, Adjunct Professor (Justice Sciences); Forensic Drug Analysis

Richard M. Ward III, Adjunct Lecturer (Justice Sciences); Law

Jeffrey D. Wells, Associate Professor (Justice Sciences); Forensic Biology

Program Information

The Master of Science in Forensic Science program is designed to prepare individuals for careers in various forensic science and conventional analytical laboratories, emphasizing the application of scientific methods and technologies to legal proceedings. With thoughtful planning, many students have found the program offerings helpful in building a strong foundation to pursue doctoral (Ph.D. and M.D.) studies.

The program support includes many UAB faculty members from other departments, personnel from the Alabama Department of Forensic Sciences' Birmingham laboratory, the Jefferson County Medical Examiner's Office, and local forensic science-related private institutions. In addition, the program maintains a close working relationship with the DNA profiling laboratories of the Alabama Department of Forensic Sciences and hosts the editorial offices of the Forensic Science Review (the only review journal in forensic science). Faculty research and practice focus especially on forensic aspects of drug chemistry, DNA-based identification, and entomology.

Minimum admission requirements include strong background in science and completion of one year of general chemistry, one year of organic chemistry, and quantitative analysis. Coursework is designed for qualified students to begin in fall and complete the program in 21 months. Admissions are granted for the fall terms only.

Additional Information

For detailed information, contact Dr. Ray H. Liu, Forensic Science Graduate Program Director, UAB Department of Justice Sciences, OB15-101, 1530 3rd Avenue South, Birmingham, Alabama 35294-2060.

Telephone 205-934-2069

E-mail rayliu@uab.edu

Course Descriptions

Unless otherwise noted, all courses are for 3 semester hours of credit. Course numbers preceded with an asterisk indicate courses that can be repeated for credit, with stated stipulations.

Justice Science (JS)

551. **Research Methods in Forensic Science.**

571. **Molecular Genetics.**

572. **Biology for Forensic Scientists.**

573. **Advanced Recombinant DNA Technology.**

650. **Advanced Questioned-Death Investigation.**

652. **Advanced Questioned Document.**

653. **Advanced Investigation of Fires and Explosives.**

656. **Advanced Forensic Approaches to Osteology.**

670. **Elements of Forensic Science.** Philosophical considerations and historical landmarks; overviews of major forensic subdisciplines such as toxicology, firearms and tool mark examination, forensic biology, trace evidence, drug analysis, questioned documents, and role of the expert witness.

671. **Conventional Criminalistics I.** Basic methodologies and approaches for analyzing trace and transfer evidence:

characterization and examination of trace evidence, transfer evidence, and two- and three-dimensional impressions left by objects and persons. Evidence categories include hairs, fibers, glass, soil, paint (surface coatings), plastics (polymers), ignitable liquid and explosives residues, and impressions resulting from friction ridge skin, firearms, tools, foot wear, automotive tires, etc.

672. **Conventional Criminalistics II.** Methodologies for the examination of firearms and questioned document.

673. **Forensic Drug Analysis.** Isolation, identification, and quantification of commonly abused drugs and poisons; interpretation of findings and correlation with legal applications.

674. **Biological Methods in Forensic Science.** Examination of biological evidence in crime laboratory, including DNA typing of blood, bloodstains, and other body fluids.

675. **Law, Evidence, and Procedure.** Legal aspects of physical evidence; role of expert witness and moot court.

676. **Topics in Forensic Science: Advanced Biological Methods in Forensic Science.**

677. **Topics in Forensic Science: Forensic Toxicology.** Relevant analyses conducted for drugs and poisons in biological evidence as it relates to forensic investigation, including collection and handling evidence, selection of the most appropriate evidence, and the analytical process. The significance of the findings will be examined in view of the pharmacokinetic and pharmacodynamic properties of the detected substances.

678. **Topics in Forensic Science: Capillary Electrophoresis.**

679. **Seminar in Forensic Science.** 1 hour.

680. **Graduate Internship in Forensic Science.** Field experience in forensic science agency.

*681-682. **Directed Research (Nonthesis).** Forensic science problems, issues, and theories. May be repeated for credit. 1-6 hours.

*684. **Thesis Research.** Prerequisite: Admission to candidacy. May be repeated for credit. 1-6 hours.

Forensic Science Doctoral Training

Chair, Committee on Graduate Study in Forensic Science: Liu

Committee: Ronald T. Acton, Peter Burrows, John W. Hicks, Larry K. Krannich, Coral Lamartiniere, Ray H. Liu, and Steven Watts.

Faculty: Ronald T. Acton, Microbiology; Robert A. Angus, Biology; Stephen Barnes, Pharmacology and Toxicology; Asim K. Bej, Biology; Robert M. Brissie, Pathology; Gregory Davis, Pathology; Joseph J. Gauthier, Biology; Rodney C. P. Go, Epidemiology; Gregg M. Janowski, Materials Science and Engineering; Coral A. Lamartiniere, Pharmacology and Toxicology; Charles A. Lindquist, Justice Sciences; Ray H. Liu, Justice Sciences; Richard B. Marchase, Cell Biology; Mario G. Martinez, Jr., Diagnostic Sciences; William K. Nonidez, Chemistry; Allen E. Shealy, Psychology; Frederick P. Smith, Justice Sciences; Charles L. Turnbough, Jr., Microbiology; Jeffrey D. Wells, Justice Sciences; Bruce P. Wheatley, Anthropology.

Visiting and Adjunct Faculty: Dale A. Carpenter, Forensic Scientist, Alabama Department of Forensic Sciences; Ph.D., South Carolina, Toxicology. Steve Drexler, Forensic Scientist, Alabama Department of Forensic Sciences; Trace evidence; questioned document. Jay M. Glass, Chief Deputy Coroner, Jefferson County; M.P.A., UAB, Death investiga-

tion. John W. Hicks, New York State Division of Criminal Justice Services; M.P.A., Southern California, Administration; evidence and procedure. Jack R. Kalin, Forensic Scientist, Alabama Department of Forensic Sciences; Ph.D., Florida, Toxicology. John McDuffie, Forensic Scientist, Alabama Department of Forensic Sciences; Ph.D., Auburn, Trace evidence. G. Sue Rogers, Forensic Scientist, Alabama Department of Forensic Sciences; M.S.F.S., UAB, Forensic biology. Franco Tagliaro, Associate Professor, Catholic University of the Sacred Heart (Rome, Italy), Forensic toxicology. Amrik S. Walia, President, American Health Research Institute; Ph.D., Loyola (New Orleans), Immunology; drugs of abuse. Victor W. Weedn, Carnegie Mellon University; J.D., South Texas College of Law; M.D., Texas Health Science Center (Dallas), Pathology.

Program Information

The Graduate Training Program in Forensic Science is a university-wide graduate training program in the context of a traditional Ph.D. program for students who wish to obtain professional training in forensic science. Students will take forensic science courses and courses required by one of the four Ph.D. granting departments (Biology, Chemistry, Molecular Cell Biology/Microbiology, or Pharmacology and Toxicology), followed by dissertation research on a topic related to forensic science and mentored by a faculty member affiliated with one of these four departments through a primary or secondary (adjunct) appointment.

Forensic science involves the application of knowledge gained from a multitude of scientific disciplines to the needs of both civil and criminal justice. Since modern legal proceedings frequently include expert testimony utilizing knowledge and technologies from the physical and biological sciences, the discipline has emerged as an important component of judicial proceedings. The use of scientific technology in court has reached such a degree of sophistication that merely applying the knowledge and technologies derived from research and development in conventional physical and biological science specializations is no longer adequate. Doctoral-level training and research skills specific to the requirements of evidentiary rules and proceedings are necessary for the identification and solution of many issues that arise in contemporary court settings.

Admission Procedures

Students who are interested in Forensic Science Doctoral Training Program must apply for admission through the Graduate School. A steering committee will then make a recommendation to the Graduate School whether an individual applicant should be admitted to the Forensic Science Doctoral Training Program. A decision is made based on the majority vote of members in the committee.

All application materials should be received by the Graduate School by the end of January. Applications completed after this date may not be considered if vacancy is no longer available.

Curriculum and Funding

All students are required to take a total of 8 hours of forensic science (FS) courses during the first three terms of attendance. The Department of Justice Sciences offers these courses. Students are also required to take a set of core courses, followed by the completion of a set of other courses

required by the Ph.D. granting program selected by the students.

Students are strongly urged to select their Ph.D. granting departments and from their advisors by the end of the second and the third terms, respectively. (Students who have not selected advisors by the end of the third term will not be permitted to continue in the program.) Students' study plans will then be guided by their advisors and graduate study committees.

With the exceptions of admissions and course requirements, students are required to complete the same requirements and protocols (such as teaching, seminar, research tool, preliminary examination, qualifying examination, research proposal, dissertation, and dissertation defense) established in their selected Ph.D. granting departments.

The Department of Justice Sciences will fund students during their first year of participation. Participating Ph.D. programs or the student advisors will begin funding selected students at the fourth term and continue funding until the completion of doctoral course work and dissertation research, generally for four years.

Additional Information

For detailed information, contact Dr. Ray H. Liu, Forensic Science Graduate Program Director, UAB Department of Justice Sciences, OB15-101, 1530 3rd Avenue South, Birmingham, AL 35294-2060.

Telephone 205-934-2069

E-mail rayliu@uab.edu

Course Descriptions

Core Courses (FS)

700. **Laboratory Rotation I** (1).^a Fall.

770. **Elements in Forensic Science** (1). Fall.

771. **Conventional Criminalistics** (1). Fall.

774. **Biological Methods in Forensic Science** (1) or [FS 704 **Laboratory Rotation II** (3)].^b Spring.

775. **Law, Evidence, and Procedure** (1). Spring.

773. **Forensic Drug Analysis** (1) or [FS 703 **Laboratory Rotation III** (3)].^b Summer.

Other Courses

CH 750. **Advanced Analytical Chemistry I** (3). Spring.

CMB 700. **Cellular and Molecular Biology I: Biomolecules** (5). Fall.

CMB 701. **Cellular and Molecular Biology II: Genetics** (5).^c Fall.

CMB 702. **Cellular and Molecular Biology III: Cells** (5). Fall.

TOX 711. **Principles of Toxicology** (3). Spring.

Laboratory Rotation

BY 798. **Nondissertation Research** (3).^b

CH 798. **Nondissertation Research** (3).^b

CMB 721. **Laboratory Research** (5).^b

TOX 796. **Laboratory Rotation** (3).^b

^a Through registering in this course, students are to be advised (by the Director of the Forensic Science Doctoral Training Program) of dissertation research options available. Students will be required to visit no less than five faculty members (at least one from each of the four Ph.D. granting departments) and submit a one-page report on the research subject discussed in each visit. Students will be permitted to delay the completion of this process until the end of the following semester.

^b In addition to taking FS 700 Laboratory Rotation I during the first term, students are also required to take at least two more laboratory rotation courses. One of the latter laboratory rotation courses must be FS 703 or FS 704 offered in the second and third term, respectively.

^c This course starts following the completion of CMB 700 in the fall semester.

Additional Courses Required by Different Departments

Departments of Biology and Molecular Cell Biology/Microbiology

BY 511	Molecular Genetics (prerequisite)
BY 531	Advanced Recombinant DNA Technology (prerequisite)
CMB 703	Cellular and Molecular Biology IV: Signaling (5)
CMB 704	Cellular and Molecular Biology V: Virology/Immunology (5)
BST 601	Biostatistics I (3)
BST 602	Biostatistics II (3)
EPI 730	Introduction to Human Population Genetics Theory (3)
MIC 726	Advanced Immunogenetics (3)

Department of Chemistry

CH 325	Thermo & Chem Kinetics (prerequisite)
CH 326	Structure/Bonding & Molecular Spectroscopy (prerequisite)
CH 450	Instrumental Analysis (prerequisite)
CH 700	Foundations of Physical and analytical Chemistry (3)
CH 725	Molecular Structure and Spectroscopy (3)
CH 750	Advanced Analytical Chemistry (3)

Department of Pharmacology and Toxicology

CH 325	Thermo & Chem Kinetics (prerequisite)
CH 326	Structure/Bonding & Molecular Spectroscopy (prerequisite)
CH 450	Instrumental Analysis (prerequisite)
CMB 703	Cellular and Molecular Biology IV: Signaling (5)
TOX 712	Actions and Assessment of Toxicants (3)
TOX 795	Advanced Toxicology Seminar (1)

Genomics and Pathobiology

The Department of Genomics and Pathobiology sponsors jointly with the Department of Pathology a graduate program leading to the Ph.D. degree in Pathology (see "[Pathology](#)"). Some courses offered by this department (e.g., PAT 710, Animal Use in Biomedical Research) are recommended for all graduate students who are preparing for research careers involving the use of laboratory animals.

Additional Information

For detailed information, contact Dr. Philip A. Wood, Department of Genomics and Pathobiology, Volker Hall, Room 402, 1670 University Boulevard, Birmingham, AL 35294-0019.

Telephone 205-934-2117

E-mail paw@uab.edu

Gerontology

Director, Gerontology Education Program: *Baker*

Faculty

Allman, Richard M., Professor (Medicine); Director, Birmingham/Atlanta Geriatric, Research, Education, and Clinical Center (GRECC); Mobility impairment and its Complications; Geriatric Care Quality Improvement

Baker, Patricia S., Assistant Professor (Sociology); Gerontology, Medical Sociology, Minority Aging

Ball, Karlene, Professor (Psychology); Clinical Science/Patient-Oriented Research; Health Services Research; Mobility Impairment and Its Complications

Bamman, Marcos, Assistant Professor (Education); Basic Biomedical Science Research; Musculoskeletal Disease; Atherosclerosis and Aging

Patricia Drentea, Assistant Professor (Sociology); Socioeconomic Aspects of Aging, Health and Disability, and Work and Family, Research Methods

Melissa Galvin, Assistant Professor (Health Behavior); Community-Based Interventions, Health Promotion

Vithal K. Ghanta, Professor (Biology); Tumor Immunology, Aging and Immune System

David Grabowski, Assistant Professor (Health Care Organization and Policy); Long-Term Care, Economics of Aging, Health Policy

Richard M. Shewchuk, Associate Professor (Health Services Administration); Health and Long-Term Care Issues in Aging

Pamela V. Valentine, Assistant Professor (Government and Public Service); Assessment and brief treatment of traumatized people with special emphasis on populations such as a domestic violence victims, incarcerated females, substance abusing adolescents, and the mentally ill.

Virginia Wadley, Research Assistant Professor Psychology; Cognition and Mobility, Dementia Caregiving, Loss of Capacity in Alzheimer's Disease

Program Information

The Gerontology Education Program was established in 1980 through the cooperative efforts of the School of Social and Behavioral Sciences and the Center for Aging. Since that time, the program has expanded considerably and offers diverse academic opportunities. Students have access to a number of faculty members from multiple disciplines who bring research and academic expertise to the study of aging and the aged.

The Gerontology Education Program offers multidisciplinary academic courses in gerontology leading to a graduate certificate. The study of gerontology at these levels is designed to provide people educated in various disciplines with the background needed to work in programs related to aging and the aged. The main goals are to provide students with a thorough background in existing theory and research in gerontology, and a supplement to their existing backgrounds and professional disciplines. We have designed the program to prepare students for leadership roles in this field of growing importance for both the private and public sectors. Our program's curriculum integrates research, theory, and practice. Its multidisciplinary approach reflects the urban mission of UAB.

The program office is located at the UAB Center for Aging. This academic program is administered by the Director of

the Gerontology Education Program, who also serves as Chair of the Guidance Committee on Graduate and Undergraduate Education in Gerontology. This committee is made up of representatives of academic departments and schools throughout the UAB campus active in the study of aging and the aged. The multidisciplinary gerontology program is offered to all UAB students in good standing with the sponsorship and support of the School of Social and Behavioral Sciences, the School of Health Related Professions, and the Center for Aging.

Student Admissions and Advisement

Although general advisement is handled through UAB student advising and parent departments, student advisement in gerontology is handled formally by the Director of the Gerontology Education Program. The director facilitates student advisement with other members of the Committee on Graduate and Undergraduate Education in Gerontology.

A graduate specialty is offered to students who want a special emphasis in gerontology or geriatrics. The major objective of this specialization is to provide a strong academic background for professional careers in academic and aging-related settings. There are two avenues for undertaking the graduate gerontology certificate requirements. Students in good standing in the graduate school can specialize in gerontology through their primary department. Letters of application also are accepted from students who have already completed requirements for an advanced or professional degree.

Students not currently enrolled in a graduate program at UAB may petition the university for nondegree admission status. Once accepted, the student can undertake a course of study to receive a graduate certificate upon completion of the required sequence of classes.

A careful review of proposed curriculum is recommended before the student enrolls for gerontology study. This will give students an opportunity to receive initial advisement while reviewing available study plans and course schedules.

Requirements

Students must complete at least 15 credit hours of graduate-level work in gerontology or geriatrics, achieving a grade of B or better in each course. The curriculum consists of a required multidisciplinary course offered through the graduate school (GRD 600, see Graduate School listing), three gerontology electives chosen from a roster of courses approved by the Committee on Graduate and Undergraduate Education in Gerontology, and a required research project or a relevant internship. To ensure a multidisciplinary perspective, courses must represent at least two departments.

Additional Information

For detailed information, contact Dr. Patricia S. Baker, Director, UAB Gerontology Education Program, Center for Aging, Room 201-E1, 933 19th Street South, Birmingham, AL 35294-2041.

Telephone 205-934-4399

Fax 205-934-7354

E-mail pbaker@uab.edu

Course Descriptions

Unless otherwise noted, all courses are for 3 semester hours of credit. Course numbers preceded with an asterisk indicate courses that can be repeated for credit, with stated stipulations.

Gerontology (GER)

Required Course

GRD 600. Core Issues in Aging. A multidisciplinary approach will be used to consider dimensions of the aging process. This course explores individual and societal meanings of aging and old age through the study of the biological, psychological, and sociological changes accompanying aging as well as current issues and controversies in the study of aging.

Electives

540. Biology of Aging. Current understanding of aging, measuring aging changes, theories of aging, and aging changes in various human systems. Prerequisite: BY 101 or permission of instructor. Additional requirements for graduate credit: discretion of instructor.

590. Seminar in Gerontological Substantive Areas. Individually designed research agendas for students wishing to conduct semi-independent research or guided reading in social gerontology. Prerequisite: Permission of instructor. 1-3 hours.

595. Independent Study in Long-Term Care. Individually designed research agendas for students wishing to conduct semi-independent research or guided reading in long-term care. Prerequisite: Permission of instructor. 1-3 hours.

611. Managed Care. Explores the organization and management of alternative health care delivery systems. Emphasis is placed on understanding the position these new organizational forms have in the U.S. health care system. The focus of the course is on organizations providing managed, ambulatory, and long-term care.

624. Multidisciplinary Research in Aging Colloquium. Discussion of current research in selected aspects of aging-related studies. Speakers are chosen to reflect the variety of scientific disciplines conducting inquiry on the theme.

638 & 738. Geriatrics and Gerontology Interdisciplinary Core Curriculum. The UAB Geriatrics Education Center coordinates the curriculum, consisting of lectures on the multidisciplinary treatment of health and aging issues.

643. Long-Term Care Administration. Seminar analysis of effect of chronic conditions and aging on delivery of health services; nursing homes and alternatives, mental health facilities and agencies; rehabilitation facilities and services. Field trips and individual research projects.

655. Minority Aging. Cross-racial and -ethnic exploration on national level of some special problems of minority aged groups, such as Latinos, Blacks, Chinese, Japanese, Koreans, Pacific Asians, and American Indians. Discussions focus on family, church, health care, housing, adult education, retirement, income, and recreation.

665. Geriatric Rehabilitation for the Health Professional. Rehabilitation of the elderly person from the perspective of age-related changes, the impact of selected functional problems, psychosocial aspects of decreasing function, personal and environmental adaptations, and the continuing autonomy of the individual.

HCO 680. Aging Policy. Providing for the physical and economic well-being of the aging population is a continual challenge facing society. This course will discuss factors that shape public policy affecting the elderly in the U. S. and other developed countries. Basic statistics or the equivalent is a prerequisite for this course.

OT 688. **The Occupation of Caregiving: Caring for Older Adults.** Review social trends, programmatic initiatives, current research and policy implications. Students will gain a broad knowledge of the interplay between disease characteristics and needs for care. Permission of instructor. 2 hours.

691, 791. **Seminar in Gerontological Substantive Areas.** Individually designed research agendas for students wishing to conduct semi-independent research or guided reading in social gerontology. Prerequisite: Permission of instructor. 1-3 hours.

HCO 720. **Health Insurance and Managed Care.** Insurance as mechanism for dealing with consequences of an uncertain world. Health insurance and its consequences as significant reasons health care markets differ from others. Workings of insurance markets and current policy issues. Demand for health insurance, underwriting, rate making, moral hazard and adverse selection, HMOs and PPOs, employer health benefits and self insurance, Medicare and Medicaid, long-term care insurance and catastrophic coverage. Prerequisite: HCO 601 or equivalent.

734. **International Medical Sociology.** Cross-cultural, comparative analysis of health and health care delivery systems in both industrialized and developing countries.

755. **Race and Ethnic Relations.** Income inequality, school and residential segregation, intermarriage and interracial crime.

759. **Social Gerontology.** Consideration of some of the structural and behavioral implications of older adulthood in American society. Included will be such topics as the relationship of the aged to political, economic, educational, medical, religious, and other structures in society.

769. **Sociology of the Life Cycle.** Consideration of sociological orientations to the life course.

777. **Demography of Health and Aging.** Demographic processes such as mortality, morbidity, disability, migration, and fertility and how each influences the number and proportion of the elderly, how these processes shape the age-sex structure of our population, and the demographic characteristics of older people.

779. **Medical Demography.** An examination of clinical, epidemiological, and sociological designs to investigate the effects of morbidity, disability, and mortality processes on human populations.

780. **Medical Sociology.** Theory and research in medical sociology; systematic overview of relevant literature.

781. **Sociology of Health.** Subjective experience of illness; predictions of health behavior; social networks and health.

785. **Psychology of Aging.** Age differences in perception, memory, intelligence, personality, adjustment, and psychopathology.

788. **Social Medicine.** Socioenvironmental factors in etiology of disease; social movements and health policy; medical ethics and broad ethical issues; place of societal science in medical care.

796. **Research Seminar Health and Aging.** Organized around a methods theme with lectures focusing on conducting social research, gaining access to research settings and getting started, writing grant applications, presenting papers at professional meetings, and thesis and dissertation proposal writing. Half of each class consists of lectures on developing research

agendas. The other half of each class entails student presentation of developing research activities.

Graduate School Professional Development Program

Program director: *Austin*

Faculty

Nancy G. Abney; English as a Second Language

Julia S. Austin; English as a Second Language, Faculty-Teacher Development, Technical Writing

J. Lee Griner; Technical Writing, Professional Presentations

Joan F. Lorden; Career Development, Extramural Funding

Program Information

These courses and workshops are offered to improve the academic and professional communication skills of graduate students and to provide language and cultural support for international graduate students.

Additional Information

For detailed information, contact Dr. Julia S. Austin, HUC 511, 1530 3rd Avenue South, Birmingham, Alabama 35294-1150.

Telephone 205-975-6539

E-mail jaustin@uab.edu

Web www.uab.edu/profdev

Course Descriptions

Graduate School (GRD)

700. **Culture and Speaking in the U.S..** Improves listening and speaking skills of nonnative English speakers in informal and academic settings. Fall. Pass/Fail. (International students).

701. **Presentation and Discussion Skills.** Develops professional communication skills, including public speaking skills, conversation management, register shifting, and overall comprehensibility. Videotaped presentations critiqued individually by instructor. Spring. Pass/Fail.

702. **Writing Up Research.** Prepares students to write academic and professional discourse, including experiment-based reports, summaries, critical reviews, and proposals. Workshop-discussion format. Fall, Pass/Fail. (International students).

703. **Style and Grammar.** Addresses issues of style and grammar as they relate to writing. Workshop-discussion format. Summer. Pass/Fail. (international students)

704. **Specialized Instruction.** Addresses particular writing needs of students actively writing theses, dissertations, articles for publication, or grant proposals. Individual instruction. Prerequisite: Permission of program director. Every semester. 1-9 hours. Pass/Fail.

705. **Teaching at the College Level and Beyond.** Introduces many of the basic principles needed to teach effectively at the college level and addresses current issues relevant to college teaching. Topics include creating a learning environment, course and syllabus design, effective lecturing, active learning approaches, evaluation and grading, and using tech-

nology to enhance learning. Spring, summer. 2 or 3 credit hours. Pass/Fail.

709. Fellowship Writing. Provides hands-on assistance with preparation of a fellowship or grant application. Participants are introduced to ways to search for funding sources, then locate an appropriate source and complete the application. Spring. 3 credit hours. Pass/Fail.

712. Research Writing and Style. Teaches effective strategies of successful writers. Topics include the different types of writing that students and professionals do (such as abstracts, proposals, journal articles, progress reports, and correspondence), publishing, and ethical issues related to writing and publication. Summer. 3 credit hours. Pass/Fail.

717. Principles of Scientific Integrity. Surveys ethical issues and principles in the practice of science. Fall and May. 3 credit hours. Pass/Fail.

720. Effective Communication Skills. Helps students develop communicative competence by practicing various tasks, functions, and methods of effective oral communication, including both the verbal and nonverbal aspects of communication. Nonverbal messages, for example, can conflict with verbal messages, making it particularly difficult to communicate. Fall. 3 credit hours. Pass/Fail.

721. Speaking and Listening Strategies. Helps students enhance their oral communication by identifying and practicing effective strategies for listening, speaking, and overall language development. This class offers suggested strategies for participating in discussions and conversations (i.e., getting a word in edgewise) and for improving both verbal production and comprehension by learning intonation patterns. Asking for and giving clarification and appropriate feedback are also discussed in this course on verbal communication in English. Spring. 3 credit hours. Pass/Fail.

722. Discovering Language Through Culture. Explores American culture as a means of understanding and practicing English in different contexts for a variety of purposes in order to improve cross-cultural communication. The language is an outgrowth of the culture, and both are in constant flux. Nevertheless, knowing certain cultural and linguistic norms can make learning the finer points of English a bit easier. Summer. 3 credit hours. Pass/Fail.

Workshops

706. Grants and Fellowships 101. Introduces the extramural funding process. Topics include types of awards, funding sources, components of an application, the review process, and writing effective grant proposals. Fall. One-day workshop. 1 credit hour. Pass/Fail.

707. Presenting Effectively. Provides an overview of giving effective oral presentations in academic and professional settings. Topics include analyzing audience and purpose, characteristics of an effective delivery, giving poster presentations, adjusting to lay audiences, and using technology in presentations. May. One-day workshop. 1 credit hour. Pass/Fail.

708. Writing Successfully. Addresses issues involved in writing in academic and professional settings. Topics include analyzing audience and purpose, addressing common writing problems, developing effective writing practices, writing for publication, adjusting text for lay readers, and grammar and punctuation for writers. Spring. One-day workshop. 1 credit hour. Pass/Fail.

710. Career Workshops for Graduate Students. Teaches the skills required for a successful job hunt inside or outside academe. Spring. One-day workshop. 1 credit hour. Pass/Fail.

715. Special Topics. Workshop topics include Intercultural Communication and Word Processing for Theses and Dissertations. See UAB Class Schedule for offerings. 1 credit hour. Pass/Fail.

Health Administration (M.S.H.A.)

Graduate program director: *O'Connor*

Primary Faculty

Eta Berner, Professor (Health Informatics); Health Informatics

Jeffrey Burkhardt, Assistant Professor (Health Services Administration); Health Care Finance

David J. Fine, Professor (Health Services Administration); Health Services Administration

Randa Hall, Instructor (Health Services Administration); Medical Practice Management

S. Robert Hernandez, Professor (Health Services Administration); Health Services Administration, Organization Theory, Organizational Assessment, Health Planning

Tee H. Hiatt, Professor Emeritus (Health Services Administration); Quantitative Methods, Information Systems, Teaching Methods

Howard W. Houser, Professor (Health Services Administration); Health Services Administration, International Health, Public Policy

Stephen J. O'Connor, Associate Professor (Health Services Administration); Governing Boards, Medical Staff Relations, Organization Behavior, Human Resources Management

Helmuth Orthner, Professor (Health Informatics); Health Informatics

Maria Pisu, Assistant Professor (Health Services Administration) Health Services Research

Jose B. Quintana, Assistant Professor (Health Services Administration); Outcomes in Production of Health

Richard M. Shewchuk, Professor (Health Services Administration); Health Issues in Aging, Quantitative Methods

Norman W. Weissman, Professor (Health Services Administration); Technology Assessment, Health Services Research

Secondary Faculty

Bowers, Debow, Duncan, Gainer, Ginter, Grabowski, Grimley, Ho, Joiner, McGee, Moon, Morrissey, Nash, Nowak, Patterson, Raczynski, Stewart, Van Matre

Program Information

The Master of Science in Health Administration (M.S.H.A.) program, accredited by the Accrediting Commission on Education for Health Services Administration, trains executives for health services organizations. The program has graduated more than 800 persons since 1965.

Students must complete 20 graduate courses on campus and a 12-month administrative residency in a health care organization. An on-line capstone course is also completed during the residency. Seventeen core courses and four elective courses are required. Students begin in the fall term and complete coursework in 16 months. Coursework is followed by the residency.

Students may pursue the M.S.H.A. and M.B.A. degrees simultaneously (request information on the M.S.H.A.-M.B.A. combined degree program). Complete applications for fall entry are due no later than the preceding March 1. Since admission to the M.S.H.A. program is very competitive, early application is encouraged.

Application Information

Applicants to the M.S.H.A. and M.S.H.A.-M.B.A. programs must have completed or anticipate completion of at least a baccalaureate degree from a regionally accredited college or university or from a recognized university abroad before entry into the program. Prior to matriculation, students must have completed 3 semester hours of undergraduate statistics with a grade of B or better. In addition, M.S.H.A.-M.B.A. students must have successfully completed three semester credit hours in calculus.

Application for the M.S.H.A. program should be made to the Admissions Coordinator, Residential Master of Science in Health Administration Program, UAB School of Health Related Professions, Webb 506, 1530 3rd Avenue South, Birmingham, Alabama 35294-3361.

Telephone 205-934-1583

E-mail msha@uab.edu

Web www.uab.edu/hsa

M.S.H.A.-M.B.A. Coordinated Degrees

Students wishing to pursue simultaneously the Master of Science in Health Administration (M.S.H.A.) and the Master of Business Administration (M.B.A.) degrees must complete 28 graduate courses, including 4 electives. A 12-month administrative residency in a health services organization is required for completion of the M.S.H.A. program. A student who enters the coordinated program but subsequently decides to pursue only one of the degrees must satisfy all the requirements for the degree sought.

Additional Information

For detailed information, contact Admissions Coordinator, Department of Health Services Administration, UAB School of Health Related Professions, Webb 506, 1530 3rd Avenue South, Birmingham, AL 35294-3361.

Telephone 205-934-1583

E-mail msha@uab.edu

Web www.uab.edu/hsa

or the UAB Graduate School of Management, BEC 203, 1530 3rd Avenue South, Birmingham, Alabama 35294-4460.

Telephone 205-934-8817

E-mail mlake@uab.edu

Web www.business.uab.edu

Executive M.S.H.A. Program

Qualified students can earn the Master of Science in Health Administration (M.S.H.A.) by completing the executive program. This program is open to those with at least 5 years of experience in health care organizations, either as managers or as clinical professionals. Participants in the Executive M.S.H.A. program complete both on-campus and distance-learning activities, and a brief field experience, within 2 years of study.

Additional Information

For detailed information, contact Stephen J. O'Connor, Director, Executive M.S.H.A. Program, UAB School of

Health Related Professions, Webb 506, 1530 3rd Avenue South, Birmingham, Alabama 35294-3361.

Telephone 205-934-1735

E-mail mshaexec@uab.edu

Web www.uab.edu/hsa

Course Descriptions

Unless otherwise noted, all courses are for 3 semester hours of credit. Course numbers preceded with an asterisk indicate courses that can be repeated for credit, with stated stipulations.

Health Administration (HA)

602. Introduction to Health Care Systems. U.S. health care system. Historical context; systems theory; analysis of organizational components; health services personnel; national, state, and local government roles; financing mechanisms; demography; mortality and morbidity; quality assurance; political issues; and trends in progress. Individual and group projects and field trips (4-credit hours).

605. Health Policy and Politics in the United States. Policy-making process in the U.S. Review of forces influencing policy-making, legislative process, and evolution of U.S. health policy.

609. Managing with Professionals. Special challenges and opportunities for health services executives in working with physicians and other clinical professionals. Review of professional education and socialization processes and examination of ways to bring together clinical and administrative concerns.

611. Managed Care. Examination of factors that will influence direction of managed care in future. Changing relationships among major stakeholders. Broad areas of discussion including market dynamics, product characteristics, reimbursement methodologies, contracting issues, management information systems, government initiatives, legal and ethical issues, and future trends.

612. Essentials of Health and Human Disease. Essentials of health and human disease related to normal and abnormal physiology.

613. Health Law. Selected legal principles and their application to health field. Legal aspects of corporate liability, medical malpractice, admission and discharge processes, medical staff bylaws, informed consent, nursing, patients' rights, medical records, and governmental regulation of personnel and health facilities.

614. Process Improvement. Customer-driven process involving team and process thinking and application of statistical tools to way in which work is accomplished. Provides knowledge, skills, and tools necessary to implement, facilitate, and coordinate continuous quality improvement activities in health care environments.

618. Seminar in Health Services Administration. The purpose of this seminar is to meet MSHA students' needs for exposure to issues and processes beyond the traditional didactic component of the curriculum by providing additional exposure to executives and other leaders in health care. It provides an opportunity to reinforce skills, knowledge, and abilities that will be required if students are to effectively transition into their administrative residency and professional health management practice (1-credit hour).

620. Health Care Financial Management I. Application of financial management techniques to decision making for

health care providers. Financial management functions and organizations, financial statement analysis, working capital management, present value analysis, capital budgeting, cost of capital, variance analysis, financing techniques, and financial analysis case studies.

621. Health Care Financial Management II. Analytical and synthetic aspects of financial management tools. Project method and case studies used to supplement theory.

625. Strategic Planning and Management. Methods for strategic planning and management of health services organizations. Techniques for determining strategies for unique services; integration of strategy, structure, and administrative systems.

631. Organization Theory and Behavior. Introduction to organization theory and behavior with applications to health services organizations. Topics include organization structure, organizational/environmental relationships, organizational performance, power and leadership, attitudes, motivation, communication, and group dynamics.

632. Quantitative Methods in Health Services Administration. Selected mathematical, statistical, and computer applications and statistical techniques applied to decision making in hospitals and health services organizations.

635. Human Resources Management in Health Services Administration. Human resources management issues, including strategic role of employee selection, appraisal, rewards, and development, applications to health care sector, labor relations, and unique aspects of labor law relevant to health care organizations.

638. Microcomputers in Health Services Administration. Applications of one or more of the major microcomputer software programs. Focus on programs not covered in other courses which are important to health care managers. Optional as independent study course devoted to a particular program of interest. 1-3 hours.

640. Information Systems and Management Science in Health Services Administration. Effective use of information and quantitative analysis in clinical care and management decision making in health services organizations. Provides students with sufficient background to communicate effectively with technical personnel and provide general management oversight of information systems within organizations.

643. Long-term Care Administration. Seminar analysis of effect of chronic conditions and aging on delivery of health services, nursing homes and alternatives, mental health facilities and agencies, rehabilitation facilities and services. Field trips and individual research projects.

645. Health Economics. Economic analysis applied to health services sector; concepts of efficiency applied to production and distribution of health services, health insurance, government programs, health care personnel and health services organizations; current public policy issues; emphasis on student application of economic principles to health care issues.

655. Seminar: Synthesis of Health Services Administration. Case method and problem-solving applications. Integration of materials presented during previous academic coursework.

661. Seminar: Social Issues in Health Services Administration. Social issues confronting and influencing health care delivery systems, maximum student participation in re-

search and conduct of seminar, optional individual research project.

671. Health Care Marketing. Introductory survey of marketing concepts as applied to health services organizations. Consumer behavior, market segmentation, target marketing, marketing research, management, and control of marketing mix variables. (Also MBA 671)

***690. Administrative Residency.**

Health Informatics (M.S.H.I.)

Graduate program director: *Orthner*

Core Faculty

Eta S. Berner, Ph.D., Professor (Health Services Administration)

Helmuth F. Orthner, Ph.D., Professor (Health Services Administration)

Other Participating Faculty

Jeffrey H. Burkhardt, Ph.D., Assistant Professor (Health Services Administration)

Jerome H. Carter, M.D., Assistant Professor (General and Internal Medicine)

Jim A. Chesney, M.S., Instructor (Health Informatics)

Gerald L. Glandon, Ph.D., Professor and Chair (Health Services Administration)

Gary J. Grimes, Ph.D., Professor (Electrical and Computer Engineering)

Sara S. Grostick, M.A., Associate Professor (Health Services Administration)

S. Robert Hernandez, Ph.D., Professor (Health Services Administration)

Joan C. Hicks, M.S.H.I., Assistant Professor (Health Services Administration)

Tee H. Hiett, Ph.D., Professor Emeritus (Health Services Administration)

Aubrey E. Hill, Ph.D., Research Assistant Professor (Medicine/Hematology/Oncology)

Howard W. Houser, Ph.D., Professor (Health Services Administration)

Thomas K. Houston, II, M.D., Assistant Professor (Medicine, General/Internal)

Warren T. Jones, Ph.D., Professor (Computer and Information Sciences)

James M. Leaming, M.D., Assistant Professor (Emergency Medicine)

Michael C. Matthews, M.H.A., Assistant Professor (Health Services Administration)

Stephen A. Moser, Ph.D., Associate Professor (Pathology/Microbiology)

Pamela E. Paustian, M.S.M., Assistant Professor (Health Services Administration)

T. Scott Plutchak, M.A., Associate Professor (Health Informatics)

Randal H. Robertson, Ph.D., Associate Professor (Health Services Administration)

Richard M. Shewchuk, Ph.D., Professor (Health Services Administration)

Donna J. Slovinsky, Ph.D., Professor (Health Services Administration)

Thomas E. Terndrup, M.D., Professor (Emergency Medicine)

Michael R. Waldrum, M.D., Associate Professor (Internal Medicine)

Norman W. Weissman, Ph.D., Professor (Health Services Administration)

Valeria M. Wilson, M.S.H.I., Instructor (Health Informatics)

Adjunct Faculty

David M. Bowen, Adjunct Professor (Health Informatics)

Gerri Lynn Frantz, Adjunct Instructor (Health Informatics)

R. David Friday, Adjunct Instructor (Health Informatics)

Glenn G. Hammack, Adjunct Professor (Health Informatics)

Terrell W. Herzig, Adjunct Professor (Health Informatics)

Charles M. Jones, Adjunct Instructor (Health Informatics)

Jacqueline W. Kennedy, Adjunct Professor (Health Informatics)

Michael E. McDevitt, Adjunct Professor (Health Informatics)

Judy G. Ozbolt, Adjunct Professor (Health Informatics)

Susan Z. Pretnar, Adjunct Instructor (Health Informatics)

Harold H. Scott, Adjunct Professor (Health Informatics)

William A. Terrell, Adjunct Professor (Health Informatics)

Program Information

Program Admission

The optimum size of the Health Informatics (HI) program is conditioned by several resource constraints, particularly faculty availability, physical space, and staff support. The maximum size of each entering class should be approximately 25 to 30 students. However, because most students in the HI program are part-time, it is anticipated that the program enrollment may be larger.

The program begins in the fall term. Application to the program may be made in September through April 30, preceding the expected date of enrollment for the next fall term. Applications received after April 30 are considered on a space-available basis. Applications are evaluated against the Graduate School criteria and those criteria developed specifically for the HI program.

Admission Requirements

Admission to the program requires acceptance to the Graduate School of The University of Alabama at Birmingham. Applicants must have completed or anticipate completion of at least a baccalaureate degree from a regionally accredited college or university or from a recognized university abroad before entering the program. As a criterion for unconditional admission, applicants must have no less than a B GPA (3.0 on a 4.0 scale) for the last 60 semester hours of earned undergraduate credit or overall undergraduate credit or overall undergraduate hours. Official transcripts of all previous academic work beyond the secondary level should be submitted. If you are still in school, a transcript showing the first three years of undergraduate work is acceptable; you need not delay your application until the first semester (or quarter) that grades of your final year are available. Before matriculation, entering

students must have received a final transcript for each degree received.

All applicants, except those holding a professional doctoral degree (e.g., M.D., J.D., D.D.S.) from a U.S. accredited school, must submit scores for a standardized admission test. Scores for the general test of the Miller Analogies Test (MAT), the Graduate Record Examination (GRE), or the Graduate Management Admission Test (GMAT) are acceptable. A score of 50 on the MAT, a combined score of at least 1500 on the three sections (verbal, quantitative, and analytical) of the GRE or a score of at least 480 on the GMAT is required for unconditional admission.

The applicant should include a carefully drafted statement about his or her personal interests, career goals, and relevant background experience.

Three *confidential* letters of recommendation from individuals qualified to write concerning your potential success in both a graduate program and in the Health Informatics field must be submitted.

Program applicants should have completed three hours of undergraduate course work in event-driven programming (e.g., Visual Basic, C++, Java) prior to the fall of the student's first year, if planning to enroll full-time, or prior to their second year, if planning to enroll part-time.

Admission to the HI program is determined by a consensus of the Admissions Committee. The decision is based on previous academic record, standardized admission test scores, professional recommendations, and evidence of ability to perform graduate-level work. The program director reserves the prerogative for final recommendation on admission status to the Graduate School.

Additional Information

For detailed information, contact Master of Science in Health Informatics Program, UAB School of Health Related Professions, Webb 532; physical address: 1675 University Blvd.; mailing address: 1530 3rd Avenue South, Birmingham, AL 35294-3361

Telephone 205-934-3509

Fax 205-975-6608

E-mail mshi@uab.edu

Course Descriptions

Note: The curriculum consists of eleven (11) Core Courses, an Administrative Internship (or a Thesis Project or a Nonthesis Project) and 13 credit hours of elective credit for a total program of 60 semester credit hours. Elective courses are identified by (E) at the end of the course title in the following course list.

Health Informatics (HI)

585. Making the Computer Work for You: An Introduction to VBA and Visual Basic. Applications in Visual Basic for Applications (VBA) and Visual Basic development; concepts of rapid prototyping for building dynamic applications. Microsoft Office tools will be used and integrated with Front Page for Web-enabled environments. Satisfies Computer Prerequisite for HI program Admission. 3 hours.

600. Analysis and Design of Health Information Systems. Requirements, concepts, methods, and tools in analyzing, modeling, and designing health information systems with emphasis on clinical systems. Prerequisites: Two undergra-

duate computer courses including visual programming. 4 hours.

601. Databases and Data Modeling. Concepts of data modeling, data architectures, and data administration. Study of various models with application to current health information projects. One hour required weekly in Health Informatics Computer Lab applying database skills. Prerequisite: HI 600 or permission of instructor. 4 hours.

602. Clinical and Administrative Systems. Foundations of clinical information use starting with information collection, processing (e.g., decision making) and recording. All aspects of clinical information use in inpatient and outpatient facilities. Special emphasis on the clinician's work to support enterprise-wide health care delivery. Prerequisites: HI 600, 605, and 640. 4 hours.

605. Communications and Networks. Architecture of enterprise-wide voice, data, and video communication systems of healthcare organizations and its implications for information systems. Fundamental concepts of local and wide-area networks using various transmission media including copper, glass (optical), and wireless technologies. Transmission and switching components; network security and fault-tolerance; emerging high-speed data access to the Internet. One hour required weekly in Health Informatics Computer Lab applying communication/networking skills. Prerequisites: two undergraduate computer courses including visual programming or permission of instructor. 4 hours.

610. Health Care Information Resources Management. Concepts and techniques in health care enterprises for information resources management through case study. Resource allocation, techniques for prioritization and control, project management, system installation, and operational fundamentals for information services. Prerequisites: HI 640 or permission of instructor. 4 hours.

612. Organizational Behavior and Leadership (E). Systematic examination of human behavior in organizational settings with special application to health care organizations. Emphasis on study of individuals and small groups; personality, perception, attitudes, motivation, communication, and leadership. Case discussions and textbook readings. Prerequisite: permission of instructor. 3 hours.

615. Administrative and Clinical Decision Support Systems. Examination of the role of information systems in supporting administrative and clinical decision-making in health care enterprises. Case studies of the design and use of computer-based decision support and modeling systems. Prerequisites: HI 640 and permission of instructor. 3 hours.

616. Knowledge Discovery and Data Mining (E). Concepts and strategies for the design, development, and implementation of data warehouses and repositories to enable their exploitation by knowledge discovery and data mining technologies. Various models of data warehouse and repository design, and of the various methodologies associated with data mining and machine learning. Applications are made to the healthcare organization. Prerequisites: HI 600, 601, 615, and advanced statistics or computer science course work, or permission of instructor. 3 hours.

620. Security and Privacy in Health Care. Security and privacy issues, legislation, regulations, and accreditation standards unique to health care domain. Technical security of networks, databases, audit mechanisms and control. Prerequisites:

HI 600, 601, 602, 605, 606, and 640, or permission of instructor. 3 hours.

622. Financial Management for Health Professionals. Financial statements, cost allocation, capital budgeting, time value analysis, reimbursement, financial risk and return, long-term debt financing, capital structure, cost of capital, and analysis of financial performance. Prerequisite: graduate level health profession student or permission of instructor. 3 hours.

630. Strategic Planning and Contracting for Health Information Systems. Theory, practice, and processes needed for strategic planning of integrated health information systems. Assessing benefits of enterprise-wide information integration and tactics needed to realize these benefits. Steps needed for developing strategic plans that are aligned with goals of health care institutions using case studies and in team projects. Development of a Request for Proposal (RFP) based on strategic plans. Critique and practice of skills needed to negotiate contracts with vendors. Prerequisites: HI 600, 601, 602, 605, and 640, or permission of instructor. 4 hours.

632. Quantitative Methods. Selected mathematical, statistical, and computer applications and statistical techniques applied to decision making in hospitals and health care organizations. Prerequisite: HI student or permission of instructor. 3 hours.

640. Introduction to Health Informatics and Health Care Delivery. History and current status of information systems in health care and health care information systems. Information architectures, administrative and clinical applications, strategic planning, security, and benefits realization. Prerequisite: permission of instructor. 3-4 hours.

655. Synthesis of Health Informatics. Topics in Health Informatics not covered in other courses. Introductory tutorials and state-of-the-art overviews. How to lead and facilitate discussions of complex health informatics issues and integrate material with remainder of HI program. Prerequisites: HI 600, 601, 602, 605, 620, and 640, or permission of instructor. 3 hours.

692. History of Health Informatics (E). Systematic and chronological overview of significant events associated with the development of medical and health informatics and a chronological picture of why and how information technology has been applied to meet problems in medicine and health care delivery. Prerequisite: HI 640. 3 hours.

694. Special Topics in Health Informatics (E). Study of selected topics in health informatics. May be repeated for credit. 3 hours. Prerequisite: Consent of instructor. 3 hours.

695. Independent Study in Health Informatics (E). Opportunity to investigate, perform activities and/or conduct a project related to a narrow topic in Health Informatics that corresponds with the current research of HI faculty, including medical informatics, nursing informatics, computer and communication sciences, library science, etc. May be repeated for credit. Prerequisite: Permission of instructor. 1-4 hours.

Thesis, Project, or Administrative Internship: Each student must complete an administrative internship, thesis, or nonthesis research project. Each student, in consultation with Program Faculty, chooses the most appropriate option. Prior to enrolling for the thesis or project, it is recommended that you prepare for it by first enrolling in an independent study to do preparatory research. It is also recommended that you enroll for the thesis or project twice, i.e., 4 credits in one semester, and 4 credits in the following semester to give you ample time

to complete your work. **The UAB Graduate School requires that you be enrolled during the semester in which you plan to graduate.**

690. Administrative Internship. Structured field experiences in health care or other enterprises associated with health care industry. Includes a mentoring relationship with a preceptor and an opportunity for application of information resource management theory and strategies. Foundation for professional development and assists in refining skills and behaviors necessary for successful practice in a complex professional, social, political, and technological environment. Prerequisite: Permission of Internship Coordinator. 4-8 hours.

698. Master's Level Nonthesis Research. Rigorous project that provides opportunity for focused investigation of informatics problem in real-world setting and for application of problems solving methodologies for development and execution of solutions. Investigation and application of theory through practical implementation project. Conducted during Administrative Internship; may be repeated for credit (8 hours maximum credit allowed). Prerequisite: permission of instructor. 4-8 hours. Prerequisite: Permission of instructor.

699. Master's Level Thesis Research. Original research in health informatics and interpretation of results. Demonstrates student's acquaintance with literature of field and competency in proper selection and execution of research methodology. Recommended for students planning to pursue a doctoral degree. May be repeated for credit (8 hours maximum credit allowed). Prerequisite: Permission of instructor. 4-8 hours.

Elective Courses

The latter should be selected by the student from the following list of recommended elective courses. Other courses require approval of the program director.

HI 612. Organizational Behavior and Leadership. 3 hours.

HI 616. Data Mining. 3 hours.

HI 655. Synthesis of Health Informatics. 3 hours.

HI 692. History of Medical and Health Informatics. 3 hours.

HI 694. Special Topics in Health Informatics. 3 hours.

HI 695. Independent Study in Health Informatics. 4 hours.

Financial Management: The HI curriculum requires a minimum of one course in financial management (HI 622). Students who plan a career in the fiscal management of health care organizations, or the health care insurance may choose additional courses.

HA 620. Health Care Financial Management I (E). Application of financial management techniques to decision making for health care providers. Financial management functions and organizations, financial statement analysis, working capital management, present value analysis, capital budgeting, cost of capital, variance analysis, financing techniques, and financial analysis case studies. 3 hours.

HA 621. Health Care Financial Management II (E). Analytical and synthetic aspects of financial management tools. Project method and case studies use to supplement theory. Prerequisite: HA 620. 3 hours.

HCOW 614/MBA 610. Cost Control for Health Professionals (E). The purpose of this course is to equip students with the knowledge and skills for the basic financial analysis needed to make decisions for budgeting, investments, leasing, inventory management, and risk return analysis. Prerequisite: Permission of program director. 3 hours.

HCOW 615. Finance for Health Professionals (E). Financial management of public health care organizations. Emphasis on time value on money, capital raising methods, cost of capital, capital budgeting methods and working capital policy. Problem-solving orientation with applications to public health issues. Prerequisite: Permission of program director. 3 hours.

Research Methods and Statistics Alternatives:

Courses in quantitative and qualitative methods and scientific inquiry may be taken from courses offered in Health Services Administration, Biostatistics, or Public Health.

BST 619. Data Collection and Management (E). Basic concepts of study design, forms design, quality control, data entry, data management and data analysis. Hands-on experience with data entry systems and data analysis software. 3 hours. Prerequisites: BST 601-602 or consent of instructor. (Fall offering—School of Public Health)

EPR 607 & 608. Microcomputer Applications to Statistical Analysis—1 credit (607) Use of microcomputers in computations of descriptive statistics, and Statistical methods in Research and Education—3 credits (608). Statistical methods for describing sets of data, differences and relationships infused in an action research paradigm. Included are conceptualizing, implementing action research with computer applications. EPR 607 and 608 must be taken concurrently. (Fall and Spring offering—School of Education)

Organizational Behavior alternatives:

The following options are available for organizational theory/behavior credit and statistics credit respectively:

HCOW 609. Organizational Concepts Applied to Health Programs. (Public Health-Fall) 3 hours.

MPA 661. Administrative Theory and Behavior. (Social and Behavioral Sciences-Fall) 3 hours.

MBA 632. Organizational Behavior (Business-Fall & Spring) 3 hours.

History (M.A.)

Graduate program director: *McConnell*

Faculty

Carolyn A. Conley, Professor (History); British and Irish Political and Social History; History of Violence

Colin J. Davis, Associate Professor (History); U.S. Labor, Women's Labor History, Social History.

Jack E. Davis, Associate Professor (History); Twentieth-Century U.S. Social, Environmental, Southern, Sport.

Harriet E. Amos Doss, Associate Professor (History); U.S. Middle Period, Antebellum South, U.S. Social History

Virginia V. Hamilton, Professor and University Scholar Emerita (History); Twentieth-Century U.S., The South Since Reconstruction

Horace Huntley, Assistant Professor (History); African American History

Andrew W. Keitt, Assistant Professor (History); Early Modern Europe, European Cultural and Intellectual, Iberian World

Daniel R. Lesnick, Associate Professor (History); Medieval History, Renaissance and Reformation, Italy

George O. Liber, Associate Professor (History); Soviet, Post-Soviet, Russian, Eastern European, and Ukraine

Michael N. McConnell, Associate Professor (History); Colonial North America, American Revolution, American Indian

Tennant S. McWilliams, Professor (History); Recent South, Modern United States, U.S. Foreign Affairs

Andre J. Millard, Professor (History); History of Technology, Economic and U.S. Cultural History

Stephen Miller, Assistant Professor (History); France; Economic History

Raymond A. Mohl, Professor and Chairman (History); U.S., Urban, Social, Ethnic, and Historiography

Pamela S. Murray, Associate Professor (History); Latin America, National Period, Colombia

Daniel E. Spector, Adjunct Professor (History); The Middle East, China

James F. Tent, Professor and University Scholar (History); Modern European History; Germany, Military History, Cold War

John van Sant, Assistant Professor (History); Asian History

Samuel L. Webb, Associate Professor (History); New South, Alabama, Legal and Constitutional History

Secondary Faculty

Robert Corley; Assistant Professor (Center for Urban Affairs); Modern South, History of Birmingham

Program Information

The history graduate program provides opportunities for students to learn the techniques of research and broaden their knowledge of historical literature. Students may choose Plan I, which includes writing a thesis based on original research using primary sources, or Plan II, which includes more course work.

All students are required to enroll in HY 601 (Historiography) and HY 602 (Historical Research and Writing) and must take at least 30 hours of their course work in graduate seminars. Each student must take a minimum of 9 hours of course work in U.S. history and 9 hours in non-U.S. history (e.g., European, Asian, Latin America, World).

Plan I (Thesis Plan)

HY 601	Historiography	3 hours
HY 602	Research and Writing	3 hours
U.S. History	3 seminars	9 hours
Non-U.S. History	3 seminars	9 hours
Electives	2 courses	6 hours
Thesis Research	2 courses or equivalent	6 hours
Foreign Language	Examination	0 hours
Total		36 hours

No foreign language study credits can be counted toward the degree requirements. Where foreign language requirements are appropriate, it is recommended that students satisfy these requirements before commencing thesis research.

Plan II: (Nonthesis Plan)

HY 601	Historiography	3 hours
HY 602	Research and Writing	3 hours
U.S. History	3 seminars	9 hours
Non-U.S. History	3 seminars	9 hours
Electives	4 courses	12 hours
Total		36 hours

Students interested in Teaching Certification for Public Schools should contact the School of Education Certification Office, EB 229, 1530 3rd Avenue South, Birmingham, Alabama 35294-1250 (telephone 205-934-5323).

Additional Information

For detailed information, contact Dr. Michael N. McConnell, History Graduate Program Director, Department of History, U401, 1530 3rd Avenue South, Birmingham, Alabama 35294-3350.

Telephone 205-934-5634

E-mail cconley@uab.edu

Course Descriptions

History (HY)

Courses are for 3 hours of credit unless otherwise indicated. All seminars except 601 and 602 may be taken more than once. Students may take no more than two Directed Readings courses (681) or internships (682).

601. Historiography. Seminar on various theoretical perspectives and methodologies of professional historians. What historians do, how they do it, and why.

602. Historical Research and Writing. Methods of historical research, including research in primary sources, and the distinctive characteristics of historical writing.

612. Seminar in Early America. Topics and issues in the history and historiography of Colonial North America, circa 1500-1775.

613. Seminar in the Civil War Period. Specialized themes and military, political, social and economic developments related to Civil War; particular emphasis on the South, 1860-1865.

614. Seminar in Recent American History. Topics in the politics of modern America.

615. Seminar in American Myths, American Values. Recommended for students teaching at the secondary-education level and for traditional history students alike. Examines the major myths that inform, and that are informed by, traditional American values and how both shape social relationships.

621. Southern History to 1877. Subjects ranging from the Antebellum through Reconstruction periods.

622. Seminar in Southern History Since 1877. Subjects pertaining to the New South era.

623. Seminar in Alabama History. Specific social, political, and economic aspects of Alabama history.

631. Seminar: Topics in American History. Historical topics of American history (e.g., conservatism, crime and punishment).

632. Seminar in U.S. Urban History. Topics in urban history.

633. Seminar in American Constitutional and Legal History. Study of major trends and cases in the history of American law, with special emphasis on the interpretation of the American constitution by the Supreme Court.

634. Seminar in American Foreign Relations. Selected topics related to American experience with foreign relations.

635. Seminar in American Social History. A reading and research seminar examining the history of the structure and power of social groups in America.

637. **Seminar in U.S. Labor History.** Development of labor force and movements in U.S. nineteenth and twentieth centuries.

638. **Seminar in Civil Rights History.** An analysis of history and historiography of Civil Rights Movement in America since the 19th century.

639. **Seminar in Women's History.** An analysis of the changing economic, political, and social roles of women.

641. **Seminar in Latin American History.** Issues in history of Latin America since the late 18th century: economic development, dependency and popular resistance, role of the Catholic Church, social revolution, and nationalism.

650. **Seminar. Topics in European History.**

651. **Seminar in Medieval Europe.** Survey of the Middle Ages focusing on society, religion, and culture from 500-1500.

652. **Seminar in the Renaissance.** Special attention given to the new urban context of society, culture, politics, art, and religion.

653. **Seminar in Modern Europe.** Reformation to the present; major topics such as society and politics, warfare, religious trends, state building, and industrialization.

654. **Seminar in British History.** Focuses on a particular period or problem in British history. Reading and discussion of current publications on the topic.

655. **Seminar in Russian/Soviet History.** Analysis of primary sources and secondary works dealing with political and social history of Imperial Russia or Soviet Union and their successor states.

656. **Seminar in French History.** Seminar dealing with various periods and issues in the history of France.

671. **Seminar in Asian History.** Topics in Asian History.

672. **Seminar: Topics in World History.** Seminar in historical topics of world history.

673. **Seminar in World Environmental History.** Comparative examination of cultures and their relationship with the natural environment in a modern world context.

674. **Seminar in Comparative History.** Explores through reading and research varied issues in comparative history; revolution, war, slavery, labor cities, industrialization, and social and cultural topics.

681. **Directed Readings in History.** Individually designed course of readings in various fields. May be repeated. Only two directed reading courses will count toward degree requirements for history majors. Prerequisite: Permission of instructor. 1, 2, 3, and 6 hours.

682. **Internship in Public History.** Individually designed program that places students in local historical museums and sites to gain professional experience in public history. Prerequisite: Permission of instructor. 1 to 3 hours.

683. **Seminar in Public History.** Explores the diverse approaches and methods of presenting history to public audiences, museums, historic sites, architectural preservation, documentary editing, and archival preservation.

693. **Special Topics in History.** Seminar exploring the historiography of a specialized topic in history.

698. **Nonthesis Research.** Individual research project. 3-6 hours.

699. **Thesis Research.** Research culminating in master's thesis in history. Prerequisite: Admission to candidacy. 3-6 hours.

771. **Special Projects in History.** Prerequisite: Open only to those who hold the M.A. degree. 1-3 hours.

Integrative Biomedical Sciences Program

(Ph.D. in participating departments)

Graduate program director: *Kirk*

Faculty from Participating Departments

Environmental Health Sciences (www.soph.uab.edu)

Genomics and Pathobiology (www.uab.edu/genpath)

Pathology (www.path.uab.edu)

Pharmacology (www.uab.edu/pharmtox)

Physiology and Biophysics (www.physiology.uab.edu)

Program Information

The Integrative Biomedical Sciences Program, offered through the Departments of Genomics and Pathobiology, Pathology, Physiology, and Pharmacology and Toxicology, and Environmental Health Sciences, consists of course work and individual laboratory research leading to the Ph.D. degree. The program is designed to provide interdisciplinary training of high quality in cellular and molecular biology, and organ-based pathophysiology, to a selected group of predoctoral students, preparing them to become independent investigators in these disciplines. Students are immersed in research at the forefront of scientific endeavor and provided with sufficient guidance and course work to place their research in the proper perspective.

The first-year curriculum emphasizes three areas: acquisition of a working knowledge of contemporary cellular and molecular biology, an integrated approach toward understanding the principals of physiology pathophysiology and disease therapy, and the role of genetics and genetic models of disease in basic biology. Involvement in laboratory training through research rotations, and the acquisition of skills in reading, writing, and speaking are also emphasized. Advanced students are engaged primarily in research but also take some advanced courses and tutorials in specialized areas of interest and participate in seminars. Completion of requirements for the Ph.D. usually takes five years. No foreign language is required.

Graduates typically go on to postdoctoral research appointments followed by careers in academic research and teaching or research in the biotechnology industry.

Facilities and Resources

Faculty members participating in the program have more than 100,000 square feet of laboratory space. In addition to well-equipped labs, a number of special facilities are available, including several multiprobe NMR spectrometers (ranging in frequency up to 400 MHz), advanced confocal microscopic equipment, state of the art mass spectrometry facilities, electron microscopes, protein and nucleic acid synthesis and analysis instrumentation, bacterial fermentation facilities, X-ray diffraction equipment, a P3 containment laboratory, computer facilities, and a hybridoma facility.

How to Apply

Admission decision is based on scores achieved on the Graduate Records Examinations (a combined score of 1200, nominally, on the verbal and quantitative portions of the General Test), undergraduate GPA, letters of evaluation and, whenever possible, a personal interview with members of the Admissions Committee. There is no application deadline, but all applications received will be reviewed by March 1, 2002.

To be accepted into the program, the student should have completed a B.S. degree that includes the following undergra-

duate course work by the time of entrance: calculus (integral and differential), general and organic chemistry, and at least one introductory course in zoology or biology. Courses in physical chemistry, genetics, and cell biology are also to the benefit of the candidate. Any remedial course work must be completed with a grade of B or better before the end of the first full year of doctoral study.

Additional Information

For more information, contact Glenda Tawbush, Program Coordinator, MCLM 958, 1530 3rd Avenue South, Birmingham, AL 35294-0005.

Telephone 205-934-7810

Fax 205-934-5787

E-mail tawbush@physiology.uab.edu

Web main.uab.edu/show.asp?durki=45399

Linguistics

Although UAB does not offer a graduate degree in linguistics, courses in this area are available to interested graduate students. For detailed information, contact Dr. David Basilico, UAB Department of English, Humanities Building, Room 210, 900 13th Street South, Birmingham, AL 35294-1260.

Telephone 205-934-8588

E-mail basilico@uab.edu

Web www.uab.edu/english/grad

Materials Science (Ph.D.)

UAB, the University of Alabama (Tuscaloosa), and the University of Alabama in Huntsville offer a joint, interdisciplinary program leading to the Ph.D. degree in materials science.

Graduate program director at UAB: *Janowski*

UAB Faculty

Rigoberto Advincula, Assistant Professor (Chemistry); Synthesis, Fabrication, and Characterization of Ultrathin Films

J. Barry Andrews, Professor (Materials Science and Engineering); Solidification, Microgravity Processing, Physical Metallurgy, Intermetallic Materials, Electronic Properties

Krishan K. Chawla, Professor (Materials Science and Engineering); Metal-, Ceramic-, and Polymer-Matrix Composite Materials; Fibers, Interfacial Phenomena

Juan P. Claude, Assistant Professor (Chemistry); Electrosynthesis and Photophysics of Semiconductor Nanoparticles

Lawrence J. DeLucas, Professor (Optometry); Microgravity Processing of Protein Crystals

Alan Eberhardt, Associate Professor (Biomedical Engineering); Solid Mechanics, Analytical and Numerical Methods, Biomechanics

Dale S. Feldman, Associate Professor (Biomedical Engineering); Porous Polymeric Soft-Tissue Implant Biocompatibility, Biodegradable Composites, Biomechanics

Gary M. Gray, Associate Professor (Chemistry); Synthesis, Characterization and Applications of Inorganic Polymers

Robin D. Griffin, Research Assistant Professor (Materials Science and Engineering); Electron Microscopy, Physical Metallurgy

Tracy P. Hamilton, Associate Professor (Chemistry); Chemistry of Small Atom Clusters and Interactions

Joseph G. Harrison, Associate Professor (Physics); Energy-Band Structure, Electronic Structure of Defect Systems, Molecular Metals

Gregg M. Janowski, Associate Professor (Materials Science and Engineering); Electron Microscopy, Composite Materials, Physical Metallurgy, Structure-Processing-Property Relationships

William R. Lacefield, Professor (Dentistry); Bonding of Ceramics, Glass, and Composite Resins to Metallic Implants, Dental Alloys

Chris Lawson, Professor (Physics); Nonlinear Optics, Fiber Optics, Optical Fibers

Jack E. Lemons, Professor (Dentistry); Design of Ligament and Tendon Prostheses, Development of Synthetic Bone Products

Linda C. Lucas, Professor (Biomedical Engineering); Corrosion Evaluation of Implant Alloys, Biocompatibility of Dental and Orthopedic Biomaterials

Jimmy W. Mays, Professor (Chemistry); Polymer Synthesis, Dilute Solution Properties, Compatibility

Burton R. Patterson, Professor (Materials Science and Engineering); Powder Processing, Physical Metallurgy, Composite Materials, Quantitative Microscopy

E. Douglas Rigney, Academic Associate Professor (Biomedical Engineering); Corrosion, Biomaterials, Metal-Ceramic Interfaces

Rosalia N. Scripa, Professor (Materials Science and Engineering); Ceramics and Glass, Extractive Metallurgy, Semiconductor of Crystal Growth, Electronic-Magnetic Materials

David L. Shealy, Professor (Physics); X-ray Telescopes, Microscopes and Lithography, Optics, Free Electron Lasers

Yogesh K. Vohra, Professor (Physics); Thin Diamond Films, Laser and X-ray Characterization of Materials at Extreme Conditions

Dong Xie, Research Assistant Professor (Biomedical Engineering); Orthopedic and Dental Composite Bone Cements, Composite Materials, Hard and Soft Tissue Adhesives; Polymers for Biomedical Applications, Evaluation of Physical and Mechanical Properties of Biomaterials and Composites

Mary Ellen Zvanut, Associate Professor (Physics); Electrical Studies and EPR Studies of Insulators and Semiconductors

Participating Faculty from the University of Alabama (Tuscaloosa)

Viola Acoff, Assistant Professor (Metallurgical and Materials Engineering); Physical Metallurgy, High Temperature Materials, Electron Microscopy, Welding

Chester Alexander, Jr., Professor (Physics); Magnetic Resonance of Organic and Magnetic Materials

Martin G. Bakker, Associate Professor (Chemistry); Physical Chemistry; Electron Paramagnetic Resonance, Surfactants

Mark E. Barkey, Associate Professor (Aerospace Engineering and Mechanics); Structural Durability and Fatigue Performance;

Richard C. Bradt, Professor (Metallurgical and Materials Engineering); Ceramic Materials

Michael P. Cava, Ramsay Professor (Chemistry); Organic Conductors, Synthetic Methods

Peter Clark, Associate Professor (Chemical Engineering); Fluid Rheology, Flow of Fluid Complex Mixtures-Slurries, Emulsions, and Gels

William D. Doyle, Professor (Physics); Magnetic Materials and Devices for Information Storage

Nagy H. El-Kaddah, Professor (Metallurgical and Materials Engineering); Materials Process Modeling

James W. Harrell, Jr., Professor (Physics); Nuclear Magnetic Resonance of Molecular Motions in Solids

Stanley E. Jones, Professor (Aerospace & Mechanics); Plasticity Analysis, Nonlinear Mechanics, and Applied Mathematics

Lowell D. Kispert, Research Professor (Chemistry); Structure of Free Radicals in Single Crystals, Magnetic Resonance Methods, Conducting Polymers, Solid-State Photochemistry

Gary Mankey, Assistant Professor (Physics); Nanostructure Ferromagnets

Robert M. Metzger, Professor (Chemistry); Solid-state Chemistry, Organic Conductors, X-ray Crystallography, Solid-State Theory

David Nikles, Associate Professor (Chemistry); Chemistry, Application of Materials for Optics and Information Technology, Optical Data Storage, Flexible Magnetic Media

Raghvendra K. Pandey, Professor (Electrical and Computer Engineering); Bulk Single Crystal and Thin Film Growth of Electronic Materials, Integrated Structures and Devices

Ramana Reddy, ACIPCO Professor (Metallurgical and Materials Engineering); High-Temperature Materials Processing, Thermodynamics

Sanjoy K. Sarker, Professor (Physics); Statistical Mechanics and High-Field Effects in Semiconductors

Doru M. Stefanescu, Professor (Metallurgical and Materials Engineering); Nucleation and Growth in Solidification Processes, Physical Chemistry of Surface and Interface Reactions

Shane C. Street, Assistant Professor (Chemistry); Analytical Chemistry; Ultrathin Oxide Films; Tribology

Pieter B. Visscher, Professor (Physics); Metals Physics, Viscoelastic Properties of Materials

Garry W. Warren, Professor (Metallurgical and Materials Engineering); Corrosion and Surface Electrochemistry

Mark Weaver, Assistant Professor (Metallurgical and Materials Engineering); Microstructure-Property Relations; Intermetallic Compounds; Structural Materials; Thin Films; Materials Characterization

Giovanni Zangari, Assistant Professor (Metallurgical and Materials Engineering); Electrochemical and Autocatalytic Deposition of Thin Films; Magnetic Films

Participating Faculty from the University of Alabama in Huntsville

James K. Baird, Professor (Chemistry); Theory of Ostwald Ripening, Electron Transport, Radiation Effects

Ramon Luis Cerro, Professor (Chemical Engineering); Langmuir-Blodgett Ultrathin Films, Capillary Hydrodynamics

Krishnan Chittur, Associate Professor (Chemical Engineering); Biological Thin Films, Polymer Films

John Dimmock, Professor (Physics); Polymers, Composites, Fluid Dynamics, Electromagnetic Scattering and Antennae

Michael A. George, Research Assistant Professor (Chemistry); Interactions Between Adsorbate Layers and Surfaces of Thin Films

Don A. Gregory, Associate Professor (Physics); Pattern Recognition

John C. Gregory, Professor (Chemistry); Interaction of Atomic Oxygen and High-Energy Particles with Surfaces and Bulk Materials

J. Milton Harris, Distinguished Professor (Chemistry); Synthesis and Biotechnical Applications of Hydrophilic polymers

Douglas G. Hayes, Assistant Professor (Chemical and Materials Engineering)

William F. Kaukler, Assistant Research Professor (Chemistry); Solidification

Boon H. Loo, Professor (Chemistry); Surface-Enhanced Raman Spectroscopy, Electrochemistry

Richard S. Lumpkin, Associate Professor (Chemistry); Molecular Modeling and Photoreactive Molecules

Edward J. Meehan, Jr., Associate Professor (Chemistry); Crystal Growth of Proteins, X-ray Crystallography of Protein Single Crystals

Robert J. Naumann, Professor (Materials Science); Crystal Growth in Low Gravity, Space Processing

Joseph Ng, Assistant Professor (Biology); X-ray Crystallography

Aleksandar G. Ostrogorsky, Professor (Physics); Gravity Effects on Materials Processing

Carmen Scholz, Assistant Professor (Chemistry); Green Chemistry, Biodegradable Biomaterials

William N. Setzer, Professor (Chemistry); NMR and X-ray Conformational Analysis of Novel Organic Compounds

James E. Smith, Associate Professor (Chemical Engineering); Catalysis, Powder Metals

James Van Alstine, Associate Research Professor (Chemistry); Macromolecules and Bioparticles

Peter G. Vekilov, Assistant Professor (Chemistry); Protein Crystallization

Jeffrey Weimer, Associate Professor (Chemistry); Surface Banding Studies

Francis C. Wessling, Professor (Mechanical and Aerospace Engineering); Space Processing of Materials

Admission

Admission into the materials science graduate program through UAB is by recommendation of the UAB Materials Science Program Committee. On acceptance into the program, the student will be affiliated with a "host" department. Assistantships can be awarded either by the host department or by the materials science program. Until a student has chosen a mentor, the Materials Science graduate program director, or his or her designate, will advise the student.

Course Work

Students enter this program with diverse undergraduate training in engineering, physical, or biological sciences. The multidisciplinary curriculum has been structured to develop a common philosophy of the interrelationship of structure, properties, and synthesis of materials. The program committee can waive some course work for a student entering the program with a master's degree in an appropriate discipline.

During the first phase of instruction (usually 12 semester hours), the student is expected to acquire a core of knowledge

in materials science through formal course work and independent study. The core is divided into four topical areas: (1) structure and analysis; (2) condensed matter science; (3) thermodynamics and kinetics; and (4) structure, processing, and properties. Each student's background will be evaluated in order to develop an individual program of study, which may involve some undergraduate course work to satisfy prerequisites for graduate courses and to provide sufficient breadth of coverage of the core areas. To complete this phase, the student must pass all sections of Program Examination I; the four parts of this examination are offered twice per year. The student is expected to choose a mentor before completion of Program Examination I.

The second (specialization, normally 24 semester hours) and the third (electives, 12 semester hours) phases of the curriculum are planned by the student and the research adviser, with approval of the student's graduate study committee. Available areas of specialization are (1) structure and properties of materials; (2) macromolecular materials; (3) electronic, optical, and magnetic materials; (4) materials processing; (5) biomaterials or (6) mechanical behavior of materials.

Courses may be taken at UAB, the University of Alabama (Tuscaloosa), or the University of Alabama in Huntsville. Near the end of the formal course work, the student must pass a comprehensive examination (Program Examination II) set by the student's graduate committee and present a dissertation proposal.

Foreign Language Requirement

Each student is required to demonstrate reading proficiency in a foreign language or proficiency in a technique or skill that is a useful adjunct to the research degree. In the case of a foreign language, competency will be established by an examination that consists of the student translating (with dictionary) a research article, chosen by the student's graduate study committee. A pass/fail determination will be made by the student's graduate study committee after receiving an assessment of merit from a foreign language professor. The language chosen may not be the native tongue of the student and must be from the following list: Chinese, French, German, Japanese, or Russian. A particular research technique or skill must be approved by the student's graduate study committee.

Program Completion

Since the Ph.D. is a research degree, all students are expected to acquire most of their advanced knowledge through research training. These activities will be directly supervised by the student's mentor. The student will write a dissertation and defend it by oral examination.

Additional Information

For detailed information, contact Dr. Gregg M. Janowski, Graduate Program Director, The University of Alabama at Birmingham, Department of Materials Science and Engineering, BEC 254, 1530 3rd Avenue South, Birmingham, AL 35294-4461.

Telephone: 205-934-8450,

E-mail: mseuab@eng.uab.edu

Web www.eng.uab.edu

Course Descriptions

UAB Courses

For courses at cooperating universities, see the graduate catalogs of the University of Alabama (Tuscaloosa) and the University of Alabama in Huntsville. Unless otherwise noted, all courses are for 3 semester hours of credit.

Courses at UAB have the following prefixes:

Biomaterials	CD (Clinical Dentistry)
Biomedical Engineering	BME
Chemistry	CH
Materials Science and Engineering	MSE
Physics	PH

A partial list of courses that prepare students for Program Examination I (See program director for reading list) is as follows:

Structure and Analysis

BME 716	Instrumental Methods of Analyses.
CH 580	Polymer Chemistry for Graduate Study I.
CH 730	Physical Organic Chemistry I.
CH 740	Bonding and Structure in Inorganic Compounds.
MSE 363	Characterization of Materials. 4 hours.
MSE 743	Materials Characterization I.
MSE 744	Materials Characterization II.
PH 745	Molecular Spectroscopy.

Condensed Matter Science

CD 661	Physical Properties of Biomaterials.
CH 725	Molecular Structure and Spectroscopy.
PH 753	Advanced Solid State Physics I.
PH 754	Advanced Solid State Physics II.
PH 771	Quantum Mechanics I.
PH 772	Quantum Mechanics II.

Thermodynamics and Kinetics

CH 729	Special Topics in Physical Chemistry. 1-3 hours.
MSE 703	Thermodynamics of Materials.
PH 635	Statistical Mechanics.

Structure, Processing, and Properties

CH 580	Polymer Chemistry I for Graduate Study.
MSE 280	Engineering Materials.
MSE 281	Physical Materials I.
MSE 381	Physical Materials II.
MSE 570	Ceramic Materials.

A partial list of courses for each specialization is given below. Additional courses may be accepted at the discretion of the graduate committee.

Specialization I: Structure and Properties of Materials.

Must include 3 hours in instrumentation, 3 hours in methods of chemical analysis, and 3 hours in spectroscopy.

BME 542	Principles of Medical Imaging
BME 546	Principles of MRI
BME 716	Instrumental Methods of Analyses
BME 742	Medical Imaging Instrumentation
CH 729	Special Topics in Physical Chemistry

CH 749	Special Topics in Inorganic Chemistry
CH 750	Advanced Analytical Chemistry
CH 751	Advanced Analytical Chemistry II
CH 755	Electroanalytical Chemistry
CH 757	Analytical Spectroscopy
MSE 703	Thermodynamics of Materials
MSE 718	Surfaces, Interfaces, and Thin Films
MSE 737	Quantitative Microscopy
MSE 743	Materials Characterization I
MSE 744	Materials Characterization II
MSE 753	Phase Diagrams

Specialization 2: Macromolecular Materials.

Must include 3 hours in advanced inorganic or organic chemistry, 3 hours in macromolecular chemistry, and 3 hours in macromolecular physics.

BME 511	Polymers for Biomedical Applications I
BME 520	Tissue Interactions
BME 712	Polymers for Biomedical Applications II
BME 750	Implants in Dentistry
CH 580	Polymer Chemistry I for Graduate Study II
CH 581	Polymer Chemistry II for Graduate Study II
CH 729	Special Topics in Physical Chemistry
CH 739	Special Topics in Organic Chemistry

Specialization 3: Electronic, Optical, and Magnetic Materials.

Must include 3 hours in spectroscopy and 6 hours in the electronic, optical, or magnetic properties of materials.

CH 729	Special Topics in Physical Chemistry
CH 743	Chemical Applications of Group Theory
CH 744	Spectroscopy of Inorganic Chemistry
MSE 584	Electronic, Magnetic and Thermal Properties of Materials
MSE 718	Surfaces, Interfaces, and Thin Films
MSE 743	Materials Characterization I
PH 623	Modern Optics I
PH 655	Advanced Solid State Laboratory
PH 715	Advanced Statistical Mechanics
PH 741	Mössbauer Spectroscopy
PH 742	Electron Spin Resonance
PH 750	Classical Electrodynamics I
PH 751	Classical Electrodynamics II
PH 753	Advanced Solid State Physics I
PH 754	Advanced Solid State Physics II
PH 760	Methods of Mathematical Physics
PH 762	Computational Physics

Specialization 4: Materials Processing.

Must include 6 hours in solidification or crystal growth and 3 hours in processing technology.

CD 633	Alloy Systems in Dentistry
MSE 503	Materials Processing
MSE 713	Mechanical Behavior of Materials
MSE 715	Nucleation and Growth
MSE 716	Microstructural Processes
MSE 718	Surfaces, Interfaces, and Thin Films
MSE 723	Solidification
MSE 753	Phase Diagrams

Specialization 5: Biomaterials.

Must include 6 hours in the structure and properties of biomaterials and 3 hours in biomaterials applications.

BME 511	Polymers for Biomedical Applications I
BME 520	Implant Tissue Interactions
BME 712	Polymers for Biomedical Applications II
BME 750	Implants in Dentistry
BME 753	Ceramic Materials in Dentistry
BME 754	Alloy Systems in Dentistry
BME 790	Special Topics in Biomaterials, 1-6 hours
BME 791	Individual Study in Biomaterials, 1-6 hours
CD 626	Surgical Implants in Dentistry
CD 629	Ceramic Cements, Alloy-Ceramic Systems
CD 633	Alloy Systems in Dentistry
CD 661	Physical Properties of Biomaterials
CD 662	Laboratory Methods for Biomaterials Research

Specialization 6: Mechanical Behavior of Materials.

Must include 3 hours in ceramic, metallurgical, or polymer engineering, 3 hours in the mechanical behavior of materials, and 3 hours in the characterization of materials.

BME 716	Instrumental Methods of Analyses
BME 733	Tissue Mechanics
BME 737	Biomechanics: Tissue Mechanics II
BME 776	Fracture Mechanics
MSE 713	Mechanical Behavior of Materials
MSE 737	Quantitative Microscopy
MSE 743	Materials Characterization I
MSE 744	Materials Characterization II
PH 610	Classical Mechanics I
PH 611	Classical Mechanics II
PH 710	Advanced Classical Mechanics I
PH 711	Advanced Classical Mechanics II

Mathematics, Applied (Ph.D.)

The Applied Mathematics graduate program is offered jointly by the University of Alabama at Birmingham, the University of Alabama (Tuscaloosa), and the University of Alabama in Huntsville.

Graduate program director at UAB: *Weinstein*

Faculty

Alexander Blokh, Associate Professor (Mathematics); Dynamical Systems.

James J. Buckley, Associate Professor (Mathematics); Analysis, Econometrics, Operations Research

Nikolai Chernov, Professor (Mathematics); Dynamical Systems, Ergodic Theory

Louis Dale, Professor (Mathematics); Ring Theory

Marcel Griesemer, Assistant Professor (Mathematics); Mathematical Physics

Yulia Karpeshina, Associate Professor (Mathematics); Partial Differential Equations and Mathematics Physics

Robert M. Kauffman, Professor (Mathematics); Ordinary and Partial Differential Equations, Operator Theory, Spectral Geometry

Ian W. Knowles, Professor (Mathematics); Ordinary and Partial Differential Equations, Numerical Analysis

Roger T. Lewis, Professor (Mathematics); Differential Equations, Spectral Theory

John C. Mayer, Professor (Mathematics); Topology, Continuum Theory, Dynamical Systems

Mulbenga N. Nkashama, Professor (Mathematics); Differential Equations, Dynamical Systems, Nonlinear Functional Analysis

Peter V. O'Neil, Professor (Mathematics); Graph Theory, Combinatorics

Lex G. Oversteegen, Professor (Mathematics); Topology, Continuum Theory, Dynamical Systems

Yoshimi Saito, Professor (Mathematics); Scattering Theory, Differential Equations

Nandor Simanyi, Associate Professor (Mathematics); Dynamical Systems With Some Algebraic Flavor

Gunter Stolz, Associate Professor (Mathematics); Spectral Theory, Mathematical Physics

James R. Ward, Jr., Professor (Mathematics); Differential Equations, Nonlinear Analysis, Dynamical Systems

Rudi Weikard, Professor (Mathematics); Ordinary and Partial Differential Equations, Mathematical Physics

Gilbert Weinstein, Associate Professor (Mathematics); Partial Differential Equations, General Relativity, Differential Geometry

Sumio Yamada, Assistant Professor (Mathematics); Nonlinear Partial Differential Equations, Differential Geometry

Yanni Zeng, Associate Professor (Mathematics); Nonlinear Partial Differential Equations, Numerical Analysis, Gas Dynamics

Henghui Zou, Associate Professor (Mathematics); Nonlinear Partial Differential Equations, Nonlinear Analysis

Program Information

Mathematics has always been divided into a pure and an applied branch. However, these have never been strictly separated. The Ph.D. program in applied mathematics stresses the interconnection between pure mathematics and its diverse applications.

Admission

Only students with a firm foundation in advanced calculus, algebra, and topology are considered for immediate admission to the Ph.D. program. A student lacking this background will be considered for admission to the M.S. program. Upon passing the qualifying examination, a student may transfer to the Ph.D. program. We expect at least a B average in a student's previous work and a score above 550 on each section of the Graduate Record Examination General Test.

Program of Study

Each student in the Ph.D. program has to take the following steps:

- Passing the Joint Program Exam (JPE), also called the Qualifying Exam. This is an exam in real analysis and applied linear algebra. It is administered by the Joint Program Committee, which includes graduate faculty from all three participating universities. A student that is admitted directly into the Ph.D. program is expected to take this exam by the end of the first year at the latest. This examination may be taken no more than twice.
- Completing 54 semester hours of graduate courses. The grade of each course has to be at least a B. The student's supervisory committee and the Joint Program Committee must approve the selection of courses. At least 18 hours must be in a major area of concentration, selected so that the student will be prepared to conduct research in an area

of applied mathematics, while at least 12 hours have to be in a minor area of study, which is a subject outside mathematics.

- Passing a language or tool of research exam.
- Passing the Comprehensive Exam, which consists of a written part and an oral part.
- Preparing a dissertation, which must be a genuine contribution to mathematics.
- Passing the Final Examination (thesis defense).

Additional Information

For detailed information, contact Dr. Gilbert Weinstein, Mathematics Graduate Program Director, UAB Department of Mathematics, CH 452, 1530 3rd Avenue South, Birmingham, Alabama 35294-1170.

Telephone 205-934-2154

E-mail graduate@math.uab.edu

Web www.math.uab.edu

Course Descriptions

For courses at cooperating universities, see the graduate catalogs of the University of Alabama (Tuscaloosa) and the University of Alabama in Huntsville. Unless otherwise noted, all courses are for 3 semester hours of credit. Course numbers preceded with an asterisk indicate courses that can be repeated for credit, with stated stipulations.

In addition to courses offered in the M.S. program, the following courses are offered in the Ph.D. program. All courses carry 3 hours of credit unless otherwise noted.

740. Advanced Complex Analysis. Varying topics. May be repeated for credit. Prerequisites: Having passed the Qualifying Exam or permission of instructor.

745. Functional Analysis I. Normed and Banach spaces, inner product and Hilbert spaces, linear functionals and dual spaces, operators in Hilbert spaces, theory of unbounded sesquilinear forms, Hahn-Banach, open mapping, and closed graph theorems, spectral theory. Prerequisites: Having passed the Qualifying Exam or permission of instructor.

746. Functional Analysis II. Varying topics. May be repeated for credit. Prerequisites: Having passed the Qualifying Exam or permission of instructor.

747. Linear Operators in Hilbert Space. Hilbert space, Bessel's inequality, Parseval's formula, bounded and unbounded linear operators, representation theorems, the Friedrichs extension, the spectral theorem for self-adjoint operators, spectral theory for Schrödinger operators. Prerequisites: Having passed the Qualifying Exam or permission of instructor.

748. Fourier Transforms. Fourier transform and inverse transform of tempered distributions; applications to partial differential equations. Prerequisites: Having passed the Qualifying Exam or permission of instructor.

750. Advanced Ordinary Differential Equations. Varying topics. May be repeated for credit. Prerequisites: Having passed the Qualifying Exam or permission of instructor.

753. Nonlinear Analysis. Selected topics including degree theory, bifurcation theory, and topological methods. Prerequisite: Having passed the Qualifying Exam or permission of instructor.

755. Advanced Partial Differential Equations. Selected topics varying with instructor. : Having passed the Qualifying Exam or permission of instructor.

760. Dynamical Systems I. Continuous dynamical systems. Limit sets, local sections, minimal sets, centers of attraction, recurrence, stable and wandering points, flow boxes, and monotone sequences in planar dynamical systems, Poincare-Bendixson theorem. Prerequisites: Having passed the Qualifying Exam or permission of instructor.

761. Dynamical Systems II. Discrete dynamical systems. Hyperbolicity, symbolic dynamics, chaos, homoclinic orbits, bifurcations, and attractors (theory and examples). Prerequisite: Having passed the Qualifying Exam or permission of instructor.

770. Continuum Theory. Pathology of compact connected metric spaces. Inverse limits, boundary bumping theorem, Hahn-Muzukiewicz theorem, composants, chainable and circle-like continua, irreducibility, separation, unicoherence, indecomposability. Prerequisite: Having passed the Qualifying Exam or permission of instructor.

772. Complex Analytic Dynamics. Riemann surfaces, iteration theory of polynomials, rational functions and entire functions, fixed point theory, Mandelbrot set, Julia sets, prime ends, conformal mappings. Prerequisite: Having passed the Qualifying Exam or permission of instructor.

774. Algebraic Topology. Covering spaces; introduction to homotopy theory, singular homology, cohomology. Prerequisites: Having passed the Qualifying Exam or permission of instructor.

776. Advanced Differential Geometry. Varying topics. May be repeated for credit. Prerequisite: Having passed the Qualifying Exam or permission of instructor.

790-797. Special Topics in Mathematics. These courses cover special topics in mathematics and the applications of mathematics. May be repeated for credit when topics vary. Prerequisites Permission of instructor. 1, 2, or 3 hours.

798. Nondissertation Research. Prerequisite: Permission of instructor. 1-6 hours.

799. Dissertation Research. Prerequisite: Admission to candidacy and permission of instructor. 1-6 hours.

Biomathematics (BST)

Please see Biostatistics (BST) course descriptions for additional graduate courses in applied mathematics.

Mathematics (M.S.)

Graduate program director at UAB: *Weinstein*

Faculty

Alexander Blokh, Associate Professor (Mathematics); Dynamical Systems.

James J. Buckley, Associate Professor (Mathematics); Analysis, Econometrics, Operations Research

Nikolai Chernov, Professor (Mathematics); Dynamical Systems, Ergodic Theory

Louis Dale, Professor (Mathematics); Ring Theory

Marcel Griesemer, Assistant Professor (Mathematics); Mathematical Physics

Yulia Karpeshina, Associate Professor (Mathematics); Partial Differential Equations and Mathematics Physics

Robert M. Kauffman, Professor (Mathematics); Ordinary and Partial Differential Equations, Operator Theory, Spectral Geometry

Ian W. Knowles, Professor (Mathematics); Ordinary and Partial Differential Equations, Numerical Analysis

Roger T. Lewis, Professor (Mathematics); Differential Equations, Spectral Theory

John C. Mayer, Professor (Mathematics); Topology, Continuum Theory, Dynamical Systems

Mulbenga N. Nkashama, Professor (Mathematics); Differential Equations, Dynamical Systems, Nonlinear Functional Analysis

Peter V. O'Neil, Professor (Mathematics); Graph Theory, Combinatorics

Lex G. Oversteegen, Professor (Mathematics); Topology, Continuum Theory, Dynamical Systems

Yoshimi Saito, Professor (Mathematics); Scattering Theory, Differential Equations

Nandor Simanyi, Associate Professor (Mathematics); Dynamical Systems With Some Algebraic Flavour

Gunter Stolz, Associate Professor (Mathematics); Spectral Theory, Mathematical Physics

James R. Ward, Jr., Professor (Mathematics); Differential Equations, Nonlinear Analysis, Dynamical Systems

Rudi Weikard, Professor (Mathematics); Ordinary and Partial Differential Equations, Mathematical Physics

Gilbert Weinstein, Associate Professor (Mathematics); Partial Differential Equations, General Relativity, Differential Geometry

Sumio Yamada, Assistant Professor (Mathematics); Nonlinear Partial Differential Equations, Differential Geometry

Yanni Zeng, Associate Professor (Mathematics); Nonlinear Partial Differential Equations, Numerical Analysis, Gas Dynamics

Henghui Zou, Associate Professor (Mathematics); Nonlinear Partial Differential Equations, Nonlinear Analysis

Program Information

Mathematics has always been divided into a pure and an applied branch. However, these have never been strictly separated. The M.S. program in mathematics stresses the interconnection between pure mathematics and its diverse applications.

Areas of Specialization

The student must choose a primary and a secondary specialization from a list of areas determined by the expertise of the faculty. As soon as the student is ready to choose specialization areas, he or she should contact the mathematics graduate program director, who will nominate a graduate study committee for the student. Courses offered to meet degree requirements must be approved by the mathematics graduate program director and the student's graduate study committee.

Degree Requirements

Plan I (Thesis)

The student must complete 30 semester hours approved by the mathematics graduate program director and the student's graduate study committee. The grade in each course has to be a B or better. A minimum of 24 hours must be on the 600 level or above. See Course Descriptions for which courses at the 500 level may not be counted toward the M.S. degree. In addition the following specific requirements must be met:

- at least 9 hours must be in the primary area of specialization,
- at least 6 hours must be in the secondary area of specialization,

- at least 9 hours must be outside the primary area,
- at most 6 hours of research may be included in the 30-hour requirement,
- a thesis must be completed, and
- an examination must be passed on material in the primary area of specialization (the exam may be written, oral, or both, at the discretion of the student's graduate study committee).

The student's performance in all respects must be approved by the graduate program director and the student's Graduate Study Committee.

Plan II (Nonthesis)

The student must complete 30 semester hours approved by the mathematics graduate program director and the student's graduate study committee. The grade in each course has to be a B or better. A minimum of 24 hours must be on the 600 level or above. See Course Descriptions for which courses at the 500 level may not be counted toward the M.S.degree. In addition, the following specific requirements must be met:

- at least 12 hours must be in the primary area of specialization,
- at least 6 hours must be in the secondary area of specialization,
- at least 9 hours must be outside the primary area,
- no research may be included in the 30-hour requirement,
- two examinations must be passed on material in the two areas of specialization. (The exams may be written, oral, or both, at the discretion of the student's graduate study committee.)

Additional Information

For detailed information, contact Dr. Gilbert Weinstein, Mathematics Graduate Program Director, UAB Department of Mathematics, CH 452, 1530 3rd Avenue South, Birmingham, Alabama 35294-1170.

Telephone 205-934-2154

E-mail graduate@math.uab.edu

Web www.math.uab.edu

Course Descriptions

All courses carry 3 hours of credit unless otherwise noted. A course may count as a prerequisite only if it was completed with a grade of B or better. The instructor can waive any prerequisite. Courses numbered 513-519 and 540-541 may not be counted toward a graduate degree in mathematics.

513. Geometry for Teachers. Topics may include foundations of Euclidean and non-Euclidean geometry, construction problems, elementary theory of area, projective geometry, Klein's Erlanger Programme. Prerequisite: MA 141.

514. Real Number System. Axiomatic development of properties of real number system for development of mathematical maturity. Prerequisite: MA 141.

515. Set Theory and Logic. Basic principles of elementary logic and naïve set theory. Prerequisite: MA 141.

517. Theory of Equations. Existence, properties, and methods of finding solutions to polynomial equations. Prerequisite: MA 142.

518. Statistics for Teachers. Descriptive and inferential statistics, probability distributions, estimation, hypothesis testing. Prerequisite: MA 102.

519. Special Topics for Teachers. With permission of instructor, may be used as continuation of any of MA 513 through 518. May be repeated for credit when topics vary.

531. Linear Algebra II. Characteristic polynomials and roots, Jordan canonical form, inner product spaces. Prerequisite: MA 330.

534. Algebra I. Abstract vector spaces, subspaces, dimension, bases, linear transformations, matrix algebra, matrix representations of linear transformations, determinants. Prerequisites: MA 142 or permission of instructor.

535. Algebra II. Groups, homomorphisms, quotient groups, isomorphism theorems, rings and ideals, integral domains, fields. As time permits, Galois theory, semigroups, modules, or other areas of algebra may be included. Prerequisite: MA 534 or permission of instructor.

540. Advanced Calculus I. Introduction to the real numbers; sequences and series of real numbers; functions and continuity; differentiation. This course is taught as a do-it-yourself course and will meet 4 hours per week. Prerequisites: Admission to the graduate program or permission of instructor.

541. Advanced Calculus II. Integration; sequences and series of functions; uniform vs. pointwise convergence; some elementary and special functions. This course is taught as a do-it-yourself course and will meet 4 hours per week. Prerequisites: Admission to the graduate program or permission of instructor.

544. Vector Analysis. Review and applications of multiple integrals, Jacobians and change of variables in multiple integrals; line and surface integrals; theorems of Green, Gauss, and Stokes with application to the physical sciences; computation in spherical and cylindrical coordinates. Prerequisite: MA 244.

545. Complex Analysis. Analytic functions, complex integration and Cauchy's theorem, Taylor and Laurent series, calculus of residues and applications, conformal mappings. Prerequisite: MA 244.

553. Transforms. Theory and applications of Laplace and Fourier transforms. Prerequisite: MA 252.

554. Intermediate Differential Equations. Topics from among Frobenius series solutions, Sturm-Liouville systems, nonlinear equations, and stability theory. Prerequisite: MA 252.

555, 556. Partial Differential Equations I, II. Classification of second-order partial differential equations, background on eigenfunction expansions and Fourier series, solution of the wave equation, reflection of waves, solution of the heat equation in bounded and unbounded media, Laplace's equation, Dirichlet and Neumann problems. Prerequisite: MA 252.

563, 564. Operations Research I, II. Mathematical techniques and models with application in industry, government, and defense. Topics usually chosen from dynamic, linear, and nonlinear programming, decision theory; Markov chains, queueing theory, inventory control, simulation, network analysis, and selected case studies. Prerequisite: MA 243.

568, 569. Numerical Analysis I, II. Integrals, interpolation, rational approximation, numerical solution of ordinary differential equations, iterative solution of algebraic equations in single variable, least squares. Gaussian elimination for solution of linear equations. Prerequisites: MA 252 and either MA 263 or CS 210.

570, 571. **Differential Geometry I, II.** Theory of curves and surfaces: Frenet formulas for curves, first and second fundamental forms of surfaces. Global theory; abstract surfaces, manifolds, Riemannian geometry. Prerequisite: MA 244.

574, 575. **Introduction to Topology I, II.** Separable metric spaces, basis and sub-basis, continuity, compactness, completeness, Baire category theorem, countable products, general topological spaces, Tychonov theorem. Prerequisite: MA 244.

580, 581. **Statistical Analysis I, II.** Applications of statistical techniques, tests of significance and confidence intervals, analysis of variance, analysis of covariance, orthogonal contrasts and multiple-range procedures, simple and multiple linear regression, design of experiments. Prerequisite: MA 243.

585. **Introduction to Probability.** Sample spaces, combinatorics, absolute and conditional probability, discrete and continuous random variables, probability distributions and density functions. Prerequisite: MA 244.

591-598. **Special Topics in Mathematics.** These courses cover special topics in mathematics and the applications of mathematics. May be repeated for credit when topics vary. Prerequisites vary with topics. 1, 2, or 3 hours.

599. **Seminar and Independent Reading in Mathematics.** Prerequisites vary with topics. 1, 2, or 3 hours.

610. **Introduction to Set Theory.** Set theory, products, relations, orders and functions, cardinal and ordinal numbers, transfinite induction, axiom of choice, equivalent statements.

630. **Algebra I.** Propositional and predicate logic; set, relations, and functions; the induction principle; vector spaces and their bases; linear transformations; eigenvalues and eigenvectors; Jordan canonical form; multilinear algebra and determinants; norms and inner products. Prerequisites: Admission to graduate program or permission of instructor.

631. **Algebra II.** Groups, in particular symmetry groups, permutations groups, and cyclic groups; cosets and quotient groups; group homomorphisms; rings, integral domains, and fields; ideals and rings homomorphisms; factorization; polynomial rings. Prerequisites: Admission to graduate program or permission of instructor

642. **Calculus of Several Variables.** Functions of several variables; total and partial derivatives; the implicit function theorem; integration of different forms; Stokes' Theorem. Prerequisites: A grade of at least B in MA 441/541 or permission of instructor.

645. **Real Analysis I.** Abstract measures and integration; positive Borel measures; L^p spaces. Prerequisites: A grade of at least B in MA 642 or permission of instructor.

646. **Real Analysis II.** Complex measures and the Radon-Nikodym theorem; differentiation; integration on product spaces and Fubini theorem. Prerequisites: A grade of at least B in MA 645 or permission of instructor.

648. **Complex Analysis.** The algebraic and topological structure of the complex plane, analytic functions, Cauchy's integral theorem and integral formula, power series, elementary functions and their Riemann surfaces, isolated singularities, residues, the Laurent expansion, the Riemann mapping. Prerequisite: A grade of at least B in MA 642 or permission of instructor.

650. **Differential Equations.** Separable, linear, and exact first-order equations; existence and uniqueness theorems; continuous dependence of solutions on data and initial conditions; first order systems and higher order equations; stability for

two-dimensional linear systems; higher order linear systems; boundary value problems; stability theory. Prerequisites: A grade of at least B in MA 630 or permission of instructor.

660. **Numerical Linear Algebra.** Vectors and matrix norms; the singular value decomposition; stability; condition numbers and error analysis; QR factorization; LU factorization; least squares problems; computation of eigenvalues and eigenvectors; iterative methods. Prerequisites: A grade of at least B in MA 630 or permission of instructor.

661, 662. **Numerical Differential Equations I, II.** Finite difference methods, consistency, stability and convergence for linear multistep methods for ODE, Runge-Kutta methods linear second-order PDE, parabolic equations, Crank-Nicholson and ADI, von Neumann stability analysis, method of lines, first-order hyperbolic systems, method of characteristics, CIR method, Lax-Wendroft schemes, shooting methods for ODE boundary value problems, invariant embedding, finite element methods, introduction to Sobolev spaces, Gateaux derivative and optimization of functionals, variational formulation of boundary value problems, Euler-Lagrange equation, Lax-Milgram lemma, Ritz and Galerkin methods. Prerequisite: MA 660 or 632.

663-665. **Operations Research I-III.** Mathematical optimization techniques. Formulation, solution, and analysis of problems arising from business, engineering, and science. Prerequisite: MA 244.

670. **Topology I.** Definition of topologies; closure; continuity; product topology; metric spaces. Prerequisites: A grade of at least B in MA 630 or permission of instructor.

671. **Topology II.** Connectedness; completeness and compactness (in particular in metric spaces); countability and separation axioms; Tychonoff's theorem; homotopy; partitions of unity. Prerequisites: A grade of at least B in MA 670 or permission of instructor.

675. **Differential Geometry I.** Local and global theory of curves and surfaces: Fenchel's theorem; the first and second fundamental forms; surface area; Bernstein's theorem; Gauss theorema egregium; local intrinsic geometry of surfaces; Riemannian surfaces; Lie derivatives; covariant differentiation; geodesics; the Riemann curvature tensor; the second variation of arclength; selected topics in the global theory of surfaces. Prerequisites: A grade of at least B in MA 642 or permission of instructor.

690. **Graduate Seminar.** Topics vary. 1, 2, or 3 hours.

691-697. **Special Topics in Mathematics.** These courses cover special topics in mathematics and the applications of mathematics. May be repeated for credit when topics vary. Prerequisites vary with topics. 1, 2, or 3 hours.

698. **Nonthesis Research.** Prerequisite: Permission of instructor. 1-6 hours.

699. **Thesis Research.** Prerequisite: Admission to candidacy and permission of instructor. 1-6 hours.

Medical Genetics (Ph.D.)

Interim graduate program director: *Carroll*

Primary Faculty

Andrew J. Carroll, III. Professor (Human Genetics); Cancer Cytogenetics, Chromosome Polymorphisms, Clinical Cytogenetics

Paula Cosper, Associate Professor (Human Genetics); Cell Culture, Prenatal Detection of Genetic Disorders, Clinical Cytogenetics

Maria Descartes, Associate Professor (Pediatrics); Molecular Genetics, Fragile X Studies, Clinical Genetics

Sara C. Finley, Professor Emerita (Pediatrics); Clinical Genetics, Clinical Cytogenetics, Prenatal Detection of Genetic Disorders

Wayne H. Finley, Professor Emeritus (Pediatrics); Clinical Cytogenetics, Cell Culture, Chromosome Structure

Edward J. Lose, Assistant Professor (Human Genetics); Clinical Genetics, Dysmorphology

Secondary Faculty

Ronald T. Acton, Professor (Microbiology); Immunogenetics, Membrane Chemistry, Genetic Markers

Robert A. Angus, Associate Professor (Biology); Population Genetics, Evolutionary Biology

Ricardo Azziz, Professor (Obstetrics and Gynecology); Metabolic Disorders

David M. Bedwell, Associate Professor (Microbiology); Gene Regulation

Richard E. Blackwell, Professor (Obstetrics and Gynecology); Reproductive Physiology, Infertility

Joseph Bloomer, Professor (Medicine); Molecular Genetics

Larry R. Boots, Professor (Obstetrics and Gynecology); Reproductive Endocrinology

David E. Briles, Professor (Microbiology); Cellular Immunology, Immunogenetics

Dan Bullard, Assistant Professor (Comparative Medicine); Molecular Genetics

Peter Burrows, Professor (Microbiology); Immunogenetics

Herbert C. Cheung, Professor (Biochemistry and Molecular Genetics); Fluorescence Spectroscopy, Contractility, Biochemical Fluorescence Kinetics

Max D. Cooper, Professor (Pediatrics); Clinical Immunology, Ontogeny of Immunity, Immunodeficiency and Autoimmune Disease

David T. Curiel, Professor (Medicine); Gene Therapy

Richard O. Davis, Professor (Obstetrics and Gynecology); Ultrasonography, Prenatal Diagnosis

Lawrence DeLucas, Professor (Optometry); Crystallography, Protein Crystal Growth

Jeffrey A. Engler, Professor (Biochemistry and Molecular Genetics); Virology

Gerald M. Fuller, Professor (Cell Biology); Cell Biology

Yancey G. Gillespie, Professor (Surgery); Neurogenetics

Rodney C. P. Go, Professor (Epidemiology); Population Genetics, Genetics Markers

Lisa Guay-Woodford, Professor (Medicine); Molecular Genetics

John F. Kearney, Professor (Microbiology); Cellular Immunology, Monoclonal Antibodies, Immunoregulation

Peter King, Assistant Professor (Neurology); Neurogenetics

Christopher Klug, Assistant Professor (Microbiology); Stem Cell Development

William J. Koopman, Professor (Medicine); Rheumatology

Jeffrey E. Kudlow, Professor (Medicine); Molecular Endocrinology

Richard B. Marchase, Professor (Cell Biology); Glycoprotein Chemistry

Richard Mayne, Professor (Cell Biology); Cell Biology, Collagen Polymorphism, Differentiation of Mesenchymal Tissues

Edward J. Miller, Professor (Biochemistry and Molecular Genetics); Collagen Synthesis and Typing

Rodney W. Nowakowski, Professor (Optometry); Genetics of Eye Disease

Alan K. Percy, Professor (Pediatrics); Pediatric Neurology, Glycosphingolipid Metabolism

Carl A. Pinkert, Associate Professor (Comparative Medicine); Gene Therapy

Steven Pittler, Associate Professor (Vision Sciences); Hereditary Disease of the Retina

Josef T. Prchal, Professor (Medicine); Congenital Hemolytic Anemia, Cloning Spectrum Gene

Lennart Roden, Professor (Medicine); Biochemistry of Connective Tissue, Mucopolysaccharide Chemistry

Jeffrey M. Roseman, Professor (Public Health); Epidemiology of Chronic Disease

Stephen G. Rostand, Professor (Medicine); Nephrology

Susan Lobo Ruppert, Assistant Professor (Biochemistry and Molecular Genetics); Transcriptional Mechanisms

S. Lane Rutledge, Associate Professor (Pediatrics); Metabolic Diseases

Susan Sell, Assistant Professor (Nutrition Sciences); Biochemistry and Molecular Biology

Eric J. Sorscher, Professor (Physiology & Biophysics); Gene Therapy

Theresa V. Strong, Assistant Professor (Medicine); Gene Therapy

Kenneth B. Taylor, Professor (Biochemistry and Molecular Genetics); Enzyme Mechanisms and Enzyme Kinetics

J. Anthony Thompson, Associate Professor (Surgery); Gene Therapy

Tim M. Townes, Professor (Biochemistry and Molecular Genetics); Gene Expression

Charles L. Turnbough, Jr., Professor (Microbiology); Gene Characterization

Bracie Watson, Assistant Professor (Medicine); Molecular Genetics

Katharine D. Wenstrom, Professor (Obstetrics and Gynecology); Prenatal Diagnosis

Gail Wertz, Professor (Microbiology); Viral Replication

Program Information

The multidisciplinary Medical Genetics graduate program, based in the Department of Human Genetics, provides coursework and laboratory research training for scientists seeking competence in genetics as it relates to human disease. Students accepted to this program should desire careers in genetic research and teaching and/or should be interested in family studies and counseling. Graduates of this program are expected to have research, training, and service roles, which will adapt to new discoveries and technological improvements in the delivery of genetic services. Graduates can seek certification by the American Board of Medical Genetics as Ph.D. medical geneticists, clinical cytogeneticists, clinical biochemi-

cal geneticists, or clinical molecular geneticists, depending on their curriculum choices.

Admission to the program requires a bachelor's degree or equivalent in biology, chemistry, or genetics. Potential students are encouraged to take undergraduate courses in inorganic and organic chemistry, embryology, genetics, physics, physical chemistry, calculus, and statistics. The members of the Interdepartmental Executive Committee of the medical genetics graduate program are Drs. M. Descartes, A. J. Carroll, Joan Lorden, and W. H. Finley. Applications for admission are reviewed by the admissions committee. Acceptance to the program is based on general Graduate School admission criteria and a personal interview, if possible.

Core courses in the curriculum include medical genetics, statistics, and basic biomedical sciences (cell biology, biochemistry, physiology, or microbiology, as needed for the proposed research), as well as regularly scheduled journal clubs and seminars. Each student rotates through the genetics clinics and participates in patient evaluation and genetic counseling. Each student's graduate study committee decides on required tools of research, which may include specific methodology, computer understanding, and appropriate elective courses.

Additional Information

For detailed information, contact Dr. Andrew Carroll, UAB Medical Genetics graduate program director, or Heather White, Kaul Human Genetics Building, Room 230, 1530 3rd Avenue South, Birmingham, AL 35294-0024.

Telephone 205-934-4983

E-mail hwhite@uabmc.edu

Course Descriptions

Unless otherwise noted, all courses are for 3 semester hours of credit. Courses numbers preceded with an asterisk indicate courses that can be repeated for credit, with stated stipulations.

Medical Genetics (MGE)

620. **Human Genetics Problems.** For master's students. Pedigree construction and interpretation, patient evaluation and genetic counseling.

698. **Master's Nonthesis Research.** 1-6 hours.

699. **Thesis Research.** Prerequisite: Admission to candidacy. 1-6 hours.

700. **Human Genetics.** Mendelian principles, human cytogenetics, biochemical and molecular genetics, and population genetics. Genetic disorders and inheritance, basic biological defects, therapy and problems in genetic counseling. Fall.

705. **Introduction to Medical Genetics.** Mendelian principles, human cytogenetics, biochemical and molecular genetics, and population genetics. (For nonmedical genetics majors.) Fall. 2 hours.

710. **Medical Cytogenetics.** Chromosome structure, polymorphisms, numerical and structural abnormalities, karyotyping, and consequences of aneuploidy and structural changes. Techniques of cell culture and chromosome banding. Spring.

715. **Human Biochemical Genetics.** Metabolic disorders, detection of biochemical defects, inheritance patterns, and in utero detection. Spring.

720. **Human Genetics Problems.** Evaluation of patients with suspected genetic disorders, interpretation of pedigrees, and genetic counseling (Ph.D. students only). 5 hours.

730. **Human Molecular Genetics: A Laboratory Introduction.** Current status of human molecular genetics methods for diagnosis.

731. **Human Molecular Genetics I.** Principles of human molecular genetics (Ph.D. students only).

735. **Human Gene Mapping.** Characterization of human linkage map; uses of DNA probes, RFLP analysis, and in situ hybridization. Spring. 2 hours.

736. **Journal Club: Genetic Control of Cellular Proliferation.** Molecular genetics of cell cycle control, oncogenes, cellular growth factors, interferons, lymphocyte differentiation. Fall. 2 hours.

780. **Seminar in Medical Genetics.** Faculty, guest investigator, and graduate student. Fall, spring, summer. 1 hour each term.

785. **Journal Club in Medical Genetics.** Recent papers in medical genetics. Fall, spring, summer. 1 hour each term.

790. **Special Topics in Medical Genetics.** Fall, spring, summer. 1-6 hours.

798. **Doctoral Nondissertation Research.** 1-6 hours.

799. **Doctoral Dissertation Research.** Prerequisite: Admission to candidacy. 1-6 hours.

Microbiology (Ph.D.)

Graduate program director: *Burrows*

Faculty

Ronald T. Acton, Professor (Microbiology); Immunogenetics

Prescott Atkinson, Associate Professor (Pediatrics); Primary Immune Deficiencies and the Role of Infection in Asthma and other Chronic Diseases

L. Andrew Ball, Professor (Microbiology); RNA Virus Replication and Assembly

Scott R. Barnum, Associate Professor (Microbiology); Complement in CNS Inflammation, EAE

David M. Bedwell, Associate Professor (Microbiology); Translation Termination, Calcium Signaling

William H. Benjamin, Assistant Professor (Pathology); Genetics of Host-Bacterial Relationship

S. Louis Bridges, Associate Professor (Medicine); B Lymphocytes and Immunoglobulin Gene Expression in Rheumatoid Arthritis and Hepatitis C; Pharmacogenetics of Rheumatoid Arthritis

David E. Briles, Professor (Microbiology); Bacterial Pathogenesis, Pneumococcus, Vaccines, Virulence, Immunity

William J. Britt, Professor (Pediatrics); Herpesvirus Envelope Assembly

R. Pat Bucy, Professor (Pathology); T Cell Development, Immune Regulation

Peter D. Burrows, Professor (Microbiology); B Cells, Developmentally Regulated Genes, Isotype Switching

Robert Carter, Associate Professor (Medicine); Molecular Mechanisms of Control of B Lymphocyte Responses

David D. Chaplin, Professor and Chair (Microbiology); Regulation of Secondary Lymphoid Tissue Development and Function

Debasish Chattopadhyay, Assistant Professor (Medicine); Structure-Based Drug Design, Vesicular Trafficking, Structural Biology of Parasites

Chen-lo H. Chen, Research Professor (Microbiology); Avian T- and B-Cell Development, Evolution of Immune System, Graft Versus Host Reactions

Noel K. Childers, Professor (Oral Biology); Oral Immunization, Dental Caries

Max D. Cooper, Professor (Medicine); Immune System Ontogeny and Phylogeny

Marilyn J. Crain, Associate Professor (Pediatrics); Pediatric and Perinatal HIV, Molecular Epidemiology of *Streptococcus pneumoniae*

Kevin Dybvig, Professor (Genomics and Pathobiology); Mycoplasmas: Genetics, Phenotypic Switching, DNA Rearrangements

Jeffrey C. Edberg, Associate Professor (Medicine); Autoimmunity, Complex Genetic Diseases, Immunoglobulin Receptors, Phagocytes

Marianne Egan, Research Associate Professor (Microbiology); Natural Killer Activity and Autoimmune Diseases

Charles O. Elson, Professor (Medicine); Regulation of Mucosal Immune Responses, Pathogenesis of Chronic Intestinal Inflammation and Inflammatory Bowel Disease

Patricia N. Fultz, Professor (Microbiology); Retroviral Pathogenesis, HIV Vaccines

James F. George, Associate Professor (Surgery); Transplantation Immunology, Mechanisms of Immunologic Tolerance, Immunologic Mechanisms of Atherosclerosis

Vithal K. Ghanta, Professor (Biology); Tumor Immunology and CNS & immune System Interactions

G. Yancey Gillespie, Professor (Surgery); Malignant Brain Tumors, Cell Biology, Immunobiology, Viral Vector Therapies, Murine Brain Tumor Models

Beatrice H. Hahn, Professor (Medicine); Human Retroviruses and Associated Diseases

Susan K. Hollingshead, Research Associate Professor (Microbiology); Mechanisms of Variation in Microbial Pathogenesis

Eric Hunter, Professor (Microbiology); Retrovirus Molecular Biology, Virus Assembly, HIV Entry and Transmission

Victoria A. Johnson, Associate Professor (Medicine); HIV Pathogenesis and Drug Development and Resistance, Hepatitis B and C Pathogenesis

Louis B. Justement, Professor (Microbiology); Lymphocyte Activation, Tyrosine Kinases and Phosphatases, CD45, CD22

John C. Kappes, Associate Professor (Medicine); HIV Molecular Virology and Pathogenesis

Richard A. Kaslow, Professor (Epidemiology); Immunogenetic Determinants in AIDS and Other Infectious and Immune Diseases

John F. Kearney, Professor; (Microbiology); B Cells, Immunology of Anthrax, Transgenic Mice

Earl R. Kern, Research Professor (Pediatrics); Pathogenesis of Herpesvirus and Poxvirus Infections

Robert P. Kimberly, Professor (Medicine); Immunologic Diseases and Autoimmunity

Christopher A. Klug, Assistant Professor (Microbiology); Hematopoietic Stem Cell Development

Hiromi Kubagawa, Associate Professor (Pathology); Immunoglobulin-like Molecules and Fc Receptors

Elliot J. Lefkowitz, Research Associate Professor (Microbiology); Bioinformatics, Genomics, Biodefense

Ming Luo, Professor (Microbiology); Structure-Based Approaches to Anti-Infectious Agents

Cindy L. Luongo, Assistant Professor (Microbiology); Double-Stranded RNA Virus

Jerry R. McGhee, Professor (Microbiology); Immunoregulation, Isotype-Specific Responses, Mucosal Vaccines

Jiri Mestecky, Professor (Microbiology); Mucosal Immunity, Vaccines

Suzanne M. Michalek, Professor (Microbiology); Vaccine Delivery Systems, Mucosal Immunity, Inflammation, T Cells and Cytokines

Zina Moldoveanu, Research Associate Professor (Microbiology); Mucosal Immunology, IgA, Vaccines

Casey D. Morrow, Professor (Cell Biology); Viral Replication, Vaccines

John D. Mountz, Professor (Medicine); Autoimmunity; Genetics, Arthritis, Apoptosis, Cell Senescence

Mark J. Mulligan, Associate Professor (Medicine); HIV, Glycoprotein Vaccine, Viral Assembly, Retroviruses

Moon H. Nahm, Professor (Pathology); Bacterial Vaccines, Antibody Structure and Function, B Cell Development

Peter E. Prevelige, Associate Professor (Microbiology); Viral Capsid Self-Assembly

Firoz Rahemtulla, Professor (Prosthodontics and Biomaterials); Salivary Peroxidase System, Salivary Glands

Chander Raman, Assistant Professor (Medicine); Autoimmunity and Tolerance, Lymphocyte Activation, Signal Transduction, Lymphocyte Development

Harry W. Schroeder, Professor (Medicine); Developmental Genetics, Clinical Immunology

George M. Shaw, Professor (Medicine); Human Retroviruses, Molecular Virology and Viral Pathogenesis

Wayne M. Sullender, Associate Professor (Pediatrics); Respiratory Syncytial Virus, Antigenic Diversity

Jianming Tang, Assistant Professor (Medicine); HIV/AIDS, Genetics, Immunogenetics, Immunology, Infectious Diseases

Charles L. Turnbough, Professor (Microbiology); Gene Expression and Regulation

Thomas R. Unnasch, Professor (Medicine); River Blindness: Evolution, Immunotherapy, Diagnosis

Mark R. Walter, Associate Professor (Microbiology); Signal Transduction, Cytokine Structure and Function

Bracie Watson Jr., Assistant Professor (Medicine); Genetics of Complex Disorders, Hypertension and Alzheimer's Disease, Population Genetics, Role of Mitochondria in the Etiology of Complex Genetic Disease

Casey T. Weaver, Associate Professor (Pathology); T Cell Development

Gail W. Wertz, Professor (Microbiology); Molecular Virology, RNA Replication

Richard J. Whitley, Professor (Pediatrics and Medicine); Herpesviruses

Craig M. Wilson, Associate Professor (Pediatrics and Medicine); HIV in Adolescents, Clinical and Pathophysiologic Studies

Janet L. Yother, Associate Professor (Microbiology); *Streptococcus pneumoniae* Genetics and Pathogenesis

Allan Zajac, Assistant Professor (Microbiology); Anti-viral Immunity, T-Cell Responses

Graduate Program Objectives

The Department of Microbiology participates in the Cellular and Molecular Biology (CMB) graduate program, which is designed to provide a core curriculum to graduate students interested in the broad area of cellular and molecular biology. The CMB program involves student recruitment, admissions, and the first-year curriculum. At the end of the first year, each CMB student chooses a mentor and elects to pursue a degree in biochemistry and molecular genetics, cell biology, microbiology or neurobiology.

The Microbiology graduate program has as its primary objective to provide high quality, multidisciplinary training leading to the Ph.D. degree. Trainees who complete this program are expected to make significant future contributions in research in the basic biomedical sciences and to teach future generations of competent and productive research scientists.

The program consists of a core curriculum that emphasizes (a) the multidisciplinary and quantitative aspects of modern biomedical sciences; (b) a diversity of laboratory research training experiences; and (c) the development of skills in reading, writing, and speaking. Advanced students take courses and tutorials in specialized areas of interest, participate in seminars, and have opportunities to gain teaching experience while satisfying other requirements for their doctoral programs.

Areas of specialization for Ph.D. dissertation research include prokaryotic and eukaryotic molecular biology; molecular virology; viral, microbial, and mammalian cell genetics; immunogenetics; cellular, developmental, and tumor immunology; biosynthesis, and structure of biological macromolecules and membranes; and host-parasite relationships, pathogenesis, and infectious disease.

Administration of Graduate Program

The Microbiology graduate program is administered by a graduate committee, chaired by the Microbiology graduate program director. The committee consists of six faculty members representing different scientific subdisciplines of microbiology.

Admission Requirements and Financial Aid

The CMB admissions committee considers applications for admission to the Ph.D. program from prospective graduate students who present evidence of superior scholarship and who have completed courses in general and organic chemistry; mathematics, and at least one introductory course in zoology or biology. Completion of courses in physical chemistry and biology, including genetics and biochemistry, is also recommended. Students with M.S., M.D., D.D.S., D.M.D., and D.V.M. degrees are encouraged to apply.

Admission criteria for the Ph.D. program are those of the Graduate School, plus a personal interview. Students accepted into the program during the last several years have had average scores of greater than 600 on the quantitative portion of the GRE General Test and 1,200 on the combined verbal and quantitative sections. All students accepted into the program are provided with fellowships or traineeships. Fellows and trainees are required to undertake full-time studies and are not permitted to do any other remunerative work. Financial support will be continued provided the student's performance is

satisfactory. During the 2002-2003 academic year, entering students were provided with stipends of \$18,156 per annum plus funds for tuition, fees, and health insurance. These amounts are reviewed yearly.

Ph.D. Program Requirements

Students entering with B.S. or B.A. degrees normally need five to six years to complete the curriculum. There are no language requirements. Requirements for the Ph.D. degree are as follows:

1. Completion of the following courses or their equivalent: CMB 700, 701, 702, 703, 704, 705, 712, 721, 722, and 723.
2. Completion of at least three advanced courses (700 level) in an area of the student's interest;
3. Attendance and participation in at least one Journal Club and the Development of Communication Skills for Biological Research (MIC 710) during each term of residence after the first year.
4. Satisfactory performance in one preliminary examination in which the student must propose and defend an original research proposition;
5. Admission to candidacy for the Ph.D. degree (upon completion of the above requirements and approval of a dissertation research program by the student's advisor and dissertation committee);
6. A dissertation reporting the results of original, significant, and publishable scientific research;
7. A final oral examination on the dissertation, conducted by the student's dissertation committee; and
8. A formal public seminar presentation of the dissertation research.

Additional Information

For detailed information, contact Ms. Debbie Sirles, Program Manager, UAB Department of Microbiology, Bevell Biomedical Research Building, Suite 264, 1530 3rd Ave South, Birmingham, AL 35294-2170.

Telephone 205-934-0621

E-mail: sirles@uab.edu

Web www.microbio.uab.edu

Course Descriptions

Cellular and Molecular Biology (CMB)

700. Cellular and Molecular Biology I. Biomolecules. Structural and biochemical properties of proteins, enzymes, and coenzymes are discussed. 5 hours.

701. Cellular and Molecular Biology II. Genetics. Prokaryotic and eukaryotic genetics; control of gene expression; DNA recombination, replication, transcription, and translation. 5 hours.

702. Cellular and Molecular Biology III. Cells. Fundamental aspects of cell biology. 5 hours.

703. Cellular and Molecular Biology IV. Signaling. Mechanisms of cellular signaling. 5 hours.

704. Cellular and Molecular Biology V. Virology/Immunology. Virology; theoretical and experimental aspects of the immune system. 5 hours.

705. Cellular and Molecular Biology VI. Special Topics. 2 hours.

721-723. **Laboratory Research.** 12 week rotations in each of three laboratories conducting research; 15-minute oral presentations on accomplishments each rotation. 4 hours each.

Microbiology (MIC)

The following courses may be taken more than once.

710. **Development of Communication Skills for Biological Research.** 2 hours.

721. **RNA Silencing (RNAi) Journal Club.** 1 hour. Fall, spring.

722. **Bacterial Pathogenesis Journal Club.** 1 hour. Fall, spring.

723. **Gene Expression and Regulation Journal Club.** 1 hour. Fall, spring.

737. **Mucosal Immunology Journal Club.** 1 hour.

772. **Bacterial Pathogenesis Journal Club.** 1 hour. Fall, spring.

785. **Biology of Parasitism Discussion Group.** Fall, spring. 1 hour.

786. **Retrovirus Journal Club.** 1 hour. Fall, spring.

789. **Journal Club in Biological Crystallography.** 1 hour. Fall, spring.

794. **Structural Virology Journal Club.** 1 hour. Fall, spring, summer.

796. **Neuroimmunology Journal Club.** 1 hour. Fall, spring.

797. **Cellular and Molecular Immunology Journal Club.** Fall, spring. 1 hour.

798. **Nondissertation Research.** 1-10 hours.

799. **Dissertation Research.** Prerequisite: Admission to candidacy. 1-10 hours.

Advanced Courses

758. **Topics in Prokaryotic Biology.** 3 hours. Yother, Turnbough

757. **Protein Folding and Association.** 3 hours. Preveliege

Other advanced courses are offered in a one-time "Contemporary Topics" format. Please consult the departmental web page for current listings.

Music

The Department of Music offers the Master of Arts in Education with a specialization in music education. Two distinct tracks are available: the Traditional 5th-Year Program for students whose undergraduate degree is in music education and the Alternative Program for those whose undergraduate degree lies outside the music education field. The latter leads toward a Class A certification in music.

For additional information, contact Dr. Jeff W. Reynolds, Interim Chair, Department of Music, Humanities Building, Room 401, 900 South 13th Street, Birmingham, AL 35294-1260 (telephone 205-975-2263), E-mail jwr@uab.edu

Neurobiology (Ph.D.)

Graduate program director: *Theibert*

Primary Faculty

Michael Brenner, Associate Professor (Neurobiology); Molecular Control of Transcription in Astrocytes; Protein Aggregate Disease; Spinal Injury

Lynn E. Dobrunz, Assistant Professor (Neurobiology); Synaptic Transmission; Presynaptic Properties of Single Synapses

Michael J. Friedlander, Professor and Chair (Neurobiology); Molecular Mechanisms of Synaptic Plasticity in the Cerebral Cortex—Role of Nitric Oxide in Synaptic Signaling

John J. Hablitz, Professor (Neurobiology); Development of Ion Channel Gating and Synaptic Transmission by Excitatory Amino Acids in the Mammalian Forebrain

Robin A. J. Lester, Associate Professor (Neurobiology); Molecular Pharmacology of Ligand- and Voltage-Gated Ion Channels in the Central Nervous System

Stuart C. Mangel, Associate Professor (Neurobiology); Pharmacological Modulation of Intra-Retinal Synaptic Circuits; Circadian Rhythms

Lin Mei, Assistant Professor (Neurobiology) Molecular Mechanisms of Synapse Formation at the Neuromuscular Junction in the Central Nervous System

Lucas D. Pozzo-Miller, Assistant Professor (Neurobiology); Micro-Compartmentalization of Calcium in Synaptic Function and Plasticity; Role of Brain-Derived Neurotrophic Factor

Harald W. Sontheimer, Professor (Neurobiology); Regulation and Function of Ion Channels in Glia; Pathology of Gliomas

Anne B. Theibert, Associate Professor (Neurobiology); Molecular Mechanisms of the PI 3-Kinase Cascade in Neuronal Development

David S. Weiss, Professor (Neurobiology); Molecular Biophysics of Receptors; Structure and Function of GABA Receptors

Scott M. Wilson, Assistant Professor (Neurobiology); The Role of the Ubiquitin-Proteasome Pathway in the Nervous System.

Secondary Faculty

Franklin R. Amthor, Associate Professor, Psychology

Dale J. Benos, Professor and Chair, Physiology & Biophysics

Etty Benveniste, Professor and Chair, Cell Biology

J. Edwin Blalock, Professor, Physiology & Biophysics

Steven L. Carroll, Associate Professor, Pathology

Michael A. Casey, Associate Professor, Cell Biology

Charles S. Cobbs, Assistant Professor, Neurosurgery

Ramon F. Dacheux, Professor, Ophthalmology

Peter J. Detloff, Associate Professor, Biochemistry and Molecular Genetics

Leon S. Dure, Associate Professor, Pediatrics and Neurology

Paul D. R. Gamlin, Professor, Physiological Optics

Gail V. W. Johnson, Professor, Psychiatry and Behavioral Neurobiology

Kent T. Keyser, Professor, Physiological Optics

Kevin L. Kirk, Professor, Physiology & Biophysics

Timothy W. Kraft, Associate Professor, Physiological Optics

Michael S. Loop, Associate Professor, Physiological Optics

Richard B. Marchase, Professor of Cell Biology and Associate Dean, School of Medicine

Lawrence E. Mays, Professor and Chair, Physiological Optics

Lori L. McMahon, Assistant Professor, Physiology & Biophysics

Anthony Nicholas, Assistant Professor, Neurology

Alan K. Percy, Professor, Pediatrics and Neurology

Douglas M. Ruden, Associate Professor, Environmental Health Sciences

Steven Rosenfeld, Professor, Neurology

J. Michael Wyss, Professor, Cell Biology

Program Information

Objectives

The mission of the Neurobiology Graduate Program is to train a new generation of neuroscientists to become leading contributors to basic and health-related brain research. Students receive a breadth of knowledge of the fundamentals of modern neurobiological research, including molecular and integrative systems approaches. Training also includes in depth research in a specific area, with topics ranging from the molecular and cellular basis of normal structure and function of the nervous system to disease mechanisms and treatment. In addition to interfacing with other basic science departments at UAB, students have the opportunity to receive training in clinical topics from Neurology, Neurosurgery, Psychiatry, Pediatrics, and Rehabilitation Medicine. The Neurobiology Graduate Program provides a firm foundation for fundamental neuroscience research and teaching careers at academic health science centers.

Admission Requirements

Students may enter the Neurobiology Graduate Program through a feeder program such as the Cellular and Molecular Biology (CMB) program, the Neuroscience program, or the M.D.-Ph.D. program. In addition, direct applications to the Neurobiology Graduate Program will be considered by the Neurobiology Admissions Committee. Recommendations for acceptance of direct applications will be based on Graduate School admissions criteria and, when possible, a personal interview.

Overview of the Program

During the first year, students take a series of core courses that are defined by the program through which they enter. In addition, each student obtains research experience and identifies potential mentors through three laboratory rotations. At the end of the first year, students choose a mentor and laboratory for their dissertation research. In the second year, students conduct research and participate in two Topics in Neurobiology courses which are based on broadening and reinforcing an understanding of fundamental concepts in neurobiology. The Topics courses also serve as the departmental qualifying exam. At the end of the second year, a graduate dissertation committee is chosen by the student. In the third year, a formal written proposal of the student's dissertation project is presented to and evaluated by the student's graduate dissertation

committee. Once the core and Topics courses have been completed and the dissertation proposal is approved, the student is admitted to candidacy for the Ph.D. degree in Neurobiology. In the third and fourth years, students perform dissertation research and may choose to take an advanced graduate course. Neurobiology students participate in the Neurobiology Seminar Series and a journal club colloquium throughout their graduate studies.

Coursework

First Year All Neurobiology students are required to take a set of courses during the first year of the graduate program that provide a fundamental understanding in biochemistry, cell biology, genetics, and cellular physiology. For M.D.-Ph.D. students, this course curriculum is a two-year program. First year courses are determined by the program through which the student enters and include a selection from the following: CMB Core (Biomolecules Genes, and Cells), Cell Signaling, Cellular and Molecular Neurobiology, Integrative Neuroscience, Developmental Neuroscience, and Medical Neuroscience. The Neurobiology Department requires all students to achieve grades of B or higher in all courses.

Second Year The centerpiece of the second-year is a sequence of two Topics in Neurobiology courses which are taken during the fall and winter. Four areas are emphasized in the Topics modules: concepts in neuroscience, literature evaluation, oral presentation, and writing skills. After successfully completing the two Topics courses, the student has qualified in the Department and is ready to prepare for admission to candidacy for the Ph.D. An elective course must be taken during the spring of the second year. This course is selected from a list of approved Neurobiology, Neuroscience, CMB, or Medical School courses. Students must also take Principles of Scientific Integrity and an approved course in statistics, such as Statistics for Biomedical Sciences/Biometry. These are usually taken during the second or third year.

Third and Fourth Years In the third and fourth years, students are encouraged, but not required, to take pertinent advanced courses in Neurobiology. Offerings of the Department include Biophysics of Membrane Excitability, Mechanisms of Signal Transduction, Mind and Brain, Neurobiology of Disease, and Principles of Synaptic Transmission and Plasticity. Advanced courses may also be selected from offerings of other departments.

Admission to Candidacy

After successfully completing the first year core and Topics courses, students are required to write and give an oral presentation of their dissertation proposal in the summer or fall of the third year. The dissertation proposal is similar in organization to an NIH NRSA style grant application. For acceptance of the proposal by the dissertation committee, the student must describe a significant and original scientific problem, formulate a testable hypothesis, write a clear and concise experimental design that addresses the problem, discuss her or his ideas orally in an effective manner, and demonstrate comprehension of the problem in a broad and critical context.

Completion of the Ph.D. Program

After being admitted to candidacy, the student meets at least once a year with the dissertation committee. It is expected that most students will complete the entire program in four or five years. However, in extenuating circumstances, up

to seven years is allowed for completion of the Ph.D degree. To further develop presentation and teaching skills, students give research seminars in the Neurobiology Student/Fellow Seminar Series and at Neurobiology Retreat. Students also participate in a teaching practicum that can take the form of didactic lectures, running a journal club, or assisting in a lab course or discussion group.

Financial Assistance

Doctoral students will receive financial aid in the form of a fellowship. Current stipends are \$18,156 per year plus tuition for 2002 entering students, contingent upon availability of funds. Doctoral students are considered full time; therefore, no work or other activity unrelated to pursuit of the doctoral degree is permitted.

Additional Information

For detailed information, contact Dr. Anne B. Theibert, Program Director, UAB Department of Neurobiology, CIRC 576, 1719 Sixth Avenue South, Birmingham, Alabama 35294-0021.

Telephone (205)934-7278

Fax (205)934-6571

E-mail theibert@nrc.uab.edu

Web www.nrc.uab.edu

Course Descriptions

Neurobiology (NBL)

700. Topics in Neurobiology I. To broaden and reinforce understanding of fundamental concepts in neurobiology, four areas are emphasized: critical evaluation of original research literature, basic concepts in neurobiology, oral presentation skills in exposition, analysis, and critiquing of research topics and writing skills for presenting topics in neurobiology and designing experiments to evaluate relevant hypotheses. The first Topics course is organized in three 4-week modules: Module 1-Genesis of the nervous system, Module 2-Electrical properties of cells in the nervous system, and Module 3-Synaptic transmission. 3 hours.

701. Topics in Neurobiology II. This second Topics course is also organized in three 4-week modules: Module 4-Signal transduction in nervous system: Cell membrane to nucleus, Module 5-Regulation of the internal environment of the central nervous system, and Module 6-Neural circuits. 3 hours.

703. Advances in Neurobiology Seminar. This weekly research seminar series features prominent outside speakers and UAB faculty. Thursdays at 1, September through May. 1 hour.

711. Medical Neuroscience. Introduction to the structure and function of the normal developing and mature nervous system from the molecular level to the behavioral level; provides a basic science introduction to clinical neuroscience. 5 hours.

712. Graduate Medical Neuroscience. This course will provide the student with a complete survey of brain function including development, neuroanatomy, sensory and motor systems, and cognitive function. Emphasis is on the relationship of these systems to medical disorders. 3 hours.

715-718. Laboratory Rotation I-IV. Research in neurobiology as applied to specific problems in areas of faculty interest. 1-6 hours.

720. Biophysics of Membrane Excitability. Selected topics in ion permeation across biological membranes via ion channels, transporters, and pumps. 4 hours.

729. Mechanisms of Signal Transduction. Molecular mechanisms involved in transduction of neural signals via cell-surface receptors, targets of intracellular second messengers, and production and outcome of cellular responses. 4 hours.

730. Neurobiology of Disease. Investigations into diseases of the nervous system at the cellular and molecular level. 4 hours.

735. Statistics for Biomedical Science (Biometry). An introduction to the science of experimental design and data analysis, with an emphasis on applications to biomedical research problems. 3 hours.

742. Principles of Synaptic Transmission. Mechanisms underlying the control of neurotransmitter release and the time course of the synaptic response. 4 hours.

751. Cellular and Molecular Neurobiology (CMB Module 2). An introduction to the principles of molecular and cellular neurobiology, including the properties of membranes, synaptic transmission, structure and function of ion channels, and mechanisms of neuromodulation. 5 hours.

752. Developmental Neuroscience. Birth, migration, growth, and differentiation of neurons; establishment of synaptic connections; regulation and plasticity. 4 hours.

755/454. Mind and Brain. An investigation into the relationship between concepts of mind and brain from both philosophical and neurobiological perspectives. 4 hours.

757. Synaptic Plasticity. The molecular and cellular mechanisms involved in modulating synaptic signaling for learning and memory, and for other adaptive brain processes. 4 hours.

780-781. Neurobiology Journal Club I-II. Students, postdoctoral fellows, and faculty critically evaluate recently published work from specific areas of neurobiology. Separate sections focus on ion channels, signal transduction, synaptic plasticity, neurodegenerative diseases, and chloride transport. 1 hour.

783. Principles of Scientific Integrity (GRD 717). A Survey of ethical issues and principles in the practice of scientific research. 3 hours

798. Nondissertation Research. Laboratory research performed prior to admission to candidacy. 1-12 hours.

799. Dissertation Research. Prerequisite: Admission to candidacy. 1-12 hours.

Neuroscience

Graduate program director: *Gamlin*

Faculty

Scott R. Barnum, Associate Professor (Microbiology); Role of complement in CNS diseases

Frank R. Amthor, Associate Professor (Psychology); Retinal Physiology, Neural Information Processing

Karlene K. Ball, Professor (Psychology); Cognitive Impairment and Aging

Dale J. Benos, Professor and Chair (Physiology & Biophysics); Elucidation of the molecular basis of operation of epithelial and astrocyte ion channels and transporters.

Etty N. Benveniste, Professor and Chair (Cell Biology); Bidirectional Communication Between the Immune and Nervous Systems

Kathleen H. Berecek, Professor (Physiology & Biophysics); Hypertension and Cardiovascular Remodeling

Mark O. Bevensee, Assistant Professor (Physiology & Biophysics); Acid-Base Transport and pH Regulation in the Nervous System

Michael Brenner, Associate Professor (Neurobiology); Molecular Neurobiology

Stephen L. Carroll, Assistant Professor (Pathology); Neuregulins in Nervous System Regeneration and Neoplasia

Yiu-Fai Chen, Research Professor (Medicine-Cardiovascular Disease); Molecular Mechanisms of Hypoxia-Induced Pulmonary Hypertension

James E. Cox, Associate Professor (Psychology); Physiological Psychology, Obesity

Christine Curcio, Associate Professor (Ophthalmology); Anatomy of Human Retina, Aging

Ramon F. Dacheux, Professor (Ophthalmology); Morphological and Physiological Organization of Mammalian Retina

Peter J. Detloff, Associate Professor (Biochemistry & Molecular Genetics); Mouse Models of Human Genetic Disorders

Allan C. Dobbins, Assistant Professor (Biomedical Engineering); Space and Form in Vision, fMRI

Lynn Dobrunz, Assistant Professor (Neurobiology); synaptic Transmission, Presynaptic Properties of Single Synapses

Alvaro G. Estevez, Assistant Professor (Physiology & Biophysics); Oxidative Stress in Motor Neuron Apoptosis

James E. Flege, Professor (Speech & Hearing Sciences); Speech and Language

Michael J. Friedlander, Professor (Neurobiology); Synapse Function, Role of Nitric Oxide in Neural Signaling, Molecular Basis of Learning

Ken Fukuchi, Associate Professor (Genomics and Pathobiology); Alzheimer's Disease

Paul D.R. Gamlin, Professor (Physiological Optics); Eye Movements, Central Visual Processing, fMRI

Craig C. Garner, Professor (Neurobiology); Molecular Neurobiology

Timothy J. Gawne, Assistant Professor (Physiological Optics); Central Visual Processing, fMRI

Vithal K. Ghanta, Professor (Biology); Tumor Immunology; Immune System and Aging; CNS and Immune System Interactions

Yancey G. Gillespie, Professor (Surgery-Neurosurgery); Molecular and Cellular Biology of Malignant Glia

Candece Gladson, Associate Professor (Pathology); Mechanisms Involved in Malignant Astrocytoma Cell Migration, Invasion, and Proliferation

John J. Hablitz, Professor (Neurobiology); Cellular Mechanisms of Neurotransmission

Mary M. Hagan, Assistant Professor (Psychology); Neural Control of Feeding

Lindy E. Harrell, Professor (Neurology); Alzheimer's Disease, Aging, Behavioral Neurology

Raymond N. Hiramoto, Professor (Microbiology); Cancer Immunotherapy; CNS-Immune System Communication

Gail V.W. Johnson, Professor (Psychiatry-Behavioral Neurobiology); Phosphorylation and Function of Cytoskeletal Proteins

Richard Jope, Professor (Psychiatry-Behavioral Neurobiology); Neuronal Signaling Systems; Mechanisms and Abnormalities in Neuronal Disorders

Kent T. Keyser, Professor (Physiological Optics); Neurotransmitters and Receptors

Timothy W. Kraft, Associate Professor (Physiological Optics); Retinal Photoreceptors and Color Vision

Thomas K. Kuyk, Adjunct Assistant Professor (Veterans' Affairs); Visual Psychophysics

Robin A. J. Lester, Associate Professor (Neurobiology); Nicotinic Receptors in the CNS

Michael S. Loop, Associate Professor (Physiological Optics); Human and Animal Psychophysics, Color Vision

Stuart Mangel, Associate Professor (Neurobiology); Synaptic Plasticity and Modulation in the Retina; Circadian Rhythmicity

Richard B. Marchase, Professor/Associate Dean of Medicine (Cell Biology); Glucose Metabolism and Cytoplasmic Glycosylation

Lawrence E. Mays, Professor/Chair (Physiological Optics); Eye Movements, Oculomotor Neurophysiology, fMRI

Lori L. McMahon, Assistant Professor (Physiology & Biophysics); Hippocampal Neurophysiology and Plasticity

Lin Mei, Assistant Professor (Neurobiology); Synapse Formation and Synaptic Plasticity

Jimmy D. Neill, Distinguished Professor (Physiology & Biophysics); The Neuroendocrine Regulation of the Reproductive Process

Anthony P. Nicholas, Assistant Professor (Neurology); Movement Disorders

Thomas T. Norton, Professor (Neurology); Regulation of Ocular Development

Suzanne Oparil, Professor (Medicine-Cardiovascular Disease); Pathophysiology of High Blood Pressure

Cynthia Owsley, Professor (Ophthalmology); Visual Psychophysics, Aging

Alan K. Percy, Professor (Pediatrics); Inherited Degenerative Diseases, Rett Syndrome, Neonatal Neurology

Steven J. Pittler, Professor (Physiological Optics); Photoreceptor Function in Health and Disease

Lucas Pozzo-Miller, Assistant Professor (Neurobiology); Calcium Signaling; Synaptic Plasticity; Neurotrophic Factors

Michael W. Quick, Associate Professor (Neurobiology); Regulation of Proteins Involved in Neuronal Signaling

Alan Randich, Professor (Psychology); Experimental Psychology

Steven S. Rosenfeld, Professor (Neurology); Malignant Gliomas, Motility of Malignant Glial Cells

Michael E. Sloane, Associate Professor (Psychology); Visual Perception, Psychophysics

Harald Sontheimer, Professor (Neurobiology); The Role Of Neuroglia In Brain Function

Edward Taub, Professor (Psychology); Biofeedback

Anne B. Theibert, Associate Professor (Neurobiology); Role of Phosphoinositides in Developmental Neurobiology

Donald B. Twieg, Associate Professor (Biomedical Engineering); MRI Technique Development for Functional Brain Imaging

Shu Zhen Wang, Assistant Professor (Ophthalmology); Molecular Mechanisms of Early Neural Development

David S. Weiss, Professor (Neurobiology); Structure/Function and Regulation of Ligand Activated Ion Channels

Rosalyn E. Weller, Associate Professor (Psychology); Neuroanatomy of the Visual System, fMRI

Michael J. Wyss, Professor (Cell Biology); Control of the Autonomic Nervous System

Program Information

Graduate study in the multidisciplinary area of Neuroscience is coordinated through the Neuroscience Graduate Program. Faculty mentors from more than twelve basic and clinical departments participate in this program. The current research of these faculty include molecular, cellular, systems, behavioral, immunological, developmental, neurological, genetic, and psychiatric approaches to the nervous system. With more than sixty participating faculty, students enrolled in the neuroscience graduate program have numerous potential research laboratories in which to pursue their doctoral training.

The neuroscience graduate program administers an intensive, year-long core curriculum designed to provide entering graduate students with a comprehensive introduction to Neuroscience. The core curriculum includes Biochemistry, Cellular and Molecular Neurobiology, Developmental Neuroscience, and Integrative Neuroscience. Students are exposed to ongoing research projects as they rotate through three different laboratories during their first nine months of residency. In addition, a highly recommended, 2½ week residential course—Introduction to Neurobiology—is offered at the Dauphin Island Sea Laboratory for incoming Neuroscience students. For more details, see www.disl.org/location.html and univ-prog.disl.org/spdescription.html

Students enter the neuroscience graduate program with the intent of using their classroom and laboratory experiences during the first year to help them further define their research interests. The minimum admission criteria are those of the Graduate School (B-level scholarship and a combined score of at least 550 on each section of the GRE) and a suitable background in the biological and physical sciences. Students for whom English is a second language are also required to take the TOEFL examination. At the beginning of their second year in graduate school, Neuroscience students who successfully complete the neuroscience core curriculum select an advisor and become affiliated with a departmental graduate program.

Advanced courses in Neuroscience are offered by individual departments, and seminar series bring outstanding neuroscientists to the UAB campus. Since large numbers of neuroscientists are actively involved in research on the campus, a variety of journal clubs and special-interest discussion groups meet weekly.

All students conduct their dissertation research and their initial laboratory rotations in the laboratories of the various faculty members in the program. The outstanding facilities for neuroscience research at UAB include state-of-the-art equipment in the laboratories of the faculty members, and unique shared resources such as high-resolution microscopic imaging and high-field MRI systems. Perhaps the greatest strength of graduate training in neuroscience at UAB is the willingness of the faculty to allow students to gain a wide range of expertise and thus greatly facilitate the students' investigation of neu-

rosience questions of interest to them. The program is designed to recruit and train individuals who will become future leaders in neuroscience research. The program anticipates admitting 6-12 students each year.

Additional Information

For detailed information, contact Dr. Paul Gamlin, Director, Neuroscience Graduate Program, 601 Worrell Building, 924 South 18th Street, Birmingham, AL 35294-4390.

Telephone 205-934-6738.

Fax 205-934-5725

E-mail pgamlin@uab.edu

Web www.neuroscience.uab.edu

Course Descriptions

Cellular and Molecular Biology (CMB)

(See CMB for complete course description)

700. Cellular and Molecular Biology I. Biochemistry. 4 hours.

Neuroscience (NEUR)

702. **Cellular and Molecular Neurobiology.** Electrical properties of nervous system in currents and channels; synapse, physiology, and pharmacology of neurotransmission; second messenger systems, neuroimmunology, signal transduction. 5 hours.

704. **Introduction to Neurobiology.** Lectures and extensive laboratories introduce students to the neuroanatomy and neurophysiology of marine invertebrates and vertebrates. 4 hours.

710. **Integrative Neuroscience** Sensory systems; motor systems; sensorimotor integration; control of the cardiovascular system; fluid and energy balance, circadian rhythms, learning and memory, genetic bases of behavior. 5 hours.

715-718. **Lab Rotation I-IV.** Techniques of neuroscience as applied to specific problems in areas of faculty interest. pass/fail 1-6 hours each.

720. **Developmental Neuroscience.** Birth, migration, growth and differentiation of neurons; establishment of synaptic connections; regulation and plasticity. 4 hours.

780-782. **Seminar I-III: Current Topics in Neuroscience.** Students and faculty critically evaluate recently published work from all areas of neuroscience. 1 hour.

Nurse Anesthesia (M.N.A)

Graduate program director: *Williams*

Faculty

Theresa L. Culpepper, Assistant Professor (Nurse Anesthesia); Pediatric Anesthesia

Mark A. Kossick, Associate Professor (Nurse Anesthesia); Electrocardiography and Cardiovascular

Joe R. Williams, Associate Professor (Nurse Anesthesia); Pharmacology

E. Laura Wright, Assistant Professor (Nurse Anesthesia), General Anesthesia

Program Information

The Nurse Anesthesia program prepares the registered nurse in all aspects of nurse anesthesia practice at the graduate level. The sequence of student coursework combines the knowledge of basic health sciences, scientific methodology in

anesthesia, and advanced preparation to include a state-of-the-art scientific paper. Completion of the prescribed coursework and clinical practice comprise the requirements for the degree. The graduate is eligible to take the National Certification Examination, which, upon passing, allows them to practice as a certified registered nurse anesthetist.

The Nurse Anesthesia Program has received ten years of full accreditation by the Council on Accreditation of Nurse Anesthesia Educational Programs.

Admission Requirements

Admission to the Master of Nurse Anesthesia (M.N.A.) program will be based on the prediction of the candidate's academic ability, work experience, and aptitude for a career in nurse anesthesia. In addition to meeting the admission requirements of the Graduate School, applicants must be graduates of an accredited nursing program and have earned a baccalaureate degree in nursing or in an appropriate science concentration; have a current professional R.N. license within the United States and be eligible for licensure within the State of Alabama; have a minimum of one year experience as an R.N. in a critical care area; have official exam results that indicate a minimum acceptable score of 500 on each section of the GRE test or a score of 50 on the MAT exam; submit satisfactory letters of reference to include an immediate nursing supervisor; and complete a personal interview with the program admission committee. The deadline to apply for admission is November 20.

Curriculum

The Master of Nurse Anesthesia Program begins in the fall semester of each year. It comprises 63 semester hours of didactic instruction and 46 semester hours of clinical practicum and requires 27 months of full-time commitment. Students complete all foundation courses before beginning the clinical practicum, which starts after the first nine months of enrollment. The curriculum does not permit enrollment on a part-time basis.

Additional Information

For detailed information, contact Mr. Joe R. Williams, Program Director, Master of Nurse Anesthesia Program, UAB School of Health Related Professions, RMSB 230, 1530 3rd Avenue South, Birmingham, AL 35294-1212. Telephone 205-934-3209
E-mail mna@uab.edu

Course Descriptions

Unless otherwise noted, all courses are for 3 semester hours of credit. Course numbers preceded with an asterisk indicate courses that can be repeated for credit, with stated stipulations.

Nurse Anesthesia (NA)

600. Research Methods & Statistics. Computer applications of inferential statistics employing parametric and nonparametric techniques; emphasis on hypotheses testing applicable to problems in health related settings; includes one-way analysis of variance. Prerequisite: Knowledge of descriptive statistics. 4 hours.

601. Gross Anatomy. Structure and functions of human body examined through laboratory dissection, lecture, models, and preceptuals. 4 hours.

610. Medical Physiology. Normal physiology of all major organ systems; emphasis on pathological conditions. 5 hours.

620, 621. Anesthesia Pharmacology I, II. Basic principles of pharmacology, emphasizing drugs directly related to practice of anesthesia. 3 hours each.

630. Biochemistry for Anesthetists. Chemistry related to the practice of anesthesia. 3 hours.

640. Anesthesia Principles. Principles and theories of anesthesia practice with emphasis on fundamental concepts of anesthesia care, and the principles of physics and monitoring related to anesthesia practice. 5 hours.

645. Professional Aspects. Psychosocial and ethical issues related to anesthesia. 1 hour.

646. Legal Consideration and Quality Assurance Issues. Malpractice and quality assurance concerns in anesthesia practice. 3 hours.

650. Regional Anesthesia. Techniques used to provide regional anesthesia for surgical procedures. 2 hours.

660. Obstetrical Anesthesia. Concepts concerning anesthesia management of pregnant patients. 1 hours.

661. Anesthesia for Extremes of Age. Introduction to anesthesia management of pediatric, geriatric, trauma, and same-day-surgery patients. 2 hours.

670, 671. Anesthesia Pathophysiology I, II. Detailed review of disease states and their influence on anesthesia management of patients. 3 hours each.

672, 675. Clinical Practicum I, IV. Operating room experience; application of theoretical principles of anesthesia management. 8 hours each.

673, 674, 676. Clinical Practicum II, III, V. (Continuation of NA 672 and 675). 10 hours each.

678. Electrocardiography. Supplements content in pathophysiology and advanced practice courses. Content relative to cardiovascular electrophysiology and its implication in the perioperative period. 3 hours.

680. Anesthesia and Surgical Specialties. Detailed review of major surgical specialties and their relationship to anesthesia care. 3 hours.

698. Graduate Project. Students develop selected topics into state-of-the-art review articles. 2 hours each.

695-697. Special Topics. Review of specialty concepts as presented in NA 670, 671, and 680. 3 hours each.

Nursing (Ph.D., M.S.N.)

Ph.D. Program Director: *Dashiff*

Faculty

Rachel Booth, Professor (Nursing); Administrator of Higher Education, Leadership, Primary Care

* **Marion Broome**, Professor (Nursing); Child Health and Pediatrics; Pain; Informed Consent

* **Kathleen Brown**, Professor (Nursing); Community Health Nursing, Occupational Health, Back Injury Prevention

* **Ann Clark**, Associate Professor (Nursing); Women's Health, Alternative Therapies

Ruth Cox, Associate Professor (Nursing); Delinquency, Family Health

* **Carol Dashiff**, Professor (Nursing); Family Processes Influencing Adolescent Autonomy, and Self-Care in Health and Chronic Illness

* **Linda Davis**, Professor (Nursing); Family Systems, Caregiving and Chronic Illness

Anne Foote, Associate Professor (Nursing); Nursing Education, Neuroscience Nursing

Pamela Fordham, Assistant Professor (Nursing); Primary Health Care, Death and Dying, Nursing Education

* **Dorothy Gauthier**, Associate Professor (Nursing); Pathophysiology, Psychoneuroimmunology

* **Joan Grant**, Associate Professor (Nursing); Nursing Diagnosis, Family Caregiving

* **Joyce Newman Giger**, Professor (Nursing); Risk Reduction in African American Women

* **Barbara Habermann**, Assistant Professor (Nursing); Family Management of Adult Chronic Illness, Qualitative Methods

* **Lynda Harrison**, Professor (Nursing); Effects of Human Touch on Preterm Infants, Maternal-Child Health, Parenting

Gail Hill, Assistant Professor (Nursing); Health Systems, Acute Care

Vicki Johnson, Assistant Professor (Nursing); Urinary Dysfunction; Muscle Adaptation to Exercise

Francine Clark Jones, Assistant Professor (Nursing); Families and Violence; Disparities in Mental Health; Qualitative Research

* **Duck-Hee Kang**, Assistant Professor (Nursing); Psychoneuroimmunology, Immune Responses and Stress in Asthmatic Youth and Cancer Patients

Norman Keltner, Associate Professor (Nursing); Psychopharmacology, Psychiatric Nursing

Alberta McCaleb, Associate Professor (Nursing); Self-Care Activities and Health Promotion in Adolescents

Linda Miers, Associate Professor (Nursing); Nurse Caring Behaviors, Roy Adaptation Model

Judy Pemberton, Assistant Professor (Nursing); Nursing and Health Systems Administration, Quality and Outcomes Management, Organization/Team Performance Excellence

Erica Pryor, Assistant Professor (Nursing); Epidemiology; Statistics; Infectious Disease

* **Marti Rice**, Assistant Professor (Nursing); Anger, Stress, Blood Pressure, Exercise, and Cardiovascular Risk in Children and Adolescents

* **Barbara Smith**, Professor and O'Koren Endowed Chair; Exercise Physiology and Health Promotion in Chronically Ill Children and Adults

* **Anne Turner-Henson**, Associate Professor (Nursing); Children with Special Health Care Needs, Caregiving Within Families

* **Joan Turner**, Professor (Nursing); Prevention and Control of Infectious and Communicable Diseases

* **Mary Umlauf**, Associate Professor (Nursing); Gerontology, Incontinence, Sleep

* **Michael Weaver**, Associate Professor (Nursing); Health Promotion, Occupational Health, Biostatistics, Statistical Genetics

Anne Williams, Assistant Professor (Nursing); Stroke Victims, Caregiving

Barbara Woodring, Professor (Nursing); Improving Care of Children, Supporting Intergenerational Families

Penelope Wright, Associate Professor (Nursing); Pediatric Oncology, Quality of Life

* Ph.D. core faculty

Ph.D. Program Description

The Doctor of Philosophy in Nursing is designed to prepare professional nurses as scholars and researchers who will make a substantive contribution to the body of knowledge for the discipline of nursing and, thereby, improve health services for those who receive nursing care. Graduates will improve the delivery of health care by investigating factors that (1) improve the health status and function of individuals and communities and (2) facilitate the health status and functioning of families engaging in caregiving. Two options are available for program entry. Applicants may either hold a master's degree in nursing (master's degree Ph.D. option) or a baccalaureate degree in nursing (Postbaccalaureate Ph.D. option)

Program Goals

The curriculum prepares graduates to critique models, concepts, and theories for their utility in defining, organizing, and expanding the body of nursing and health care knowledge within the focal areas; contribute to nursing through theory-testing and theory-generating research; conduct health care investigations based on scientifically sound conceptual and methodological decisions about research designs, measures, and statistics; reflect a consistent commitment to human values and high ethical standards in nursing practice and science; and initiate and collaborate in interdisciplinary and multidisciplinary endeavors that contribute to the health and functional status of individuals and communities and that foster the ability of families, including caregivers, to facilitate the health of family members.

Admission Requirements

In addition to the requirements of the UAB Graduate School, admission to this program depends upon the following criteria:

- Master's degree in nursing from an accredited program, or baccalaureate degree in nursing from an accredited program for those applying to the Postbaccalaureate Ph.D. option;
- At least an overall B average on all graduate level coursework;
- Scores of at least 550 on the verbal and quantitative sections of the GRE, or a total of 1650 on the verbal, quantitative, and analytical sections of the GRE;
- Satisfactory TOEFL scores for students from non-English-speaking countries (minimum of 550);
- Evidence of graduate coursework in research methods and inferential statistics required for those with master's degree in nursing. Postbaccalaureate Ph.D. students complete these requirements during the program;
- Eligibility for licensure as a registered nurse in Alabama;
- A written goal statement that describes congruence between the applicant's research interests and one of the program focal areas;
- A current curriculum vita;
- Submission of an independent work that demonstrates the applicant's scholarship potential;
- Letters of reference;
- A personal interview, required for applicants meeting all other requirements;

Individuals who do not meet the above criteria will be considered on an individual basis.

Degree Requirements

Candidates for the degree of Doctor of Philosophy in Nursing must complete the following requirements:

- Coursework and experiences based on the student's background and focal area, with an overall GPA of B or better, and grades of B or better in all required courses in the School of Nursing;
- A qualifying exam by the end of the first year of full-time study;
- A statistical analysis sequence;
- A comprehensive examination administered upon completion of an individualized program of studies; and
- A written dissertation demonstrating competence in research, individual inquiry, critical analysis, and in-depth treatment of a health care problem in the focal area. The investigation must make a genuine contribution to knowledge, concepts, and theories in nursing. A final defense of the dissertation is required.

M.S.N. and Postmaster's Programs in Nursing

For information on the Master of Science in Nursing Program and Certificate of Advanced Study in Nursing, please see the UAB School of Nursing catalog or contact Dr. Lynda Harrison, Associate Dean, UAB School of Nursing, 1530 3rd Avenue South, Birmingham, AL 35294-1210 (telephone 205-934-6787).

Postdoctoral Study

Postdoctoral studies in nursing are individually arranged based on a student's learning needs in specific areas of interest that match the strengths of the graduate faculty. The focus of postdoctoral study is on expanding and extending the student's knowledge base in nursing theory, practice, research, and generally centers on a research effort of mutual interest to the student and faculty mentor. Special faculty strength supports postdoctoral study in the areas of physical exercise, functional status and family caregiving.

Financial Aid

Many opportunities for financial aid available in their form of living stipends, tuition and fee coverage and support for scholarship including graduate teaching or research assistantships; Graduate Fellowships; and federal professional nurse traineeships. Additional internal and external sources of support include the Florence A. Hixson Scholarship; Alabama Graduate Nurse Scholarships; federal National Research Service Awards for predoctoral and postdoctoral study and part-time employment for registered nurses licensed in Alabama. For further information concerning these, contact the Chair for Graduate Studies in Nursing (see below) or the Office of Student Affairs in the School of Nursing.

Other Policies of the School of Nursing

All students enrolled in clinical nursing courses must have Alabama registration, malpractice insurance, CPR certification, and evidence of hepatitis B immunization and instruction in OSHA.

Additional Information

For detailed information, contact Dr. Carol Dashiff, Chair, Graduate Studies, UAB School of Nursing, NB 301, 1530 3rd Avenue South, Birmingham, AL 35294-1210. Telephone 205-934-6852 or 934-6102

E-mail dashiffc@uab.edu

Web www.uab.edu/son

Course Descriptions

Unless otherwise noted, all courses are for 3 semester hours of credit. Courses numbers preceded with an asterisk indicate courses that can be repeated for credit, with stated stipulations.

NFH 760. **Family Health and Caregiving Across the Lifespan.** A survey of current research related to the reciprocal relationship between the family and health and caregiving within the context of the family lifespan. The student develops an understanding of health and illness within a framework of human development, interaction and adaptation, as well as cultural and gender norms. 3 hours. Fall. (Davis)

NFH 761. **Theory Development in Family Health and Caregiving.** Skill development in evaluating selected family and caregiving theories for their current or potential relevance to research on family health and individual health in the context of the family, and family caregiving processes in health and illness. 3 hours. Spring. (Habermann)

NFH 762. **Family Research Methods.** Skill development in the critical analysis and application of family research methods as a foundation for conducting family research. Experience is gained in instrument evaluation and selection, decision-making regarding level of variable formation, model validation through multiple measurement, and selection of appropriate statistical tests to capture the complexity and dynamic nature of the family. 3 hours. Fall. (Dashiff)

NFH 763. **Families and Caregiving Proseminar.** Students synthesize family health and caregiving knowledge and skills gained in previous coursework and practica and apply this to research experiences within the area of family health and caregiving. 3 hours. Spring. (Grant)

NIC 760. **Conceptual Foundations of Health Status and Function.** A survey of current conceptual approaches and interventions as well as cultural and gender norms relevant to enhancing or restoring health and functional status. 3 hours. Fall. (Brown, B. Smith)

NIC 761. **Health and Functional Status Interventions.** Advanced study in clinical interventions from a holistic perspective for promoting health status and function in high risk populations. Theoretical foundations of interventions and empirical evidence of their effectiveness are presented. 3 hours. Spring. (Harrison, Clark)

NIC 763. **Health Status and Function of Individuals and Communities Proseminar.** Students synthesize health status and function knowledge and research skills gained in previous coursework and practica and apply this to research experience within the area of health status and function. 3 hours. Spring. (Kang)

NRM 770. **Designs for Nursing Studies I.** The beginning phases of the research process, including formulation of research questions/aims, integration of theory and/or conceptual framework in the development of research, the critique and review of knowledge that supports an identified area of research, and the discussion of the type of research design. 3 hours. Spring. (Rice, Kang)

NRM 771. **Methods/Measurement in Nursing Research.** Overview of the theories, principles, and techniques that yield reliable and valid measurement of human systems. 3 hours. Fall. (Davis)

NRM 772. **Designs for Nursing Studies II.** Design, sampling, collection of data, data analysis plans, presentation of findings, conclusions in various research designs and the reintegration of these into the body of knowledge in an identified focal area of research. Ethical and cultural issues related to the conduct of research will be addressed. Students will develop a research proposal. 3 hours. Summer. (Kang, Rice)

NSM 776. **Linear Models for Clinical Nursing Research.** Survey course on the application of advanced General Linear Model and related techniques in health care research. 3 hours. Spring. (Weaver, Pryor)

NSM 777. **Multivariate Statistical Methods for Clinical Nursing Research.** Survey course on the application of multivariate techniques in health care research. The course will focus on application of multivariate statistical methods to nursing-related research questions, with emphasis on interpretation within clinical nursing research problems. 3 hours. Summer. (Weaver, Pryor)

NUR 706. **Theory Building in Nursing.** The nature of knowledge in practice disciplines with an emphasis on critical analysis of selected theories and concepts, approaches to theory and conceptual development, and criteria for evaluation of theory. 3 hours. Fall. (Broome)

* NUR 730. **Special Topics.** A special topic seminar with variable focus. 1-3 hours. Each Term. (TBA)

* NUR 790. **Independent Study in Nursing.** Pass/Fail. 1-9 hours.

* NUR 791. **Independent Study in Nursing Practice.** Pass/Fail. 1-9 hours.

* NUR 798. **Research Practicum.** A series of course credits taken throughout the student's doctoral coursework to provide continuous research experience under the supervision of the mentor. Credits may vary by term, from a minimum of one hour credit to a maximum of nine hours credit. Offered every term. Pass/Fail. 1-9 hours.

* NUR 799. **Dissertation Research.** Prerequisites: Comprehensive Exam, admission to candidacy and IRB approval. Pass/Fail. 1-9 hours.

Nutrition Sciences (Ph.D.), Clinical Nutrition (M.S.)

Ph.D. Program Director (Nutrition Sciences): *Nagy*

M.S. Program Director (Clinical Nutrition): *Brown*

Faculty

For additional courses in epidemiology and other public health areas, see the catalog of the School of Public Health.

Joseph E. Baggott, Assistant Professor (Nutrition Sciences); Folate and Antifolate Metabolism, One-Carbon Metabolism, Purine Biosynthesis

C. Michael Brooks, Professor (School of Health Related Professions); Nutrition Education; Cancer Education, Prevention and Control; Asthma/COPD Self-Management

M. Amanda Brown, Instructor (Nutrition Sciences); Dietetics Education.

Pi-Ling Chang, Assistant Professor (Nutrition Sciences); Vitamin D and Cancer, Osteoporosis, Bone-Matrix Proteins, Osteoblast Differentiation

Harriet H. Cloud, Professor Emerita (Nutrition Sciences); Mental Retardation and Learning Disabilities, Metabolic Inborn Errors of Metabolism

Nassrin Dashti, Associate Professor (Nutrition Sciences); Lipoprotein Metabolism, Regulation of Lipoprotein Expression

Isao Eto, Associate Professor (Nutrition Sciences); Nutritional Biochemistry, Folate Metabolism and Interactions, Cancer Biology and Biochemistry

Frank A. Franklin, Professor (Pediatrics); Gastroenterology, Lipids, Nutrition

Barbara Gower, Associate Professor (Nutrition Sciences); Endocrinology, Body Composition, Postmenopausal Hormone Replacement Therapy, Insulin Sensitivity

Clinton J. Grubbs, Professor (School of Health Related Professions); Nutrition and Cancer, Vitamin A and Retinoid Derivatives

J. Michael Hardin, Professor (Health Services Administration); Informatics, Linear Models, Data Mining, Time Series, Data Warehouses

Douglas C. Heimbarger, Professor (Nutrition Sciences); Clinical Nutrition Support and Assessment, Nutrition and Cancer

Gary Hunter, Professor (Human Studies); Exercise Physiology

Janet Isaacs, Assistant Professor (Nutrition Sciences); Children with Special Health Care Needs

Gary L. Johanning, Assistant Professor (Nutrition Sciences); Lipid Metabolism, Molecular Biology, Obesity, Cancer, Nutrition

Mohammed A. Khaled, Associate Professor (Nutrition Sciences); Body Composition, Energy Metabolism, Oxidants and Antioxidants, International Public Health

Carlos L. Krumdieck, Professor Emeritus (Nutrition Sciences); Folic Acid Metabolism, Carcinogenesis, Homocysteine Metabolism

Sarah L. Morgan, Professor (Nutrition Sciences and Medicine); Nutrition and Rheumatic Diseases, Folate and Antifolates, Osteoporosis

Tim R. Nagy, Associate Professor (Nutrition Sciences); Hormonal and Environmental Effects on Body Mass and Body Composition

Juan M. Navia, Professor Emeritus (Public Health); International Nutrition, Vitamin A Metabolism, Calcium Nutrition, Dental Nutrition

Chandrika Piyathilake, Assistant Professor (Nutrition Sciences); Lung Cancer and Biomarkers

Charles W. Prince, Professor (Nutrition Sciences); Bone Metabolism, Vitamin D Function; Osteopontin, Orthopedic Implant Biocompatibility, Cellular Transduction of Mechanical Load

Susan Sell, Assistant Professor (Nutrition Sciences); Molecular Genetics, Diabetes and Obesity

Bonnie A. Spear, Assistant Professor (Pediatrics); Pediatric and Adolescent Nutrition

Tsunenobu Tamura, Professor (Nutrition Sciences); Folate Metabolism, Trace Element Nutrition, Metabolic Inborn Errors

Roland L. Weinsier, C.E. Butterworth Jr. Professor, and Chair (Nutrition Sciences); Energy Metabolism, Obesity, Medical-Nutrition Education

Nancy H. Wooldridge, Assistant Professor (Pediatrics); Pediatric Nutrition, Nutrition Management of Patients with Pediatric Disease

M.S. Program in Clinical Nutrition

The program leading to the Master of Science degree with a major in clinical nutrition is designed to provide training and experience related to treatment and prevention of disease through the science and art of optimal nutritional care. Professionals with backgrounds in the science of nutrition or dietetics will have an opportunity to learn the metabolic and biochemical basis for nutritional care while being involved in direct patient management and in either laboratory or clinical research. Opportunities exist for specialization within clinical subspecialty areas such as pediatrics, children with special health care needs, general clinical research, exercise science, health education, health services administration, and public health.

Admission

The Clinical Nutrition graduate program recommends fall-term entry. Interested students must first obtain admission to the UAB Graduate School. Graduate School admission standards include

1. a B average computed overall, or alternatively computed over the last 60 semester hours of earned credit;
2. evidence of a bachelor's degree from a regionally accredited university or college in the United States; and
3. a score of at least 500 on each section of the GRE General Test.

Additionally, eligible students must be registered dietitians, registration-eligible dietitians, or have a baccalaureate degree from an American Dietetic Association-approved Didactic Program in Dietetics. A nutrition laboratory sciences option is offered to nondietetics students with strong chemistry backgrounds.

Degree Requirements

The graduate program in clinical nutrition offers the Plan I (thesis) option only. Candidates for the M.S. degree are expected to complete a minimum of 30 hours of graduate-level course work, and submit and defend thesis research that makes a contribution to the knowledge of clinical nutrition.

Curriculum Core Requirements

Successful completion of the M.S. degree will require completion of a minimum of 20 semester hours in Clinical Nutrition core courses, 6 semester hours of thesis research, and additional courses to be selected from departmental offerings.

Additional Information

For detailed information, contact Dr. Amanda Brown, Assistant Professor and Director, Graduate Program in Clinical Nutrition and Dietetic Internship, Department of Nutrition Sciences, UAB School of Health Related Professions, Webb Building, Room 212, 1675 University Boulevard, Birmingham, AL 35294-3360.

Telephone 205-934-3006

E-mail cntr@uab.edu

Web www.uab.edu/nutrition

Dietetic Internship

The Dietetic Internship Program is accredited by the Commission on Accreditation of Dietetics Education of the American Dietetic Association and is designed to prepare entry-level dietitians for careers in a variety of health care and food service facilities. Internship appointments are awarded on a competitive basis through a national computer matching process. Dietetic interns must also be admitted to the Graduate School (admission standards are listed under the M.S. in Clinical Nutrition above) and are required to enroll in a full graduate course load each term during the internship.

A full-time (9-month) internship with a general emphasis is offered in Birmingham, and a part-time (11-month) internship is offered in each of the following cities in Alabama: Dothan, Huntsville, Mobile, Montgomery, and Birmingham. Upon completion of the internship, the student will be eligible to take the national examination to become a registered dietitian. Full-time interns will have 12 hours of graduate credit, and part-time interns will have 9 hours of graduate credit which may be applied toward the requirements for the M.S. in Clinical Nutrition. Students may elect to continue in the M.S. program in Clinical Nutrition to complete requirements for the M.S. degree on a full or part-time basis.

Additional Information

For detailed information, contact Dr. Amanda Brown, Assistant Professor and Director, Graduate Program in Clinical Nutrition and Dietetic Internship, Department of Nutrition Sciences, UAB School of Health Related Professions, Webb Building, Room 212, 1675 University Boulevard, Birmingham, AL 35294-3360.

Telephone 205-934-3006

E-mail dintr@uab.edu

Web www.uab.edu/nutrition

Ph.D. Program in Nutrition Sciences

The program leading to the Ph.D. in Nutrition Sciences at UAB is designed to provide coursework and research experience that emphasize the science of nutrition in maintaining the health of individuals and populations and preventing a variety of diseases. The doctoral program is rather traditional in structure and combines required and elective didactic coursework in basic sciences and nutrition with research conducted in superb facilities in an outstanding research environment. Two tracks are currently in place in the Ph.D. program—one with a physiology emphasis, the other with a molecular biology emphasis. Required and elective coursework for each track includes didactic courses in clinical nutrition, nutritional biochemistry, molecular biology, statistics and experimental design, as well as elective courses chosen from among the many doctoral level courses at UAB. This flexibility allows students to tailor programs to their specific interests while insuring that they are exposed to a broad knowledge base of nutrition sciences.

Admission

To meet Graduate School and departmental standards, a student must have a combined GRE score of 1650, an undergraduate degree with a strong science background, three letters of recommendation based on thorough knowledge of the applicant's background and abilities, and, of great importance, a statement of goals and purpose that delineates the student's

motivation and purpose in seeking this degree. Fall-term entry is recommended.

Coursework and Other Requirements

Successful completion of the Ph.D. will require completion of a minimum of 33 semester hours in core courses (encompassing the disciplines of cellular and molecular biology, biochemistry, physiology, nutritional biochemistry, clinical nutrition, and statistics and experimental design) and at least 24 additional graduate semester hours of elective coursework; passing a comprehensive written qualifying examination; and defense of a dissertation reporting the results of original scientific research that makes a genuine contribution to the knowledge of nutrition sciences. In fulfilling the latter requirement, a student must author at least two papers that are publishable in peer-reviewed journals.

Additional Information

For detailed information, contact Dr. Tim Nagy, Director of the Ph.D. Program in Nutrition Sciences, Department of Nutrition Sciences, UAB School of Health Related Professions, Susan Mott Webb Nutrition Sciences Building, Room 429, 1675 University Boulevard, Birmingham, AL 35294-3360.

Telephone 205-975-9640

E-mail phdnt@uab.edu

Web www.uab.edu/nutrition

Course Descriptions

Unless otherwise noted, all courses are for 3 semester hours of credit. Courses numbers preceded with an asterisk indicate courses that can be repeated for credit, with stated stipulations.

Nutrition Sciences (NTR)

589. **Internship Practicum.** Clinical experience in food service management and clinical nutrition. Fall, spring, summer.

601. **Advanced Medical Nutrition.** Nutrition in relationship to health; prevention of disease and correction of disorders resulting from nutritional imbalance throughout the life cycle. Prerequisite: Permission of instructor. Fall.

604. **Principles and Practice of Nutrition Support.** Nutrition support for critically ill patients; theory integrated with clinical practice.

611. **Advanced Food Service Systems Management.** Management systems, application to hospital food service. Prerequisite: Permission of instructor.

618. **Nutritional Biochemistry.** Metabolism and functions of nutrients; biosynthesis of vitamins and cofactors; human requirements for energy, amino acids, minerals, and vitamins; food fortification; current human nutritional problems. Spring. 6 hours.

622. **Nutrition, Obesity, and Prevention of Cardiovascular Disease and Cancer.** Critical evaluation of the effects of genetics and environmental factors, especially nutrients, on the development and prevention of obesity, atherosclerosis, and cancer. Prerequisite: Permission of instructor.

633. **Laboratory Instruments and Methods in Nutrition Research.** Operation, capabilities, and limitations of laboratory instruments. Prerequisite: Permission of instructor. 1-3 hours.

636. **Scientific Methods.** Investigations in nutrition using animal models and laboratory procedures, design of experiments, data collection, analysis, interpretation, and communication of experimental results. Prerequisite: Permission of instructor.

650. **Body Composition and Energy Metabolism.** Methods of measurement and relationship to human health and disease. Prerequisite: Permission of instructor.

680. **Journal Club in Clinical Nutrition.** Review and critique of current literature in clinical nutrition. 1 hour.

685. **Pediatric Pulmonary Care: An Interdisciplinary Approach.** Health care delivery to pediatric clients at risk for or compromised by pulmonary disease. Prerequisite: Permission of instructor.

690. **Seminar.** Review of current literature and research in nutrition. Prerequisite: Permission of instructor. 1 hour.

691. **Clinical Practicum: Nutritional Aspects of Mental Retardation and Developmental Disabilities.** Clinical experiences in evaluation of nutritional status, feeding behavior and food habits of mentally retarded and developmentally disabled children. Prerequisite: Permission of instructor. 1-6 hours.

692. **Clinical Practicum: Community Nutrition.** Clinical experiences in health care delivery systems with nutrition components. Prerequisite: Permission of instructor. 6 hours.

693. **Clinical Practicum: Pediatric Nutrition.** Clinical experiences in normal growth patterns in children; nutritional needs in health and disease. Prerequisite: Permission of instructor. 6 hours.

694. **Clinical Practicum: General Clinical Research.** Clinical experiences in a multidisciplinary research facility involving human subjects. Prerequisite: permission of instructor. 1-6 hours.

695. **Special Problems.** To meet individual student needs; clinical rotation, review of current literature, completion of defined objectives. Prerequisite: Permission of instructor. 1-3 hours.

696. **Clinical Practicum: Nutritional Support of Pediatric Clients with Pulmonary Problems.** Observation of and participation in interdisciplinary team delivery of health care to pediatric patients with pulmonary disease. Prerequisite: Permission of instructor. 1-6 hours.

697. **Clinical Practicum: Nutrition Support Service.** Interdisciplinary team delivery of nutrition support to critically ill hospitalized patients and ambulatory patients. 3-6 hours.

698. **Master's Nonthesis Research.** Prerequisite: Permission of instructor. 1-6 hours.

699. **Master's Thesis Research.** Prerequisites: Admission to candidacy and permission of instructor. 1-9 hours.

711. **Clinical Nutrition.** Nutritional aspects of growth, development, pregnancy, chronic diseases, nutrient requirements, sources, toxicities. Malnutrition in, and nutritional support of, hospitalized patients. Prerequisites: Biochemistry and permission of instructor. Spring. 4 hours.

718. **Nutritional Biochemistry.** Metabolism and functions of nutrients; biosynthesis of vitamins and cofactors; human requirements for energy, amino acids, minerals, and vitamins; food fortification; current human nutritional problems. Spring. 6 hours.

722. **Nutrition, Obesity, and Prevention of Cardiovascular Disease and Cancer.** Critical evaluation of the effects of genetics and environmental factors, especially nutrients, on

the development and prevention of obesity, atherosclerosis, and cancer. Prerequisite: Permission of instructor. Fall.

723. Assessment of Nutritional Status in Populations. Theoretical and hands-on instruction in methods of assessment of dietary intakes, body composition, and biochemical levels of macro- and micronutrients. Proper techniques for collecting measurements and review of computer software packages that specialize in analysis of specific measurements.

733. Laboratory Instruments and Methods in Nutrition Research. Operation, capabilities, and limitations of laboratory instruments. Prerequisite: Permission of instructor. Fall, spring, summer. 1-3 hours.

734. Laboratory Methods in Vitaminology. Vitamin determinations in clinical and other specimens. Prerequisite: Permission of instructor. Fall, spring, summer.

747. Molecular Biology and Nutrition Sciences. Overview of molecular biology applications in nutrition science research. Examination of basic molecular biology techniques, current usage of molecular biology to solve nutrition problems, and application of biotechnology to study disorders with a nutritional component. Prerequisite: Permission of instructor. Fall.

750. Body Composition and Energy Metabolism. Methods of measurement and relationship to human health and disease. Prerequisite: Permission of instructor. Fall.

778. Special Topics in Nutrition Sciences. Fall, spring, summer. 1-5 hours.

788. Advanced Nutrition Seminar. Fall, spring, summer. 1 hour.

791. Advanced Clinical Nutrition, Diagnosis, and Treatments. Clinical rounds with nutrition support team; approximately 12 hours weekly. Limited enrollment. Prerequisite: NTR 711 or equivalent. 4 hours.

798. Doctoral Nondissertation Research. 1-12 hours.

799. Doctoral Dissertation Research. Prerequisite: Admission to candidacy. 1-12 hours.

Occupational Therapy (M.S.)*

Graduate program director: *Peyton*

Postprofessional graduate program director: *Vogtle*

Faculty

Caroline Amari, Associate Professor Emeritus

Jo Ann Clelland, Professor (Physical Therapy); Pain Management, Facilitation and Inhibition of Motor Activity

Retta Johnson, Assistant Professor (Occupational Therapy); Certified Hand Therapist, Physical Dysfunction and Upper Extremity Specialist

Claudia G. Peyton, Associate Professor (Occupational Therapy); Behavioral Health, Theories of Occupation, Higher Education, Research Methods, Curriculum Design, Program Evaluation

Jan A. Rowe, Associate Professor (Occupational Therapy); Pediatrics, Community: Family Centered Practice and Assistive Technology

Laura K. Vogtle, Associate Professor (Occupational Therapy); Pediatrics, Research Methods, Program Evaluation, Outcomes Research

Mary Warren, Assistant Professor (Occupational Therapy); Low-Vision Rehabilitation, Neurology, Physical Dysfunction

Sally B. Whitley, Assistant Professor (Occupational Therapy); Pediatric Practice, Neonatology, Sensory Integration

Lawrence E. Zachow, Associate Professor (Occupational Therapy); Developmental Disability, Mental Health

Program Information

MSOT Occupational Therapy

First Professional Degree Program

The Master of Science in Occupational Therapy Program at the University of Alabama at Birmingham offers two tracks in the master's program. The professional program is an entry-level program in occupational therapy for individuals who hold a baccalaureate degree in a field other than occupational therapy. The program is full-time and meets the requirements for certification by the National Board for Certification in Occupational Therapy (NBCOT) and includes a project or thesis. Reaccreditation of the program will occur in 2003-2004

Credentials Conferred

Master of Science in Occupational Therapy.

Professional Certification

Graduates of the program are eligible to sit for the national occupational therapist certification examination administered by the National Board for Certification in Occupational Therapy (NBCOT). After successful completion of the exam, the individual will be an Occupational Therapist, Registered (OTR). Most states require licensure in order to practice; however, state licenses are usually based on the results of the NBCOT Certification Examination.

Accreditation

Accredited by the Accreditation Council of Occupational Therapy Education (ACOTE) of the American Occupational Therapy Association (AOTA), located at 44270 Montgomery Lane, PO Box 31220, Bethesda, MD 20824-1220; telephone: (301) 652 AOTA (2682).

Requirements for Admission

Acceptance will be based on the student's academic performance record and aptitude for a career as an occupational therapist. The candidate must satisfy the following requirements:

- hold a baccalaureate degree from an accredited college or university;
- have a minimum of 3.0 (A = 4.0) in the last 60 hours of undergraduate course work;
- have a minimum of 3.0 (A = 4.0) in the natural sciences prerequisites;
- have a minimum of 3.0 (A = 4.0) in the social and behavioral sciences prerequisites;
- have a minimum GRE score of 1000 (500 in each [verbal and quantitative] or a MAT score of 50 (GRE OR MAT scores must be within last five years);
- meet the nonacademic eligibility requirements for certification to practice occupational therapy upon completion of the program;
- hold a personal interview with members of the faculty of the Department of Occupational Therapy;
- complete applications to the UAB Graduate School and the occupational therapy program; and
- if accepted, complete the UAB Medical History Questionnaire and Physical, including proof of required immunizations.

nizations with satisfactory screening by the UAB Medical Center Student Health Service.

Variations in these requirements are considered. In cases where applicants do not meet the principle requirements for admission, they may be admitted on probation with approval of the Department Chair and Graduate School Dean.

The applicant must have completed successfully the following prerequisite coursework in addition to, or in conjunction with the baccalaureate degree:

Program Prerequisites Semester Hours

Art and Humanities

Expressive Arts or Media (e.g., ceramics, theater, art, music, dance, photography)	3
English Composition	6
Electives (e.g., writing for publications, public speaking, English, foreign languages, philosophy)	12

Social and Behavioral Sciences

Abnormal Psychology*	3
Developmental Psychology*	3
Electives (e.g., psychology, sociology, anthropology)	9

Natural Sciences and Mathematics

Human Anatomy*	4
Human Physiology*	4
Statistics*	3-4
Electives (e.g., Chemistry, Mathematics, Physics, Biology, Computer Science)	3-4
Medical Terminology	2

*Course must be completed within the last five years; basic science coursework taken more than five years ago must be repeated. **Course must be completed within the past 10 years.

Application Process

Complete application materials must be received by February 15 of the year preceding the expected date of enrollment. Rolling admission begins November 1 and concludes February 15. Early submission of application for admission is recommended. Later applications will be reviewed and admitted on a space-available basis.

A complete application includes

- UAB Graduate School and Department of Occupational Therapy applications;
- nonrefundable application fee;
- two official transcripts from each college or university attended;
- test scores (GRE or MAT);
- and three evaluations (references).

International students: Applicants must have their transcripts evaluated by an external agency prior to the submission of application materials. It is the student's responsibility to have the transcripts evaluated. Please contact the UAB Graduate School (205-934-8227) for information regarding agencies qualified to evaluate transcripts.

Additional Information

For detailed information contact: Department of Occupational Therapy, UAB School of Health Related Professions, RMSB 353, 1530 3rd Avenue South, Birmingham, AL 35294-1212.

Telephone 205-934-3568

E-mail msot@uab.edu

Web www.uab.edu/OT

Course Descriptions

Occupational Therapy (OT)

First Professional Degree

607. Occupational Performance Lab. Introduction to treatment techniques commonly used in occupational therapy practice; group dynamics, interaction skills, task analysis, craft modalities, and activities of daily living; application of typical growth and development in relationship to different age and treatment populations. Prerequisite: admission to OT program. 7 hours.

608. Neurophysiological Principles of Patient Care. Study of underlying neuroanatomical and neurophysiological principles as basis for evaluation and treatment of patients with neurological disorders; study of current research in selected areas of applied neurophysiology. Prerequisite: Permission of instructor. 5 hours.

609. Barriers to Occupational Performance. Exposure to content specific to human disease processes, injuries, and developmental or inherited abnormalities within body systems that affect individual's occupational performance. Prerequisite: Permission of instructor. 3 hours.

611. Occupation Centered Assessment. Continuation of content taught in OT 607 with focus on assessment with activities and adaptation of tasks and environments to facilitate meeting needs of individuals and specific populations. Prerequisite: Permission of instructor. 6 hours.

620. Gross Anatomy. Advanced study of human body by means of dissection, demonstration, and lecture. Prerequisite: Permission of instructor. 6 hours.

623. Human Neuroanatomy. Advanced study of structure and function of central nervous system. Prerequisite: Permission of instructor. 3 hours.

624. Therapeutic Enhancement of Occupation I. Aspects of treatment planning, implementation, and specific treatment strategies across diagnostic categories and throughout life span, using holistic approach that incorporates all aspects of individual's lifestyle; basic and instrumental activities of daily living, performance components and contexts, environmental contexts and occupational performance issues related to adaptation and life satisfaction. Prerequisite: Permission of instructor. 4 hours.

625. Therapeutic Enhancement of Occupation II. Aspects of treatment planning, implementation, and specific treatment strategies across diagnostic categories and throughout life span, patient needs using holistic approach that incorporates all aspects of individual's lifestyle; areas of work/productive occupation and play/leisure addressing performance components and contexts and how these affect occupational performance. Prerequisite: Permission of instructor. 4 hours.

628. Pharmaceutical Effects on Human Performance. Survey of pharmacology with emphasis on medications used by patients treated by occupational therapists; pharmacological principles that apply to all groups of drugs; emphasis on medications used for physical and behavioral disorders. Prerequisite: Permission of instructor. 2 hours.

630. Evaluation of Occupational Performance. Critical review of approaches to evaluating occupational performance including conceptual models, frames of reference, clinical applications, and development of assessment tools; emphasis on documentation of clinical outcomes. Prerequisite: Permission of instructor. 3 hours.

631. Functional Anatomy, Goniometry, and Manual Muscle Testing. Basic kinesiological principles and functional movement patterns of the human body; introduction to processes of clinical measurements; study of principles and techniques for obtaining data about status of patients'/clients' joint range of motion and muscle strength. Prerequisite: Permission of instructor. 5 hours.

632, 633. Fieldwork Seminar I, II. Forum for exchange of ideas and experiences; detailed case study/ inservice on modality and treatment technique/intervention chosen from client-patient-consumer census during previous term's Level I Fieldwork experience. Prerequisite: Permission of instructor. 1 hour each.

634. Seminar in Professional Readiness. Forum for exchange of ideas and experiences; student, faculty, and alumni presentations on variety of topics; integral part of Level II Fieldwork Experiences, OT 685 and 686. Prerequisite: Permission of instructor. 1 hour.

636. Principles of Applied Forces in the Upper Extremity. Anatomical and biomechanical concepts of normal and pathological movement in arm or hand; principles of dynamic assist, remodeling analysis, and clinical evaluation of adapted upper extremity performance. Prerequisite: Permission of instructor. 3 hours.

651. Spectrum of Care: A Seminar in Problem Based Learning. Progression of professional roles from population's evaluation to treatment of occupational performance deficits; small groups mentored by interdisciplinary faculty to stimulate individual and cooperative skills. Prerequisite: Permission of instructor. 4 hours.

655. Qualitative Research Methods for Health Professionals. Comparison of basic concepts of qualitative and quantitative research; qualitative research's role in discovering theory and its various applications in practice in health care professions; research design, data collection strategies, and methods of analysis. Prerequisite: Permission of instructor. 2 hours.

660. Seminar in Interdisciplinary Services for Infants, Children, and Youth with Development Disabilities. Synthesis of team-based approaches to intervention for infants, children, and youth with known or suspected disabilities. Prerequisite: Permission of instructor. 1-2 hours.

664. Ethics and Principles of Management in Practice. Introduction to basic principles of organization and administration of occupational therapy programs related to practice in variety of settings; important information for students' consideration as practitioner in the 21st century. Prerequisite: Permission of instructor. 4 hours.

665. Geriatric Rehabilitation for Health Professionals. Rehabilitation of elderly from perspective of functional impact of age-related changes, evaluation and remediation of functional limitations, and personal and environmental adaptations to promote continuing autonomy. Prerequisites: OT 611, 624, 625. 3 hours. (Also GER 665).

666. Splinting. Anatomical and biomechanical concepts for splint selection, design, and application as related to re-

mediation of occupational performance deficits. Prerequisite: Permission of instructor. 2 hours.

667. Research Methods I. Research ethics, experimental design, basic statistical concepts, and types of research to enable student to critically analyze and use scientific literature to improve clinical practice; emphasis on understanding components of research report and concepts associated with judging of internal and external validity. Prerequisite: Permission of instructor. 3 hours.

671. Advanced Theories of Assessment in Occupational Therapy. Advanced theory and concepts of evaluation and measurement. Prerequisite: Permission of instructor. 3 hours.

674. Technology Applications for Clinicians. RESNA technology competencies for occupational therapists; laws affecting availability of assistive technology; assessments used in evaluation of clients for technology prescription, seating and wheelchairs, computer input devices, augmentative communication systems, and environmental controls. Prerequisite: Permission of instructor. 2 hour.

675. History and Theory of Occupation. A historical survey of occupation, occupational meaning, and purposeful activity as used by occupational therapists in the study of the occupational nature of human beings across the life span; how leaders of the profession articulate occupational and therapeutic applications across time. Prerequisite: Permission of instructor. 3 hours.

676. Health in the Context of Occupation. Problem-based critical inquiry; clinical problem solving from the perspective of client-centered based using action research methods. Prerequisite: Permission of instructor. 3 hours.

677. Foundations in Low Vision Rehabilitation. Basic evaluation and treatment techniques for persons experiencing functional limitations secondary to visual impairment from hereditary conditions, disease, and trauma. Prerequisites: OT 609, 623, 624, and 625. 3 hours.

678. Animal Assisted Care. Fundamental knowledge of role of animals (dogs and horses) in occupational therapy; basic anatomy and diseases of these species; methods for minimizing exposure of patients to zoonotic diseases; emphasis on animal assisted therapy and therapeutic riding, hippotherapy; introduction to key organizations which govern these areas of practice and their certification processes. Prerequisite: Permission of instructor. 3 hours.

679. Foundations in Low Vision Rehabilitation II. 3 hours.

680. Clinical Education and Supervision. Departmental management and supervision of employees with secondary focus on occupational therapy fieldwork supervision. Prerequisite: Permission of instructor. 3 hours.

681. Practicum in Consultation. Prerequisite: Permission of instructor. 1-2 hours.

682. Advanced Clinical Practicum. Prerequisite: Permission of instructor. 1-3 hours.

683. Practicum in Teaching. Prerequisite: Permission of instructor. 1-3 hours.

685. Advanced Fieldwork Experience I. Prerequisite: Permission of instructor. 10 hours.

686. Advanced Fieldwork Experience II. Prerequisite: Permission of instructor. 10 hours.

692. Directed Readings. Study of specific topic or area under guidance of faculty member. Prerequisite: Permission of instructor. 1-3 hours.

698. **Master's Level Nonthesis Research.** Prerequisite: Permission of instructor. 1-6 hours.

699. **Master's Level Thesis Research.** Elements of proposal and development of thesis/project; thesis and institutional review board procedures; student presentation, group discussion, recommendations, and critique. Prerequisite: admission to candidacy. 1-6 hours.

MSOT Postprofessional Occupational Therapy Program

The professional program provides advanced learning for the individual who already holds a degree in occupational therapy.

The program offers postprofessional education to occupational therapists who wish to learn advanced theoretical, clinical, and research skills. The 33 semester hour program guides the student through four specific domains: foundations, specialty clinical application, research methodology, and a project or thesis. Elective course work from related departments may be approved for degree requirements. Each student meets individually with a graduate advisor and the Director of the postprofessional program to design a plan of study. Graduates of the program may use this degree to enter specialized areas of practice, to assume leadership positions within the profession, or to prepare for doctoral-level study.

Credentials Conferred

Diploma—the Master of Science degree is awarded by the University of Alabama at Birmingham.

Length of Study

Minimum of four semesters (18 months) for the full-time student and approximately 3 years for part-time students.

Program Entrance Date

Any semester throughout the academic year.

Application Deadline

During the term preceding the expected semester of enrollment.

Application Procedure

The following materials must be submitted to the UAB Graduate School Admissions Office:

- completed UAB Graduate School application materials (all forms available from Graduate School, Hill University Center, Room 511, 1400 University Boulevard, Birmingham, Alabama 35294-1150,
- nonrefundable application processing fee,
- official transcripts from each college attended,
- official test score report (GRE or MAT), and
- three evaluations (references).

Requirement for Admission

For unconditional acceptance, the student must satisfy the following requirements:

- a baccalaureate degree in occupational therapy from an accredited educational program with a minimum cumulative GPA of 3.0 (A = 4.0) computed over the last 60 hours of course work,
- eligibility for licensure as an occupational therapist,
- a score of at least 500 on each section (verbal and quantitative) of the GRE general test or a minimum MAT score of 50),

- completed application for admission to the UAB Graduate School,
- three letters of reference,
- personal interviews with members of the faculty of the Department of Occupational Therapy, and
- if accepted, complete the UAB medical history questionnaire and physical, provide proof of required immunizations, and receive satisfactory screening by the UAB Medical Center Student Health Service.

Essential Requirements

Fundamental tasks, behaviors, and abilities necessary to successfully complete the academic and clinical/residency requirements of the program and to satisfy licensure/certification requirements, if any, have been outlined and are available upon request from the academic program office. Students requesting disability accommodations must do so by filing a disability accommodation request in writing with the academic program office.

Typical Program (Course requirements are listed in semester credit hours)

All students must specify an interest area upon entering the program. These include the following: administration, education, leadership, practice, or research. Students may identify a focus within the practice field (i.e., geriatrics, low vision, mental health, or pediatrics). Course work will be chosen based on the four interest areas and include courses in a clinical focus area if indicated. At least 12 hours of course work must be chosen from occupational therapy classes listed below:

- | | |
|--------|--|
| OT 608 | Neurophysiological Principles of Patient Care (5) |
| OT 630 | Occupational Performance (3) |
| OT 363 | Principles of Applied Forces in the Upper Extremity (3) |
| OT 655 | Qualitative Research Methods for Health Professionals (2) |
| OT 660 | Seminar in Interdisciplinary Services for Infants, Children, and Youth with Developmental Disabilities (1-2) |
| OT 665 | Geriatric Rehabilitation for Health Professionals (3) |
| OT 667 | Research Methods (3) |
| OT 671 | The Advanced Theory of the Assessment Process in Occupational Therapy (3) |
| OT 674 | Technology Applications for Clinicians (2) |
| OT 675 | History and Theory of Occupation (3) |
| OT 681 | Practicum in Consultation (1-2) |
| OT 682 | Advanced Clinical Practicum (1-3) |
| OT 693 | Practicum in Teaching (1-3) |
| OT 692 | Directed Readings (1-3) |
| OT 699 | Master's Level Thesis Research (1-6) |

Electives offered outside of the occupational therapy curriculum are allowed up to 15 hours. These electives must be chosen with the supervision and approval of the student's graduate advisor and may include courses that coincide with the student's interests. Examples of programs from which electives may be chosen are: public health, health administration, early childhood education, physical therapy, gerontology, psychology, and sociology. The Graduate School allows up to

12 hours of courses to be taken at institutions other than UAB as long as the student receives a grade of B or better. The occupational therapy faculty must approve transfer of such courses.

For further information contact:

Department of Occupational Therapy, UAB School of Health Related Professions, RMSB 353, 1530 3rd Avenue South, Birmingham, AL 35294-1212.

Telephone 205-934-3568

E-mail msot@uab.edu

Web www.uab.edu/OT

Course Descriptions

Occupational Therapy (OT)

608. Neurophysiological Principles of Patient Care. Underlying neuroanatomical and neurophysiological principles as a basis for evaluation and treatment of patients with neurological disorders; study of current research in selected areas of applied neurophysiology. 5 hours. (Also PT 608)

630. Occupational Performance. Critical review of approaches to evaluating occupational performance, including conceptual models, frames of reference, clinical applications, and development of assessment tools; emphasis on documentation of clinical outcomes. 3 hours.

636. Principles of Applied Forces in the Upper Extremity. Anatomical and biomechanical concepts of normal and pathological movement in arm or hand; principles of dynamic assist, remodeling analysis, and clinical evaluation of adapted upper extremity performance. 3 hours.

655. Qualitative Research Methods for Health Professionals. Comparison of basic concepts of qualitative and quantitative research; qualitative research's role in discovering theory and its various applications in practice in health care professions; research design, data collection strategies, and methods of analysis. 2 hours.

660. Seminar in Interdisciplinary Services for Infants, Children, and Youth with Developmental Disabilities. Synthesis on team-based approaches to interventions for infants, children, and youth with known or suspected disabilities. 1-2 hours. (Also PTGR 647).

665. Geriatric Rehabilitation for Health Professionals. Rehabilitation of elderly from perspective of functional impact of age-related changes, evaluation and remediation of functional limitations, and personal and environmental adaptations to promote continuing autonomy. 3 hours. (Also GER 665).

671. The Advanced Theory of the Assessment Process in Occupational Therapy. Advanced theory and concepts of evaluation and measurement.

Oral Biology (M.S.)

Graduate program director: *Katz*

Faculty

Noel Childers, Professor (Oral Biology); Mucosal Immunology as it Relates to the Immunobiology of Dental Caries

Jeffery A. Engler, Professor (Biochemistry and Molecular Genetics); Gene Cloning, DNA Sequencing, Virology, Metalloproteinases

Kohtaro Fujimashi, Professor (Oral Biology); Mucosal Immunity, Molecular Pathogenesis, Periodontal Disease, Gamma/Delta and Alpha/Beta T Cells and Epithelial Cells

Marjorie Jeffcoat, Professor (Periodontics); Diagnostic Techniques for Periodontal Disease and Implants, Clinical Trials

Jannet Katz, Associate Professor (Oral Biology); Periodontal Disease, Porphyromonas Gingivalis, Hemagglutinins and Proteases, Immune Response, Cytokines, Epithelial Cells

Hiroshi Kiyono, Research Professor (Oral Biology); Mucosal Immunobiology, T-Cell and Lymphokine Regulation

Jack Lemons, Professor (Biomaterials); Synthetic Materials, Surgical Implants, Implant to Tissue Interfaces, Biocompatibility

Linda Lucas, Professor (Biomedical Engineering); Biological Implants, Biocorrosion, Biocompatible Coatings

Richard Mayne, Professor (Cell Biology); Structure and Pathophysiology of Skeletal Muscle, Cartilage, Eye

Jerry R. McGhee, Professor (Microbiology); Director, Immunobiology Vaccine Center); Mucosal Vaccines; Regulation of Mucosal Immunity, Tolerance and Inflammation

Jiri Mestecky, Professor (Microbiology and Medicine); Regulation of the Secretory Immune System Response; Mucosal Vaccines

Suzanne M. Michalek, Professor (Microbiology); Oral Microbiology, Secretory Immune System, Vaccine Development, Caries Immunity, Host Mechanisms Involved in Periodontal Disease

Jan Novak, Assistant Professor (Microbiology); Immunoglobulin Glycosylation in Chronic Inflammatory Diseases; Periodontal Disease; Differential Gene Expression; Antimicrobials; Modified Peptides and Proteins

Charles W. Prince, Professor (Nutrition Sciences); Bone Metabolism, Vitamin D, Bone Proteins, Orthopedic and Dental Implant Biocompatibility

Firoz Rahemtulla, Professor (Biomaterials); Proteoglycans, Biosynthesis, Soft Connective Tissue, Oxidants

Michael Reddy, Professor (Periodontics); Bone Resorption, Attachment Loss, Periodontitis, Implant Therapy, Regenerative Technology

Program Information

The Department of Oral Biology in collaboration with the joint basic science departments at The University of Alabama School of Dentistry offers graduate studies leading to a Master of Science degree in Oral Biology. The objective of the program is to relate basic biological sciences to health and disease of the oral cavity. This program prepares dentists for careers in dental academics and teaching as well as in basic or applied research.

Students are required to pursue studies in oral biology, in the basic biological sciences, and in clinical research. These studies include course work, seminars, journal club, and a laboratory component. Course work includes formal lectures form within the Department of Oral Biology and courses offered by the basic sciences departments, School of Public Health and the School of Medicine. Seminars are organized jointly by the School of Dentistry, the Research Center in Oral Biology, the Specialized Caries Research Center, the Oral Cancer Research Center, the Postdoctoral Training Program in Caries Research, the Comprehensive Training Program for Clinical, Biomaterials or Immunological Research, and the Institutional Dentist Scientist Award Program. The Seminars cover a wide array of topics relevant to oral biology as well as other disciplines of dentistry. A weekly journal club serves to

keep the trainee abreast of a broad range of topics in biomedical research as well as teach basic critical thinking and presentation skills. A significant portion of the program is devoted to the design and completion of a thesis research project, which is a requirement of the program. Students have the opportunity to select research advisors from several disciplines and topics from many basic science and clinical research. Thesis research will be carried out under the supervision of a faculty member. Members of the Department of Oral Biology and the Research Center in Oral Biology are actively engaged in research that represents a variety of oral and basic biomedical disciplines within the Medical Center. The diversity of the research interests offers opportunities for students to pursue studies in a stimulating research environment.

The program requires a minimum of 30 graduate credits beyond the professional degree in dentistry. Of these, at least 24 credits must be selected from graduate-level courses approved for the program and a minimum of 6 credits at the master's research level. Each student must orally defend a master's thesis based on their research. Some program may be combined with dental specialty training.

Admission

Applicants to the Oral Biology graduate program must hold a D.D.S., D.M.D., M.D., Ph.D., or an equivalent degree and should possess a cumulative GPA of at least a 3.00 on a 4.00 scale. Students whose first language is not English must earn a score of 550 or better on the TOEFL.

Applicants are asked to submit a statement describing past research experience and current research interests, and stating how completion of the M.S. program fits into their career goals.

Depending on the specialty program, stipends may be available. Financial assistance may also be available through other university scholarship and fellowship funds. The faculty of the Department of Oral Biology and of the Research Center in Oral Biology have access to a wide range of fellowships, training grants, research grants, etc., that may be used to support qualified students. Inquiries about available support mechanisms should be addressed directly to the sponsor with whom the student is interested in studying, since there is currently no support available through the department. Each year, three scholarships are made available from the Graduate School based upon open competition and merit.

Contact

For detailed information, contact Dr. Jannet Katz, Program Director, UAB Department of Oral Biology, Mailing address: BBRB 713, 1530 3rd Avenue South, Birmingham, AL 35294-2170.

Telephone 205-934-2878

Fax (205) 934-1426

E-mail meow@uab.edu

Web www.dental.uab.edu

Course Descriptions (OB)

600. Graduate Cariology. Review of etiological factors, preventive measures, and current literature in cardiology. Fall.

602. Pharmacology and Therapeutics for Dentistry. To provide important pharmacological issues related to dental patient care.

611. Saliva: Composition and Function. Physiology, biochemistry, and function of saliva in relation to oral health. Spring.

620. Oral Microbiology and Immunology. Areas of dental interest. Immunoglobulins, complement, microbial plaque, and gnotobiotic research. Spring.

622. Biochemistry of Connective Tissue and Bone. Biology, chemistry, and function of connective tissue elements. Methods and approaches to research. Spring.

625. Design and Analysis of Clinical Dental Research Rationale and logistics of setting up a clinical trial for testing the efficacy of treatment or procedure. Spring.

627. Surgical Implants in Dentistry. Basic aspects of dental implant-based treatment modalities. Spring

663. Saliva as a Diagnostic Fluid. Comprehensive knowledge about planning, performing, and interpreting results of saliva analyses. Fall.

687. Oral Immunology and Vaccine Development. Comprehensive knowledge of immune responses and "state of the art" mucosal vaccine development and their protection of oral/mucosal infectious diseases.

690. Oral Biology Seminar. Communication skills in areas of scientific writing, speech, and audiovisuals. 1 hour.

698. Nonthesis Research. 3-6 hours.

699. Thesis Research. Prerequisite: Admission to candidacy. 3-6

Pathology (Ph.D.)

Graduate program director: *Messina*

Faculty

Sarki Abdulkadir, Assistant Professor (Pathology); Molecular Genetic Mechanisms of Prostate Cancer Initiation and Progression.

Peter G. Anderson, Professor (Pathology and Genomics & Pathobiology); Cardiovascular Pathology, Comparative Pathology

Scott Ballinger, Associate Professor (Pathology); Reactive Oxygen and/or Nitrogen Species in Mitochondrial Dysfunction in Disease

William H. Benjamin, Jr., Assistant Professor (Pathology); Parasitology

Paul Brookes, Research Instructor. Mitochondria and Reactive Nitrogen Species in Cardiovascular Disease.

R. Pat Bucy, Associate Professor (Pathology); Immunology and Transplant Rejection

Daniel Bullard, Assistant Professor (Genomics and Pathobiology); (Comparative Medicine); Adhesion Molecules, Chronic Inflammatory Diseases

Xu Cao, Assistant Professor (Pathology); Bone Morphogenic Protein, Osteoclasts

Stephen L. Carroll, Assistant Professor (Pathology); Neuregulins in Nervous System Regeneration and Neoplasia

Thomas M. Daly, Assistant Professor (Pathology); Gene Therapy of Inborn Errors of Metabolism

Victor M. Darley-Usmar, Professor (Pathology); Oxygen Free Radicals, Atherosclerosis, Stroke and Alzheimer's, Coronary Heart Disease

Joanne T. Douglas, Assistant Professor (Pathology); Gene Therapy for Musculoskeletal Diseases and Cancer

Kevin F. Dybvig, Professor (Genomics and Pathobiology); Molecular Genetics and Molecular Pathogenesis of Mycoplasmas

Ada Elgavish, Associate Professor (Genomics and Pathobiology); Mechanisms of Cystitis and Prostate Cancer

Xu Feng, Assistant Professor; Bone Metabolism in Rheumatoid Arthritis, Osteoclast Differentiation and Apoptosis

Andra Frost, Associate Professor (Pathology); Biomarkers in Breast Cancer

Ken Fukuchi, Associate Professor (Genomics and Pathobiology); Alzheimer's Disease, Study of Mechanisms Relating to Neuritic Plaques and Neurofibrillary Tangles

Candece L. Gladson, Associate Professor (Pathology); Tumor Cell Invasion, Cell Matrix and Signaling

William E. Grizzle, Professor (Pathology); Endocrinology, Biomarkers of Cancer

Robert W. Hardy, Assistant Professor (Pathology); Cellular and Molecular Mechanisms of Fatty Acids in Disease

Victor Krasnykh, Research Assistant Professor; Human Gene Therapy

Dennis F. Kucik, Assistant Professor (Pathology); Cell Motility and Adhesion, Integrins, Laser Tweezers, Biophysics of Membrane Protein Movements

Jay M. McDonald, Professor (Pathology); Bone and Calcium Metabolism, AIDS

Joseph L. Messina, Associate Professor (Pathology); Insulin and Growth Hormone Intracellular Signaling Pathways, Regulation of Gene Transcription, Hormones and Cytokines in Trauma and Infections

Stephen A. Moser, Associate Professor (Pathology); Cytokines, Infectious Disease, Computerized Statistical Analysis of Scientific and Biological Data

Joanne E. Murphy-Ullrich, Professor (Pathology); Endothelial Cell Adhesion

Moon H. Nahm, Professor (Pathology); Immunology

Rakesh Patel, Research Instructor (Pathology); Nitric Oxide, Heme Proteins, Blood Substitutes, Free Radicals and Cell Signaling

Selvaragan Ponnazhagan, Assistant Professor (Pathology); Adeno-Associated Virus, Gene Therapy, Cancer Gene Therapy, Targeting Vectors

Kevin A. Roth, Professor (Pathology); Neuronal Apoptosis in Development and Neurodegenerative Diseases

Gene P. Siegal, Professor (Pathology); Immunohistochemistry of Solid Tumors, Tumor Invasion and Metastasis, Cancer Cell Biology

John A. Smith, Professor (Pathology); N-Terminal and Antigen Processing, Immunotherapy of Human Breast Cancer

Casey T. Weaver, Associate Professor (Pathology); Costimulatory Molecules, T-Cell Receptor Signaling

Philip A. Wood, Professor (Genomics and Pathobiology); Molecular Genetics, Defective Fatty-Acid Metabolism in Man and Animals, Inherited Metabolic Diseases

Wen-Cheng Xiong, Assistant Professor (Pathology); Integrin Signaling

Program Information and Objectives

A graduate program in molecular and cellular pathology, leading to the Ph.D. degree, is offered jointly by the Department of Pathology and the Department of Genomics and Pathobiology. The program is administered by a committee

composed of members of the graduate faculty: Drs. J.L. Messina, D. Bullard, J.E. Murphy-Ullrich, K. Fukuchi, A. Elgavish, X. Cao, D. Kucik, and J. Douglas.

Students demonstrating superior scholarship who desire careers in academic and investigative pathology are encouraged to apply. Acceptance of students is based on Graduate School admission criteria, letters of recommendation, assessment of motivation, and a personal interview by the Pathology Graduate Committee.

Admission is open to highly motivated students with strong backgrounds in the biological sciences. It is recommended that students with B.Sc. degrees have completed undergraduate courses in physics, calculus, chemistry, organic chemistry, biology, or zoology and at least one advanced course in areas such as comparative anatomy, embryology, genetics, histology, or physiology. Applicants who hold M.D., D.V.M., D.M.D., or equivalent degrees are also encouraged to apply.

The objective of the program is to train individuals for academic and investigative careers in disease mechanisms and processes. A combination of didactic and laboratory experience will be provided to achieve the following specific goals for each student: (1) understanding of basic disease mechanisms, (2) appreciation of modern techniques in cellular and molecular biology, (3) integration of molecular mechanisms of disease with pathophysiology, (4) application of the scientific method to problems in disease mechanisms through discerning experimentation, and (5) effective communication of information through teaching and writing skills.

Although the program is designed to acquaint the student with all major facets of experimental pathology and genomic research, specialization is encouraged. At present, students may choose to concentrate their efforts in any of the following areas: cardiovascular biology, immunopathology, oncology, comparative pathophysiology, metabolic and bone diseases, genetics of disease, animal models of disease, nutritional pathology, oral pathology, and pathology of various organ systems.

Ph.D. Program

This degree is granted on the basis of scholarly proficiency, distinctive achievement, and original research. Additional course requirements are not rigidly fixed but are planned to meet the needs and interests of individual students. All students are expected to gain competence in cognate fields (e.g., scientific method, computer applications, cellular and molecular biology) and become independent investigators in experimental pathology. Students are given opportunities to study modern techniques of teaching and to participate in teaching under the supervision of experienced instructors. Preparation and defense of an acceptable dissertation is the final requirement for award of this degree. The core curriculum includes Integrative Biomedical Sciences (IBS 700, 701, 702) and Graduate Pathology (PAT 700, 701).

Additional Information

For detailed information, contact Dr. Joseph L. Messina, Department of Pathology; Director, Graduate Program of the Department of Pathology and Department of Genomics and Pathobiology, Volker Hall G019, 1670 University Boulevard, Birmingham, AL 35294-0019.

Telephone (205) 934-2445;

E-mail graduateprog@path.uab.edu

Course Descriptions

Unless otherwise noted, all courses are for 3 semester hours of credit. Course numbers preceded with an asterisk indicate courses that can be repeated for credit, with stated stipulations.

All courses require permission of instructor.

Core Interdepartmental First Year Courses

IBS 700. Comprehensive and rigorous background in the principles of biochemistry, molecular biology, and cellular physiology. Fall. 10 hours. (Patel)

IBS 701. Physiology, pathophysiology, and therapeutic approaches to diseases. Spring. 10 hours. (Schwiebert)

IBS 702. Genetics, genetic basis of disease and molecular medicine. Summer. 5 hours. (Bullard)

Pathology (PAT)

General and Systemic Pathology

500. General Pathology (Medical). Fundamental mechanisms of disease. Prerequisites: Basic gross anatomy, histology, biochemistry, and physiology. Fall. 5 hours. (Anderson)

501, 502. Medical Correlative Pathology (Medical). Natural history, morphologic and biochemical correlates of major diseases in humans. Prerequisite: PAT 500 or equivalent. Fall, Spring. 3-4 hours. (Alexander)

503. General Pathology (Dental/Optomtry). Fundamental mechanisms of disease. Prerequisites: Basic gross anatomy, histology, biochemistry, and physiology. Fall. 4 hours. (Waites)

504. Systemic Human Pathology (Dental/Optomtry). Fundamental mechanisms of disease and pathologic processes of selected major organ systems of humans. Prerequisite: PAT 503 or equivalent. Spring. 4 hours. (Waites)

700. Biology of Disease. Basic mechanisms of acute and chronic cell injury, inflammation, immune injury, neoplasia, hemostasis, and developmental disease. Prerequisite: CMB or permission of instructor. Fall. 3 hours. (Anderson)

701. Molecular Basis of Disease. Alterations in molecular and cellular mechanisms of cells and tissues resulting in disease. Prerequisite: PAT 700. Spring. 3 hours. (Murphy-Ullrich)

702. Integrative Pathophysiology. Physiological and pathophysiological principles governing organ system function in disease. Prerequisite: PAT 700. Spring. 3 hours. (Staff)

703. Introduction to Pathology Research. A course designed to introduce first-year students to faculty research interests. Permission of instructor. Fall. 1 hour. (Messina)

704. Pathology Research. Data analysis and presentation. 1 hour each. Fall, Spring. (Messina)

705. Oral Pathology. Pathology of oral cavity and associated structures. Prerequisite: PAT 500, 503, or equivalent. Fall. 6 hours. (Rodu)

706, 707. Pathology of Laboratory Animals. Natural history, pathogenesis, diagnosis, and prevention of spontaneously occurring disease in laboratory animal species. Prerequisite: PAT 500 or equivalent. Spring. 4 hours each. (Gerrity)

708. Principles of Gene Therapy. Key principles of gene-based therapeutics, from the basic science of gene therapy

to the implementation of hypothesis-driven human clinical trials. Spring. 4 hours. (Douglas)

710. Animal Use in Biomedical Research. Basic knowledge and experience needed for appropriate selection and use of animals in contemporary biomedical research. Includes animal biology, model selection, husbandry standards, disease prevention, technical methods, and regulatory requirements for humane use of animals in biomedical research. Fall. 4 hours. (Gerrity)

711, 712. Scientific Method in Biomedical Research. Research approaches, experimental designs, major statistical methods, protocol preparation, report writing, and ethical considerations. Spring. 3 hours each. (Elgavish)

714, 715. Ultrastructural Pathology. Theory, techniques, application, and interpretation of ultrastructure in normal and pathologic material, including spontaneous and experimental disease. Spring. 3-5 hours each. (Staff)

718-720. Experimental Immunopathology. Examination of immune mechanisms in human disease and selected experimental models. Prerequisite: PAT 500, 503, or equivalent. Fall. 3 hours each. (Bucy)

723. In Vivo Systems for Study of Disease. Useful in vivo models of human disease in lower animal species. Prerequisite: PAT 500 or equivalent. Summer, odd years. 3 hours. (Wood)

730, 752. Laboratory Rotation. Original laboratory research conducted by the student under the supervision of a graduate faculty member. Fall, Spring, Summer. 3-5 hours. (Staff)

756. Molecular Biology of Cell Adhesion. Techniques and the science. Spring, even years. 3 hours. (Murphy-Ullrich)

Seminars

791. Advances in Molecular and Cellular Pathology Seminar. Required attendance for all graduate students in pathology. Fall, Spring. Pass/Fail. 1 hour. (Messina)

792. Comparative Histopathology Seminar. Fall, Spring. Pass/Fail. 1 hour. (Brix)

793. Oral Pathology Seminar. Selected examples of disease, emphasizing clinicopathologic correlation. Prerequisite: PAT 705. Fall, Spring. Pass/Fail. 1 hour. (Rodu)

794. Comparative Medicine Seminar. Fall, Spring. Pass/Fail. 1 hour. (Gerrity)

Research Problems and Special Topics

797. Comparative Medicine Rotation. Clinical pathological correlation in laboratory animal medicine. Fall, Spring, Summer. 1-12 hours. (Gerrity)

798. Research Problems Doctoral Nondissertation Research. Fall, Spring, Summer. Pass/Fail. 1-15 hours.

799. Research Problems Doctoral Dissertation Research. Prerequisite: Admission to candidacy. Fall, Spring, Summer. Pass/Fail. 1-15 hours.

Pharmacology & Toxicology (Ph.D.)

Graduate program director: *Meezan*

Faculty

Edward P. Acosta, Assistant Professor (Clinical Pharmacology); Pharmacokinetics of and Pharmacodynamics of Antiviral and Antiretroviral Drugs in Adults and Children with HIV Disease

Stephen Barnes, Professor (Pharmacology and Toxicology, Biochemistry and Molecular Genetics); Pharmacokinetics of Dietary Phytoestrogens and Mechanism of Their Action on Cancer and Heart Disease; Molecular Biology of the Amino Acid Conjugation of Bile Acids in Mammals; HPLC-Mass Spectrometry

Jimmy Bartlett, Professor (Optometry, Pharmacology and Toxicology); Clinical Ocular Pharmacology; Diagnosis and Treatment of External Ocular Disease and Glaucoma; Clinical Trials of Investigational Anti-Inflammatory, Anti-Infective, and Anti-Glaucoma Drugs

Donald Buchsbaum, Professor (Radiation Oncology; Pharmacology and Toxicology; and Director, Radiation Biology); Experimental Therapeutics With Radiolabeled Monoclonal Antibodies and Immunotoxins; Radiation Biology

Robert B. Diasio, Professor and Chairman (Pharmacology and Toxicology; Medicine; and Director, Division of Clinical Pharmacology); Biochemical, Molecular, Chemical, and Clinical Pharmacology of Antineoplastic Agents; Pharmacogenetics

Xu Cao, Assistant Professor (Pathology, Pharmacology and Toxicology); the Mechanisms of Differentiation of Multipotential Stem Cells Into Functionally Distinct Cell Types, Particularly, the TGF-Beta/BMP Transcription Factors That Control Initiation of Cascade Networks of the Cell Lineage Split

Ada Elgavish, Associate Professor (Genomics and Pathobiology, Pharmacology and Toxicology, Urology); Molecular Mechanisms of Epithelial Cell Membrane-Extracellular Matrix Interactions: Role In Chronic Inflammation and Cancer Etiology and Chemoprevention

Charles N. Falany, Professor (Pharmacology and Toxicology); Protein Chemistry and Molecular Biology of Drug Metabolizing Enzymes and Molecular Biology of Bile Acid-Conjugating Enzymes

Clinton J. Grubbs, Professor (Nutrition Sciences, Pharmacology and Toxicology); Nutrition; Reproductive Pathoendocrinology; Development of Animal Cancer Models; Metabolism and Binding of Chemical Carcinogens

Gail V. W. Johnson, Associate Professor (Pharmacology and Toxicology); Professor (Psychiatry and Behavioral Neurobiology); Neuropharmacology and Biochemistry of Neurodegenerative Disorders, Including Alzheimer's Disease; Signal Transduction; Metabolism and Function of Neuronal Cytoskeletal Proteins

Martin Johnson, Research Assistant Professor (Pharmacology and Toxicology); Biochemical, Molecular and Clinical Pharmacology of Antineoplastic Agents; Pharmacogenetics

Richard S. Jope, Professor (Psychiatry and Pharmacology and Toxicology); Neuropharmacology and Neurochemistry of Neurological Disorders, Including Alzheimer's Disease,

Aluminum Neurotoxicity, and Psychiatric and Epilepsy Disorders; Neurotransmitters, Second Messengers, and Lipid Metabolism

Helen Kim, Research Associate Professor (Pharmacology and Toxicology); Protein Biochemistry, Cell Biology, and Cytoskeletal Proteins in Normal and Disease States; Mechanisms of Estrogenic Factors in Modulating Cognition and Brain Function

Mahmoud el Kouni, Associate Professor (Pharmacology and Toxicology); Biochemical and Molecular Pharmacology of Nucleotide Metabolism in Mammalian Systems and Parasites

David D. Ku, Professor (Pharmacology and Toxicology, Cardiovascular Disease); Cardiovascular and Coronary Pharmacology; Role of Thrombin, Endothelium, and Platelets in Coronary Vasospasm and Ischemic Heart Disease

Coral A. Lamartiniere, Professor (Pharmacology and Toxicology); Environmental Toxicology; Molecular Endocrinology; Cause and Prevention of Mammary Cancer

Lee Ann MacMillan-Crow, Assistant Professor (Surgery, Pharmacology and Toxicology); Role of Oxidant Stress During Proinflammatory Disease States, Specifically Renal Ischemia/Reperfusion, Human Chronic Renal Rejection, and Pancreatic Adenocarcinoma

Elias Meezan, Professor (Pharmacology and Toxicology); Biochemical Pharmacology of Glycoconjugates in Health and Disease, Particularly Diabetes Mellitus

Fardos Naguib, Research Assistant Professor (Pharmacology and Toxicology); Biochemical Regulation of Nucleotide Metabolism in Mammals

Dennis J. Pillion, (Pharmacology and Toxicology); Endocrine Pharmacology; Administration of Insulin in Eye Drops and Nose Drops; Diagnosis and Treatment of Diabetes Mellitus

Denise R. Shaw, Research Associate Professor (Medicine, Pharmacology and Toxicology); Immunohematology and Immunotherapy

Jeffrey B. Smith, Professor (Pharmacology and Toxicology); Molecular Pharmacology of Novel Antitumor Agents Called Bryostatins; Regulation of Sodium-Calcium Exchanger; an Orphan Receptor Triggered by Cadmium

Richie Soong, Research Instructor (Pharmacology and Toxicology); Clinical correlation and development of molecular diagnostic systems for oncology pharmacogenetics and pharmacogenomics

Hui Wang, Research Instructor (Pharmacology and Toxicology); Molecular Therapeutics; Pharmacokinetics and Pharmacodynamics; Genetic-Based Therapy; Cancer Prevention

Ruiwen Zhang, Associate Professor (Pharmacology and Toxicology); Antisense Therapy; Toxicology; Carcinogenesis; Anticancer Agents; Anti-AIDS Therapeutics; Cancer Prevention

Adjunct Faculty

John C. Besse, Associate Professor Emeritus (Pharmacology and Toxicology); Modulation of Vascular Smooth-Muscle Contractile Responses by Steroids

Donald L. Hill, Research Professor (Nutrition Sciences); Adjunct Associate Professor (Pharmacology and Toxicology); Metabolism and Site of Action of Antitumor Agents, Chemopreventive Agents, Carcinogens, and Xenobiotics

William P. McCann, Professor Emeritus (Pharmacology and Toxicology); Renal Physiology; Pharmacokinetics

William B. Parker, Adjunct Associate Professor (Pharmacology and Toxicology); Biochemical and Molecular Mechanism of Action of Anticancer and Antiviral Nucleoside Analogs

Jean-Pierre Sommadossi, Adjunct Professor (Pharmacology and Toxicology); Cellular, Molecular, and Clinical Pharmacology of Drugs Used in the Treatment of AIDS and Viral Diseases.

Program Information

The objectives of the program leading to the Ph.D. degree in pharmacology are to prepare students for careers as research scientists in academia, government, or industry. Training and research programs include biochemical, endocrine, neuro-, cardiovascular, behavioral, and molecular pharmacology; environmental and molecular toxicology; chemical carcinogenesis and chemoprevention; and drug discovery, design, and toxicity.

Admission to graduate study in pharmacology requires a bachelor's degree in an appropriate science, such as chemistry or biology. Students should have completed courses in general, organic, and physical chemistry; mathematics through calculus; and general biology. Courses in biochemistry, physiology, and toxicology are also recommended. The pharmacology graduate program committee reviews all applications for admission. Acceptance for graduate study in pharmacology is based on Graduate School admission criteria, and a personal interview with the graduate program committee if possible.

Completion of the requirements of the Ph.D. program normally requires four to five years for students entering with B.S. degrees. The general course of study will include introductory courses in pharmacology and toxicology, biochemistry, and physiology, as well as advanced courses selected in accordance with the student's area of specialization and with the guidance of the advisor and graduate study committee.

Additional Information

For detailed information, contact Dr. Elias Meezan, Graduate Program Director, UAB Department of Pharmacology and Toxicology, Volker Hall, Room L108B, 1670 University Boulevard, Birmingham, AL 35294-0019.

Telephone 205-934-4577

Fax 205-934-8240

E-mail ELIAS.MEEZAN@CCC.UAB.EDU

Web www.uab.edu/pharmtox/pharm.htm

Course Descriptions

Unless otherwise noted, all courses are for 3 semester hours of credit. Course numbers preceded with an asterisk indicate courses that can be repeated for credit, with stated stipulations.

Pharmacology (PHR)

701. Graduate Pharmacology I. Introduction to graduate pharmacology. Dose-response relationships, drug absorption, disposition and metabolism, drug receptors, agonists and antagonists, enzyme receptor binding kinetics, pharmacokinetics, biostatistics. 5 hours.

702. Graduate Pharmacology II. Neuropharmacology. Drug modulation of neurotransmission; drugs used in diseases

of the nervous system; sympathetic agonists and antagonists; cholinergic agents; CNS pharmacology. 5 hours.

703. Graduate Pharmacology III. Cardiovascular, renal and GI pharmacology. Drug modulation of the cardiovascular system, GI tract and renal system. Anti-inflammatory and anti-allergic agents. 5 hours.

704. Graduate Pharmacology IV. Endocrine pharmacology and chemotherapy of disease. Hormones; antimicrobial agents; antiparasitic drugs; cancer chemotherapy; antiviral and antifungal agents. 5 hours.

705. Graduate Pharmacology V. Molecular pharmacology. Current topics, including interaction between a particular drug and its target with emphasis on current literature; mechanisms of drug action.

***720. Lab Rotation in Pharmacology.** Introduction to laboratory methods, experimental design and execution. Sequential rotations (one per term) mentored and based on student's research. 5-8 hours.

723. Medical Pharmacology. Comprehensive treatment of pharmacology and therapeutics including principles of pharmacology, neuropharmacology, cardiovascular, renal and gastrointestinal pharmacology and chemotherapeutics. 6 hours.

725. Modern Drug Design and Development. This course covers various topics regarding modern drug research and development, including molecular targeting, lead compounds screening, genomics, biotechnology, pharmacological and toxicological evaluation, and regulatory issues.

730. Research Assessment in Pharmacological Problems. Original research proposal is written based on current library research and assistance of faculty member. Hypothesis formulation and experimental design. 2 hours.

750. Advanced Principles of Pharmacology I. Basic Principles: Dose-response relationships, drug absorption, disposition and metabolism, enzyme-receptor binding kinetics, pharmacokinetics, drug receptors, agonists and antagonists, mechanisms of drug action, interaction between a particular drug and its target. Pharmacogenetics. Biostatistics. Neuropharmacology: Drug modulation of neurotransmission; drugs used in diseases of the nervous system; sympathetic agonists and antagonists; cholinergic agents, 4 hours.

751. Advanced Principles of Pharmacology II. Endocrine, CNS, cardiovascular, renal and GI pharmacology. Drug modulation of the cardiovascular system, GI tract and renal system. Chemotherapy of disease; Anti-inflammatory and anti-allergic agents, Hormones; antimicrobial agents; antiparasitic drugs; cancer chemotherapy; antiviral and antifungal agents, 4 hours

***790. Advanced Pharmacology Seminar.** Recent advances in pharmacology and toxicology and departmental research in progress. 1 hour.

***798. Doctoral Nondissertation Research.** 1-12 hours.

***799. Doctoral Dissertation Research.** Prerequisite: Admission to candidacy. 1-12 hours.

Toxicology (TOX)

711. Principles of Toxicology. Foundation for understanding the basis of toxicology. Designed for doctoral students pursuing a career in toxicology; also appropriate for doctoral students studying pharmacology, veterinary medicine, pathology, forensic science, neuroscience, environmental health sciences, etc.

712. Advanced Topics in Toxicology. Foundation for understanding the basis of toxicology. Designed for doctoral

students pursuing a career in toxicology. Exposes students to the most recent advances in contemporary toxicology. 5 hours.

713. Actions and Assessments of Toxicants. Origin, distribution, and mechanistic actions of toxicants on the mammalian system. Designed for doctoral students pursuing a career in toxicology or a related science such as pharmacology, veterinary medicine, pathology, forensic science, neuroscience, environmental health sciences, etc. Prerequisites: A background in chemistry and biology is required. Biochemistry, pharmacology, and an introductory course in toxicology is recommended.

720. Laboratory Rotation in Toxicology. Introduction to laboratory methods, experimental design and execution. 6-12 hours.

750. Breast Cancer Causation and Regulation. Designed for students in the Interdisciplinary Breast Cancer Training Program but also appropriate for any doctoral student studying cancer. Lays the foundation for understanding the nature of the disease, mechanism and action of established and novel approaches of therapeutic and chemopreventive drugs, and innovative research and clinical approaches.

795. Advanced Toxicology Seminar. To facilitate the critical review of recent refereed publications in the field of toxicology. This will expose students to advanced knowledge and diversified subjects. All students enrolled in the UAB campus-wide toxicology program are required to participate. 1 hour.

798. Doctoral Nondissertation Research in Toxicology. 1-12 hours.

Philosophy

Although UAB does not offer a graduate degree in philosophy, the Department of Philosophy does offer occasional graduate courses for qualified students enrolled in graduate and professional programs of other UAB departments. For detailed information contact UAB Department of Philosophy, HB 414A 1530 3rd Avenue South, Birmingham, AL 35294-1260.

Telephone 205-934-4805

Web www.uab.edu/philosophy/faculty/graham

Course Descriptions

Philosophy (PHL)

517. (Also GRD 717). Principles of Scientific Integrity. Survey of ethical issues and principles in the practice of science. Prerequisite: Permission of instructor. 3 hours.

590. Directed Readings. Directed readings in special areas or topics of philosophy; honors thesis supervision or opportunity for graduate credit in philosophy. Prerequisite: Permission of instructor. 3 hours.

770. Philosophy of Science. Overview of philosophy of science with attention to foundational debates in social sciences, and social constructivist views of scientific knowledge. Prerequisite: Permission of instructor. 3 hours.

790-792. Problems Proseminar. Philosophic problems of current interest in graduate and professional education. Specific issues in cognitive science, the arts, or ethics and public policy may be selected for analysis. Content varies depending upon instructor and student interest. Prerequisite: Permission of instructor. 3 hours.

Physical Therapy (M.S.)

Graduate program chair: *Shaw*

Primary Faculty

Cara C. Adams, Associate Professor (Physical Therapy); Exercise and Postural Deviations

Joan Bergman, Professor Emerita (Physical Therapy); Developmental Disabilities

Philip Blatt, Assistant Professor (Physical Therapy); Vestibular Dysfunction and Falls

Jo Ann Clelland, Professor (Physical Therapy); Pain Management

Betty G. Denton, Associate Professor (Physical Therapy); Clinical Education, Curriculum Development

Mathew Ford, Assistant Professor (Physical Therapy); Motor Control Dysfunction

Kennon T. Francis, Professor Emeritus (Physical Therapy); Exercise in Health Promotion; Delayed Muscle Soreness

Robert S. Harden, Associate Professor Emeritus (Physical Therapy); Ethical and Legal Dimensions of Physical Therapy

Bernard Harris, Instructor (Physical Therapy); Pain Management, Thermal Agents

Cheryl J. Knowles, Assistant Professor (Physical Therapy); Cardiopulmonary Physical Therapy

David M. Morris, Assistant Professor (Physical Therapy); Aquatic Physical Therapy, Clinical Education

Patrice Murphy, Assistant Professor (Physical Therapy); Developmental Disabilities, Orthotics

Garvice G. Nicholson, Associate Professor (Physical Therapy); Clinical Assessment of Musculoskeletal Dysfunctions

William Ogard, Assistant Professor (Physical Therapy); Sensory Function of Anterior Cruciate Ligament, Proprioception of Knee Joint, Anatomy, Function of Lumbar Musculature

Claire Peel, Associate Professor (Physical Therapy); Exercise Physiology, Cardiopulmonary Therapeutics, Geriatric Rehabilitation

Dorothy Pinkston, Professor Emerita (Physical Therapy); History of Physical Therapy, Curriculum Development

Sharon E. Shaw, Associate Professor (Physical Therapy); Health Outcomes Assessment, Rehabilitation Management of Neurological Conditions

Carolyn Sherer, Assistant Professor (Physical Therapy); Orthopedic Rehabilitation, Cultural Diversity in Disability

Rachel Unanue, Assistant Professor (Physical Therapy); Motor Control Dysfunction

Program Information

Two programs of graduate study in physical therapy are offered, each with its own entrance and graduation requirements. The M.S.-postprofessional program* is designed for students who already hold degrees in physical therapy. The M.S.-professional program is for students without previous background in physical therapy.

M.S.-Postprofessional Program

The Department of Physical Therapy offers postprofessional graduate study for physical therapists who desire preparation for advanced study in physical therapy. This curriculum is currently being revised.

For detailed information, contact the program director, Physical Therapy-Postprofessional Preparation Program, School of Health Related Professions, RM Scrushy Building, Room 333, 1705 University Boulevard (mailing address: BB 102, 1530 3rd Ave S), Birmingham, Alabama 35294-1212. Telephone 205-934-3566
E-mail sshaw@uab.edu

M.S.-Professional Program

Physical therapists practice the art and science of physical therapy in direct patient care. Additionally, they have the capability of assuming responsibilities in areas of administration, consultation, teaching, and research as these relate to physical therapy.

Physical therapists work in hospitals, nursing homes, schools for handicapped children, private offices, rehabilitation centers, community health centers, research centers, and industry and as athletic trainers and educators in colleges and universities providing programs in physical therapy.

Accreditation: The program is accredited by the American Physical Therapy Association.

Credentials Conferred: Diploma—The Master of Science degree is awarded by the University of Alabama at Birmingham.

License: Graduates are eligible for the physical therapist licensure examination. Note that state law regulates the practice of Physical Therapy; contact a specific state's Board of Licensure for Physical Therapy to obtain information on that state's eligibility requirements.

Length of Study: Six semesters.

Program Entrance Date: Spring semester.

Application Deadline: Rolling admission with priority deadline of January 15 preceding the expected term of enrollment.

Application Procedure: The following materials must be submitted directly to the Department of Physical Therapy:

- UAB Graduate School application, including the Department of Physical Therapy application,
- a nonrefundable \$35.00 application fee,
- two official transcripts from each college attended,
- test scores (GRE or MAT), and GRE Writing Assessment scores, and
- three evaluation forms (references).

Requirements of Admission: The applicant must hold a baccalaureate degree from an accredited college or university within the United States in a field other than physical therapy. Acceptance will be based on the student's academic ability and aptitude for a career as a physical therapist. The candidate is expected to satisfy the following requirements:

- have a minimum GRE score of 1,000 (minimum 500 verbal and minimum 500 quantitative) or MAT of 50,
- complete the GRE Writing Assessment,
- have a minimum 3.0 (A=4.0) overall GPA and on the last 60 semester hours of course work,
- have a minimum academic average performance of 3.0 in the biological sciences, 3.0 in the physical sciences, 3.0 in 6 semester hours of English composition, and at least a C in each of the other prerequisite courses,
- complete a personal interview with the Department of Physical Therapy faculty, and

- if accepted, complete the UAB medical history questionnaire and physical, provide proof of required immunizations, and receive satisfactory screening by the UAB Medical Center Student Health Service.

Because state law regulates the practice of Physical Therapy, applicants are encouraged to review the nonacademic eligibility requirements for licensure to practice physical therapy upon completion of the program. These may be obtained from each individual state's Board of Licensure for Physical Therapy.

Variations in these requirements are considered. In instances where applicants do not meet the principle requirements for admission, they may be admitted on probation with the approval of the Graduate School dean. Such students must establish themselves in good standing by achieving not less than a B average by the time they have completed 2 terms of approved work taken at UAB for graduate credit.

Program Prerequisites—UAB Equivalents

(Course requirements are listed in semester credit hours)

Arts and Humanities

English Composition—EH 101, 102 (6)

Social and Behavioral Sciences

Psychology (9)

Natural Sciences and Mathematics

Precalculus with Trigonometry—MA 106 (4)

Statistics (must be taken in Math, Psychology, or Sociology)—MA 180, PY 214, or SOC 110 (3-4)

Physics*—PH 201/211 lab, 202/212 lab or PH 221/231 lab, 222/232 lab** (8)

General Chemistry for science majors with labs*—CH 115/116 lab, 117/118 lab (8)

Biology including Human or Mammalian Physiology*—BY 116 or 309 (16)

Current certification in CPR for Health Providers

**For these prerequisite courses, credit older than ten years from the application deadline must be validated by examination or other appropriate mechanism.*

***The physics course sequence must be designed for science majors and include laboratory sessions. A minimum of 8 semester hours is required. The following topics must be studied: mechanics, heat, electricity and magnetism, wave motion and sound, and light.*

Essential Requirements: Fundamental tasks, behaviors, and abilities necessary to successfully complete the academic and clinical/residency requirements of the program and to satisfy licensure/certification requirements, if any, have been outlined and are available upon request from the academic program office. Students requesting disability accommodations must do so by filing a disability accommodation request in writing with the academic program office.

Typical Program

(Course requirements are listed in semester credit hours)

First Year

Spring

PT 600 Human Gross Anatomy I (5)

PT 602 Functional Anatomy (5)
 PT 603 Movement Science I (1)
 PT 6030 Applied Physiology for Movement Science (5)
 PT 611 Introduction to PT Examination (1)
 PT 613 Introduction to PT Intervention (2)
 PT 660 Introduction to PT Professional Practice (3)
 PT 670 Clinical Education I (1)

Summer

PT 601 Human Gross Anatomy II (1)
 PT 606 Neuroscience I (4)
 PT 612 PT Examination I (3)
 PT 614 PT Intervention (3)
 PT 640 PT Management of Musculoskeletal Dysfunction I (4)
 PT 661 PT Professional Practice I (3)
 PT 690 Scientific Inquiry I (1)

Fall

PT 607 Neuroscience II (3)
 PT 604 Movement Science II (3)
 PT 620 Pathology and Pharmacology for Movement Disorders I (3)
 PT 641 PT Management of Musculoskeletal Dysfunction II (3)
 PT 643 PT Management of Cardiopulmonary Dysfunction (4)
 PT 662 PT Professional Practice II (2)
 PT 671 Clinical Education II (3)
 PT 691 Scientific Inquiry II (2)

Second Year

Spring

PT 605 Movement Science III (2)
 PT 615 PT Intervention II (3)
 PT 621 Pathology and Pharmacology for Movement Disorders II (3)
 PT 642 PT Management of Musculoskeletal Dysfunction III (3)
 PT 644 PT Management of Neuromuscular Dysfunction (5)
 PT 663 PT Professional Practice (3)
 PT 692 Scientific Inquiry III (1)

Summer

PT 672 Clinical Education III (7)
 PT 645 Complex Clinical Management Seminar (2)
 PT 695 Scholarly Activity Presentation (1)

Fall

PT 673 Clinical Education IV (7)
 PT 674 Clinical Education V (7)

Total Credit Hours for Program: 107

Additional Information

For detailed information, contact the department chair, Physical Therapy-Professional Preparation Program, School of Health Related Professions, Bishop Building, Room 102, 900 South 19th Street (mailing address: BB 102, 1530 3rd Ave S), Birmingham, Alabama 35294-2030.
 Telephone 205-934-3566
 E-mail sshaw@uab.edu

Course Descriptions

Physical Therapy (PT)

600, 601. **Human Gross Anatomy I, II.** Gross anatomical structure of the human body including the limbs, trunk, head, and neck. Specific emphasis includes regional study of the relationships between musculoskeletal, nervous, and vascular systems, joint structure, cardiovascular and pulmonary systems, and surveys of selected viscera. Includes lecture, dissection of the human body, and demonstrations. Prerequisite: permission of instructor. PT 600-5 hours; PT 601-1 hour.

602. **Functional Anatomy.** Integrated study of anatomy, kinesiology, muscle biology, and biomechanics to develop understanding of and ability to analyze normal and pathologic human movement. Prerequisite: permission of instructor. 5 hours.

603. **Movement Science I.** Basic processes underlying motor control aspects of movement, including perspectives from individual, task, and environmental levels. Motor control and motor learning theories and models that describe and contribute to understanding of normal movement. Prerequisite: permission of instructor. 1 hour.

604. **Movement Science II.** Concepts of motor control theories applied to development of normal movements, including assessments of static and dynamic postures and postural stability, gait analysis, and movement throughout lifespan. Use of qualitative and quantitative measures (visual force plates, wt-bearing scales, stabilometry). General knowledge of normal development and assessment of gross and fine motor development. Prerequisite: permission of instructor. 3 hours.

605. **Movement Science III.** Basic pathology/etiology, clinical manifestations, and intervention philosophies regarding selected abnormalities of motor behavior, including muscle tone disorders, incoordination, gait, and balance dysfunction; physiological mechanisms of functional recovery; and specific intervention strategies for motor control components of neuromuscular disorders and secondary disorders related to cardiopulmonary and musculoskeletal disorders. Prerequisite: permission of instructor. 2 hours.

606, 607. **Neuroscience I, II.** Structures and functions of human nervous system with emphasis on sensory/motor function. Prerequisite: permission of instructor. PT 606: 4 hours; PT 607: 3 hours.

611. **Introduction to Physical Therapy Examination.** Measurement theory with application to types of tests and measures commonly used by physical therapists. Overview of major types of tests and measures employed by physical therapists and type of data generated with focus on self-care for patient. Prerequisite: permission of instructor. 1 hour.

612. **Physical Therapy Examination I.** Continuation of PT 611 with focus on knowledge and skills needed to test and measure strength, range of motion, and posture. Prerequisite: permission of instructor. 3 hours.

613. **Introduction to Physical Therapy Intervention.** Beginning basic patient care skills used in practice of physical therapy. Physical and physiological principles and methods of therapeutic application of thermal agents. Guiding principles and methods of beginning patient mobility. Prerequisite: permission of instructor. 2 hours.

614. **Physical Therapy Intervention I.** Continuation of PT 613 with focus on knowledge and skills needed to select and apply interventions for impairments and functional limita-

tions related to noncomplex problems of movement performance (muscle strength, range). Prerequisite: permission of instructor. 3 hours.

615. Physical Therapy Intervention II. Study and use of knowledge and skills needed to select and apply interventions for impairments and functional limitations related to selected conditions not previously emphasized in curriculum. Emphasis placed on integrating electrical evaluation and therapy with previously learned examination, evaluation, and intervention skills; other selected conditions include pregnancy, dysfunction of pelvic floor, lymphedema, burns, and stasis ulcers. Prerequisite: permission of instructor. 3 hours.

620. Pathology and Pharmacology for Movement Disorders I. Basic principles of pathology and pharmacology. Medical and surgical management of disorders involving musculoskeletal, cardiopulmonary, and endocrine systems. Diagnosis, medical, surgical, and pharmacological management, as appropriate, for each disease discussed. Prerequisite: permission of instructor. 3 hours.

621. Pathology and Pharmacology for Movement Disorders II. Continuation of PT 620 with focus on disorders of nervous, integumentary, endocrine and immune systems. Principles of diagnosis and management of common types of cancer included. Diagnosis, medical, surgical, and pharmacological management, as appropriate, for each disease category. Prerequisite: permission of instructor. 3 hours.

630. Applied Physiology for Movement. Foundation in cellular and systemic physiology covering cardiovascular, pulmonary, musculoskeletal, renal genitourinary, and endocrine systems with applications to exercise, disease, injury, and immobilization. Basic principles of nutrition and assessment of body composition. Prerequisite: permission of instructor. 5 hours.

640. Physical Therapy Management of Musculoskeletal Dysfunction I. Application of biological and physical sciences in understanding musculoskeletal disorders. Diagnosis of common musculoskeletal dysfunctions; clinical decision making concerning treatment and prevention of musculoskeletal disorders. Medical and surgical diagnostic and treatment procedures with implications for rehabilitation. Focus on upper quarter including TMJ. Prerequisite: permission of instructor. 4 hours.

641. Physical Therapy Management of Musculoskeletal Dysfunction II. Continuation of PT 640 with focus on spine. Prerequisite: permission of instructor. 3 hours.

642. Physical Therapy Management of Musculoskeletal Dysfunction III. Continuation of PT 640 and 641 with focus on lower extremity. Prerequisite: permission of instructor. 3 hours.

643. Physical Therapy Management of Cardiopulmonary Dysfunction. Physical therapy examination, evaluation, diagnosis, prognosis, and intervention for patients with primary and secondary disorders involving cardiopulmonary system. Prerequisite: permission of instructor. 4 hours.

644. Physical Therapy Management of Neuromuscular Dysfunction. Application, analysis, and synthesis of neurodevelopmental principles in physical therapy examination, evaluation, diagnosis, and intervention. Prerequisite: permission of instructor. 5 hours.

645. Complex Clinical Management Seminar. Integration of all previous course work applied to complex cases reflective of scope of PT practice: direct patient/client physical

therapy care; interaction/practice in collaboration with other professionals; prevention, wellness, and health promotion services; consultation, education, and critical inquiry; administration and management. Prerequisite: permission of instructor. 2 hours.

660. Introduction to Physical Therapy Professional Practice. Profession of physical therapy and role of physical therapy in primary, secondary, and tertiary care; prevention; and wellness. Application of education and communication concepts and skills in physical therapists' interactions with patients, families, colleagues, other health care providers, and public. Prerequisite: permission of instructor. 3 hours.

661. Physical Therapy Professional Practice I. Understanding of forces contributing to health care environment and effects of environment on physical therapy practice, research, and education. Experiential learning in group process, with health care system of United States and relationship of its components as focus of group presentations. Communication skills important to team process, including documentation and strategic planning and cultural diversity issues related to physical therapy practice. Moral, ethical, and legal ramifications of interactions. Prerequisite: permission of instructor. 3 hours.

662. Physical Therapy Professional Practice II. Synthesis and application of legal mandates and ethical principles and theories to issues facing physical therapy student and physical therapist functioning in multifaceted role; values clarification and decision making related to current professional issues. Prerequisite: permission of instructor. 2 hours.

663. Physical Therapy Professional Practice III. Principles of consultation and management and application in health care organizations, with emphasis on community health context. Study of organizational behavior and ethical behavior in organizations; current issues in physical therapy in relation to organizations; relationship of administrative, business, and regulatory law to practice of physical therapy; and defining a health problem and identifying alternative solutions to problem. Documentation formats and importance to physical therapy practice. Prerequisite: permission of instructor. 3 hours.

670, 671. Clinical Education I, II. Supervised clinical education in basic patient care skills and introduction to practice issues. Prerequisite: permission of instructor. PT 670: 1 hour; PT 671: 3 hours.

672. Clinical Education III. Full time supervised clinical education in a clinical setting to provide student opportunity to apply previously acquired knowledge and skills to client care. Prerequisite: permission of instructor. 7 hours.

673, 674. Clinical Education IV, V. Continuation of PT 672. Full time clinical education. Integration of all patient care techniques; evaluation of patient progress and appropriate progression of patients in therapeutic programs; experiences in supervision, consultation, research, management, and teaching. Prerequisite: permission of instructor. 7 hours each.

690. Scientific Inquiry I. Research concepts utilized in physical therapy including fundamentals of epidemiology; introduction to research design, hypothesis generation and testing, measurement theory; and critical analysis of scientific literature. Prerequisite: permission of instructor. 1 hour.

691. Scientific Inquiry II. Concepts of measurement principles, experimental design, qualitative, survey outcomes research, and introduction to basic statistical concepts, that prepare graduate to critically analyze and use scientific literature to improve clinical practice. Emphases on understanding

components of research report and concepts associated with judging quality of research design and report. Prerequisite: permission of instructor. 2 hours.

692. **Scientific Inquiry III.** Concepts of research methodology with emphasis on data collection, management, and analysis. Prerequisite: permission of instructor. 1 hour.

695. **Scholarly Activity Presentation.** Oral presentation of scholarly project activity/results. Prerequisites: PT 690, 691, 692. 1 hour.

698. **Master's Level NonThesis Research.** Implementation of research. Prerequisite: permission of instructor. 1-3 hours.

699. **Master's Level Thesis Research.** Implementation of research. Prerequisite: permission of instructor. 1-6 hours.

Physical Therapy (PTGR)

647. **Seminar in Interdisciplinary Services for Infants, Children, and Youth with Developmental Disabilities.** Synthesis of team-based approaches to intervention for infants, children, and youth with known or suspected disabilities. Focus on legislation and policy, team processes and practices, and family-centered applications. Open to upper level students in disciplines which have roles in service provision for the described population. Prerequisite: prior/concurrent work experience, recommendation of advisor, or consent of department. 1-2 hours.

Physics (Ph.D., M.S.)

Graduate program director: *Vohra*

Faculty

David G. Agresti, Professor (Physics); Mössbauer Spectroscopy, Computer Data Fitting, Extraterrestrial Magnetic Materials

Ivan A. Brezovich, Professor (Radiation Oncology); Physics of Radiation Oncology, Hyperthermia

Renato C. Camata, Assistant Professor (Physics); Laser Synthesis, Processing, and Characterization of Nanostructured Materials; Aerosol Strategies in Nanoparticle Research; Hybrid Inorganic/Polymer Nanocomposites and Bioactive Coatings; Carbon Nanotube-Based Materials.

Herbert C. Cheung, Professor (Biochemistry and Molecular Genetics); Time-Resolved Fluorescence Spectroscopy and Rapid Kinetics of Proteins, Mechanism of Muscle Contraction

Perry A. Gerakines, Assistant Professor (Physics); Infrared Astronomy, Laboratory Astrophysics, Interstellar Dust and Ices, Comets, Astrobiology

Gary J. Grimes, Professor (Electrical and Computer Engineering); Photonic Switching and Fiber Optics, Polymer Waveguides, Integrated Optics

Joseph G. Harrison, Associate Professor (Physics); Energy-Band Structure, Electronic Structure of Defect Systems, Molecular Metal

Stephen C. Harvey, Professor (Biochemistry and Molecular Genetics); Computational Modeling of Structure, Function and Dynamics of Biological Macromolecules and Macromolecular Assemblies

Ryoichi Kawai, Associate Professor (Physics); Condensed Matter Physics Theory, Computational Physics, Science of Complexity

N. Rama Krishna, Professor (Biochemistry and Molecular Genetics); High-Field NMR Studies of Biomolecules, Biomolecular Structure and Function, Motional Dynamics of Proteins, Development of NMR Methodologies for Structure Refinement.

Anatoliy Kudryavtsev, Research Assistant Professor (Physics); Optical Spectroscopy Methods for Structural Studies of Objects Mostly of Biological Origin From Proteins to Ancient Fossils

Chris M. Lawson, Professor (Physics); Nonlinear Optics, Fiber Optics, Optical Sensor

James C. Martin, Associate Professor (Physics); Conformations of Biological Macromolecules, Laser Light Scattering, Fluorescence Photobleaching

Sergey B. Mirov, Professor (Physics); Experimental Quantum Electronics, Solid-State Lasers, Laser Spectroscopy

Thomas M. Nordlund, Associate Professor (Physics); Structure and Dynamics of Biological Macromolecules, Optical Spectroscopy

David L. Shealy, Chair, Professor (Physics); Laser Beam Shaping Optics, Optical System Design, Theoretical Optics, High Performance Computing, Internet2

Yogesh K. Vohra, Professor & University Scholar (Physics); High Pressure Materials Research, Growth and Characterization of Synthetic Diamond and Biomaterials, Laser Spectroscopy and Synchrotron X-ray Diffraction in Materials Characterization

Thomas J. Wdowiak, Associate Professor (Physics); Laboratory Astrophysics, Interstellar Matter, Meteoritics, Early Solar System

Edward L. Wills, Research Associate Professor (Physics); Experimental Nuclear Physics, Biomedical Applications, Mössbauer Spectroscopy

John H. Young, Professor (Physics); Electromagnetic Theory and Biomedical Applications, General Relativity

Mary Ellen Zvanut, Associate Professor (Physics); Electrical and EPR Studies of Insulators and Semiconductors

Program Information

Students in the M.S. and Ph.D. programs may specialize in any of the areas of interest to the faculty, including experimental physics and astrophysics, theoretical and computational physics, or biophysics and medical applications of physics.

Admission

Admission into the physics graduate program is by recommendation of the graduate admission committee of the Department of Physics. The committee takes into consideration GRE General Test scores, prior academic performance, and the letters of evaluation, usually from former instructors. For international students, a TOEFL score of 570 is required for admission.

Beginning the Program

All students must take an oral placement examination on basic physics concepts before registering for any courses. Upon arrival at UAB, international students will be required to take an English as a Second Language course or Scientific Communication courses at UAB during their first year of study until a score equivalent to 570 on the TOEFL is achieved.

M.S. Program

Plan I

The student must successfully complete at least 30 semester hours of coursework, including at least four core courses selected from PH 610-611, 650-651, and 671-672 and 6 semester hours of Thesis Research (PH 699). The student must also write and complete a successful oral defense of a thesis under the direction of a graduate faculty member. Additional coursework should be selected with the advice of the student's graduate study committee to meet the particular needs of the student.

An interdisciplinary track for an M.S. degree Plan I is also offered. Students admitted to this track will typically hold a bachelor's degree in a science area other than physics, such as astronomy, biology, chemistry, geology, mathematics, or psychology, or an engineering degree, including optics and materials science. Thesis research will be in an interdisciplinary area, including astrophysics, astrobiology, biophysics, chemical physics, geophysics, mathematical physics, neurophysics, optics, materials science, or engineering physics. Students awarded an M.S. degree within this track will be prepared for an Assistant Research Physicist position, including qualification for coauthorship, and would typically work under the direction of a doctoral-level person. The acquired skill would be highly marketable, as individuals trained in multidisciplinary areas for basic and applied research are increasingly in demand in industry, government laboratories, and other research institutions.

Acceptance into this interdisciplinary track will be through a Physics Graduate Faculty member, who will be prepared to supervise the student's thesis research and develop a plan of study. This plan of study will include a core of courses (Classical Mechanics, PH 561-562; Electromagnetic Theory, PH 545-546; and Quantum Mechanics, PH 550-551), other physics graduate-level courses, and a minimum of 12 hours of graduate-level courses offered by other departments. The Department of Physics will establish a standing Physics Interdisciplinary Track Committee to review and concur in each student's plan of study. As is current practice, thesis oversight will be by the student's M.S. Graduate Study Committee.

Plan II

With approval of the physics graduate program director, a nonthesis option (Plan II) is available; in this case, the graduate study committee requires an additional 6 semester hours of coursework instead of a thesis and gives the student an M.S.-degree exit examination.

Ph.D. Program

All students are required to pass an oral and written qualifying examination covering the areas of classical mechanics, electromagnetic theory, quantum physics, and one selected topic from thermodynamics/statistical mechanics, optics, or solid-state physics. This examination is to be taken within two terms of completing six core courses, PH 710-711, 750-751, and 771-772. Under no circumstances may the examination be taken more than twice.

Following satisfactory completion of the qualifying examination and consultation with individual faculty members, the student selects a specific area for dissertation research under the supervision of an appropriate graduate faculty member. The student's Graduate Study Committee, chaired by the major advisor, will outline a program of study including at least

four graduate courses and appropriate tools of research, such as computer and/or foreign language competency. After the student completes these specialization courses and tools of research, the Graduate Study Committee will administer an oral examination to test the student's knowledge in the area of research. The student must pass this oral examination in no more than two attempts. Then, with direction from the major advisor, the student should focus on formulating and writing a formal research proposal that must be presented and defended before the Graduate Study Committee; this should lead to a recommendation from the committee for admission to candidacy. Dissertation research culminates in the successful oral defense of the dissertation.

Additional Information

For detailed information, contact Dr. Yogesh K. Vohra, UAB Department of Physics, CH 387, 1530 3rd Avenue South, Birmingham, AL 35294-1170.

Telephone 205-934-4736

E-mail ykvohra@uab.edu

Web www.phy.uab.edu

Course Descriptions

Unless otherwise noted, all courses are for 3 semester hours of credit. Course numbers preceded with an asterisk indicate courses that can be repeated for credit, with stated stipulations.

Physics (PH)

501-503. **Modern Physics for Teachers I-III.** Concepts of physics, including lecture demonstrations and laboratory experiments. Prerequisite: Permission of instructor. 3 hours each.

504, 505. **Studies in Physics Teaching I, II.** Development of new curricula, apparatus, and techniques of presentation of concepts in physics. Prerequisite: Permission of instructor. 3 hours each.

507-509. **Physical Science of Teachers I-III.** Concepts of physical science. Laboratory includes evaluation of experiments and equipment for lecture demonstrations. Prerequisite: Permission of instructor. 3 hours each.

520, 521. **Introduction to Methods in Theoretical Physics I, II.** Vector calculus. Curvilinear coordinate systems; commonly encountered ordinary differential equations and special functions; complex variables and contour integration partial differential equations, including solutions by Green function methods. Prerequisite: Permission of instructor. 3 hours each.

525. **Applications of Contemporary Optics I.** Applied geometrical optics. Refraction and reflection, paraxial optics, thick lens, matrix theory, optical aberrations, optical systems, and optical design using computer simulations. Prerequisite: PH 222 or equivalent.

526. **Applications of Contemporary Optics II.** Applied wave optics. Fresnel equations, optical interference, optical interferometry, coherence, diffraction, lasers, and Gaussian beam propagation. Prerequisite: PH 525.

527. **Geometrical Optics.** Properties of optical systems. Lenses, mirrors, and stops; aberrations; rays and wave fronts, optical instruments; aspheric components. Prerequisite: PH 222 or equivalent. Lecture and laboratory.

528. **Physical Optics.** Interference and diffraction phenomena; emission, propagation, and absorption of radiation;

polarization and dispersion; stimulated emission. Prerequisite: PH 222 or equivalent. Lecture and laboratory.

529. **Applications of Optics III.** Applied optical interactions with materials—linear and nonlinear polarization phenomena, optical properties of materials, anisotropic optics, electro-optics, and nonlinear optics. Prerequisite: PH 526.

532, 533. **Statistical Thermodynamics I, II.** Statistical basis of laws of thermodynamics; ensembles and partition functions; quantum statistics of ideal gases, including photons and electrons; applications to solids, real gases, liquids, and magnetic systems; transport theory. Prerequisites: PH 550. 3 hours each.

545, 546. **Electromagnetic Theory I, II.** Electromagnetic theory approached from standpoint of fields and using Maxwell's equations. Prerequisites: PH 222 and MA 444, or equivalent. 3 hours each.

550, 551. **Introductory Quantum Mechanics I, II.** Principles of quantum mechanics; their application to particle waves, angular momentum, tunneling, radiation, and selection rules; perturbation and variational methods. Prerequisites: PH 251 and PH 562, PH 252 recommended. 3 hours each.

553, 554. **Introductory Solid-State Physics I, II.** Properties of crystal lattices, lattice dynamics, lattice imperfections, and bonding energies; electronic properties of dielectrics, semiconductors, and metals; ferroelectric, magnetic, and optical properties of solids. Prerequisites: PH 331 and PH 551 or equivalent. 3 hours each.

561, 562. **Classical Mechanics I, II.** Kinematics and dynamics, including central forces, rotating coordinate systems, and generalized coordinates; Lagrangian and Hamiltonian. Prerequisites: PH 222 and MA 252. 3 hours each.

567. **Special Relativity.** Foundations and principles of special relativity with applications to mechanics and electrodynamics. Prerequisites: PH 546 and PH 562.

571. **Atomic and Molecular Physics.** Applications of quantum mechanics to structure and spectra of atoms and small molecules; use of symmetry in understanding and describing molecular vibrations and bonding. Prerequisite: PH 551.

575, 576. **Introduction to Biophysics I, II.** Application of physical techniques and analytical methods of selected biological problems. Prerequisite: Permission of instructor. 3 hours each.

581, 582. **Laser Physics I, II.** Physical principles of laser operation and design. Spontaneous and stimulated emission, population inversion, light amplification, laser resonators, Q-switching, mode-locking, pulse shortening techniques, spectral narrowing, and tunable lasers. Individual types of lasers will be considered. Practical applications of lasers will be treated in detail. Prerequisites: PH 222. 3 hours each.

585. **Laser Spectroscopy.** Practical applications of lasers and modern techniques and instrumentation in laser spectroscopy. Prerequisites: PH 222.

591-593. **Advanced Physics Laboratory I-III.** Laboratory investigation of topics of modern physics. Prerequisite: Permission of instructor. 1-3 hours each.

610, 611. **Classical Mechanics.** Applications of methods of LaGrange, Hamilton, Poisson, and Hamilton-Jacobi to such classical problems as central force, small oscillation, and rigid body motions. Prerequisite: PH 562. 3 hours each.

623, 624. **Modern Optics I, II.** Classical and modern theories of propagation of radiation, interference, diffraction,

and dispersion; optical devices, including lasers, holograms, sources, and detectors. Prerequisites: PH 222, MA 252. 3 hours each.

635. **Statistical Mechanics.** Interpretation of macroscopic phenomena from microscopic principles; fundamental laws of statistical mechanics; applications to simple equilibrium systems, phase transitions, and transport problems. Prerequisite: PH 551.

650, 651. **Electromagnetic Theory I, II.** Boundary value and Green function methods for solving potential problems; fields in dielectric, magnetic media, and radiation fields. Prerequisite: PH 546. 3 hours each.

653, 654. **Solid-State Physics I, II.** Structure and dynamics of solids; optical, magnetic, and transport properties. Prerequisites: PH 331, 551. 3 hours each.

655. **Advanced Solid-State Laboratory.** Thin film X-ray diffraction, Raman spectroscopy in materials characterization, electron paramagnetic resonance, and thin film deposition. Prerequisite: PH 351.

671, 672. **Quantum Mechanics I, II.** Discrete and continuous spectra; central force problems; angular momentum and spin; systems of identical particles; perturbation theory; scattering theory. Prerequisites: PH 546 and 551. 3 hours each.

673. **Applications of Quantum Mechanics.** Scattering theory, density matrix, and polarization; applications to atomic and nuclear reactions. Prerequisites: PH 671, 672.

697. **Special Topics in Physics.** Topics of current interest, such as theoretical physics, computational physics, experimental techniques. May be repeated for credit. 1-12 hours.

698. **Nonthesis Research.** May be repeated for credit.

699. **Thesis Research.** May be repeated for credit. Prerequisite: Admission to candidacy. 1-12 hours.

710, 711. **Advanced Classical Mechanics I, II.** Analysis of dynamics, including rigid body motion, featuring the LaGrange formulation, introduction to the Hamiltonian, formulation, Poisson brackets, analyses in nonrelativistic applications. 3 hours each.

715, 716. **Advanced Statistical Mechanics.** Applications of statistical laws to modern topics such as quantum fluids, critical phenomena, and nonequilibrium systems. Prerequisite: PH 533 or PH 635. 3 hours each.

740. **Physical Applications of Group Theory.** Point groups, space groups, and applications in atomic, molecular, and solid-state physics.

741. **Mössbauer Spectroscopy.** Theory of nuclear gamma resonance phenomena; experimental techniques; computer fitting of Mössbauer data; application to structure chemistry and properties of nuclei.

742. **Electron Spin Resonance.** Microwave techniques, spin Hamiltonian formalism; applications of ESR to solids.

745. **Molecular Spectroscopy.** Infrared, Raman, and ultraviolet techniques applied to study of molecular properties, including rotation-vibration spectra and spectra of crystalline solids.

750, 751. **Classical Electrodynamics I, II.** Static and time-varying fields in vacuum and in matter, radiation fields, solutions and implications of Maxwell's equation utilizing advanced mathematical methods. Prerequisite: PH 546. 3 hours each.

753, 754. **Advanced Solid State I, II.** Properties of electrons and photons in crystal lattices; electromagnetic interactions with solids; lattice defects. 3 hours each.

760, 761. **Methods of Mathematical Physics I, II.** Vector and tensor analysis; differential and integral equations; Green functions; variational techniques; linear operator theory; Fourier and Laplace transforms. 3 hours each.

762, 763. **Computational Physics I, II.** Numerical techniques for solution of differential, integral, and matrix equations of physics; computer simulations of physical phenomena; optimization problems. Prerequisites: PH 545, 551, and 561.

764-767. **Directed Problems in Computational Physics.** Prerequisite: Permission of instructor. 3 hours each.

771, 772. **Quantum Mechanics I, II.** Discrete and continuous spectra; central force problems; angular momentum and spin; systems of identical particles; perturbation theory; scattering theory. Prerequisites: PH 546, 551. 3 hours each.

773. **Applications of Quantum Mechanics.** Scattering theory, density matrix, and polarization; applications to atomic and nuclear reactions. Prerequisites: PH 771, 772. Spring.

791, 792. **Seminar in Physics I, II.** Topics of current interest in physics, presented by graduate students, faculty, and visitors. Required each term of all full-time graduate students. 1 hour each.

797. **Special Topics in Physics.** Topics of current interest, such as group theory, medical physics, computational methods, biological physics, materials physics, optics, and space physics. May be repeated for credit. 1-12 hours.

*798. **Nondissertation Research.** Prerequisite: Permission of instructor. 1-12 hours.

*799. **Dissertation Research.** Prerequisite: Admission to candidacy. 3-12 hours.

Physiology and Biophysics (Ph.D.)

Graduate program director: *L. M. Schwiebert*

Primary Faculty

Marcas M. Bamman, Assistant Professor (Physiology & Biophysics); Exercise Physiology

Susan L. Bellis, Assistant Professor (Physiology & Biophysics); Cellular Physiology

Dale J. Benos, Professor and Chair (Physiology & Biophysics); Epithelial Transport, Membrane Biochemistry

Mark O. Bevensee, Assistant Professor (Physiology & Biophysics); Cellular and Molecular Physiology of the Central Nervous System

Carmel McNicolas-Bevensee, Instructor (Physiology & Biophysics); Structure-Function and Regulation of Ion Channels of the Renal and Cardiovascular System

Kathleen H. Berecek, Professor (Physiology & Biophysics); Cardiovascular Physiology

J. Edwin Blalock, Professor (Physiology & Biophysics); Neuroimmunoenocrinology

James K. Bubien, Associate Professor (Physiology & Biophysics); Ion Transport Systems-Nephrology

Alvaro G. Estevez, Assistant Professor (Physiology & Biophysics); Oxidative Stress in Motor Neuron Apoptosis

Catherine M. Fuller, Assistant Professor (Physiology & Biophysics); Membrane Transport, Molecular Biology of Ion Channels

F. Shawn Galin, Assistant Professor (Physiology & Biophysics); Neuroimmunology

Patricia Jackson, Instructor (Physiology & Biophysics); Molecular Physiology

Hong-long Ji, Instructor (Physiology & Biophysics); Cellular Physiology

Kevin L. Kirk, Professor (Physiology & Biophysics); Molecular Physiology of the Cystic Fibrosis Gene Product; Polarized Membrane Traffic

Pamela A. Lucchesi, Assistant Professor (Physiology & Biophysics); Cardiovascular Physiology

Lori L. McMahon, Assistant Professor (Physiology & Biophysics); Neurophysiology

Jimmy D. Neill, Professor (Physiology & Biophysics); Molecular Neuroendocrinology

Roger M. Rick, Professor (Physiology & Biophysics); Electron Microprobe Analysis of Transepithelial Ion Transport

James A. Schafer, Professor (Physiology & Biophysics); Regulation of Epithelial Transport Processes

Erik M. Schwiebert, Assistant Professor (Physiology & Biophysics); Cellular Physiology and Autocrine Regulation of Epithelial Ion Channels in Cystic Fibrosis and Polycystic Kidney Disease

Lisa Marshall Schwiebert, Assistant Professor (Physiology & Biophysics); Cellular and Molecular Mechanisms of Airway Inflammation

Douglas A. Weigent, Professor (Physiology & Biophysics); Immunoendocrinology

Secondary Faculty

P. Darwin Bell, Professor (Medicine-Nephrology); Renal Physiology

Etty Benveniste, Professor (Cell Biology); Neuronal Cell Biology

Richard Blackwell, Associate Professor (OB/GYN); Endocrinology/ Reproductive Biology

Debashish Chattopadhyay, Assistant Professor (Medicine); Protein Structure, Vesicular Trafficking

Irshad Chaudry, Professor (Surgery); Cardiovascular; trauma-hemorrhage & sepsis

Scott Curtis, Associate Professor (Pediatrics); Respiratory Physiology

Louis Dell'Italia, Associate Professor (Medicine-Cardiology); Cardiovascular Physiology

Lawrence DeLucas, Professor (Medicine); Crystallography

William Evanochko, Associate Professor (Medicine-Cardiology); Cardiovascular NMR

Michael Friedlander, Professor and Chair (Neurobiology); Neurophysiology

John Hablitz, Professor (Neurobiology); Cellular Neurophysiology

Basil Hirschowitz, Professor (Neurobiology); Gastrointestinal Physiology

Raymond Ideker, Associate Professor (Medicine-Cardiology); Cardiovascular Physiology

Robert Jackson, Associate Professor (Medicine); Respiratory Physiology

James E. Johnson, Associate Professor (Medicine); Pulmonary Research

Jeffrey Kudlow, Professor (Medicine-Endocrinology); Regulation of Growth-Factor Expression

Robin Lester, Assistant Professor (Neurobiology); Neurophysiology

Stuart Mangel, Associate Professor (Neurobiology); Neurophysiology

Sadis Matalon, Professor (Anesthesiology); Respiratory Physiology

Suzanne Oparil, Professor (Medicine-Hypertension); Cardiovascular Physiology

Laura Pinderski, Assistant Professor (Medicine-Cardiovascular); Cardiovascular Physiology

Dale Parks, Associate Professor (Anesthesiology); Respiratory Physiology

Joseph Philips, III, Associate Professor (Pediatrics); Neonatal Pulmonary Physiology

James Pittman, Distinguished Professor (Medicine); Thyroid and the Pituitary Control of the Thyroid

Steven Rosenfeld, Associate Professor (Medicine) Neurology

Paul W. Sanders, Associate Professor (Medicine); Nitric Oxide Physiology

Harald Sontheimer, Associate Professor (Neurobiology); Neurophysiology

Eric Sorscher, Associate Professor and Director (Medicine and CF Center); Molecular Biology in Cystic Fibrosis

Anne Theibert, Assistant Professor (Neurobiology); Neurophysiology

Ferdinand Urthaler, Professor (Medicine-Cardiology); Cardiovascular Physiology

Ping Wang, Professor (Surgery); Cardiovascular; Trauma-Hemorrhage and Sepsis

David Warnock, Professor (Medicine-Nephrology); Renal Physiology

David Weiss, Associate Professor (Neurobiology); Neurophysiology

C. Roger White, Assistant Professor (Medicine-Cardiology); Cardiovascular Physiology

Philip A. Wood, Professor (Medicine); Comparative Medicine-Genetic/Metabolic Physiology

Program Information

Program Objective

The objective of the Physiology and Biophysics graduate program is to develop in doctoral candidates a fundamental knowledge of mammalian physiology, the ability to conduct research, a capacity to assess work in the field critically, and the ability to teach physiology.

Admission Requirements

Applications to the program will be judged by the graduate committee of the Department of Physiology and Biophysics, in consultation with other appropriate faculty. Acceptance recommendations will be based on Graduate School admission criteria and, when possible, a personal interview with members of the graduate committee.

Selection of Faculty Advisor and Area of Research

Upon admission to the graduate program, each student will be assigned a temporary graduate committee until a field of research is selected. During the first year, students will perform at least three (3) laboratory rotations. Each rotation must be approved by the graduate program director. Students are encouraged to perform laboratory rotations with primary and secondary faculty members in the Department of Physiology and Biophysics. In the event that a student identifies a faculty member outside of the Department of Physiology and Bio-

physics with whom he/she would like to rotate, the student must bring this matter to the attention of the graduate program director. The student must state clearly to the Director why he/she has made such a choice. The Director will then present the matter to the Physiology and Biophysics Graduate Committee for review and approval. The length of each of these rotations can vary, but they must last at least eight weeks. By the end of the first year, the student is expected to have selected an area of research and a permanent advisor from the Physiology and Biophysics faculty roster. It is hoped that International students select a permanent mentor when applying for admission. During the second year, the student should assemble his/her thesis committee. The committee will consist of a minimum of five faculty members to include three physiology faculty and two external faculty (at least one external member should be neither a primary nor secondary Physiology & Biophysics faculty appointment); the departmental chair and graduate program director are ex-officio members of all graduate thesis committees. The student's committee is required to meet formally with the student every 9-12 months, and submit a written report summarizing the deliberations of that meeting to the Director of Graduate Students with a copy to the student. After 4 years in the program, the Committee will meet every 6 months until the Ph.D. dissertation work is completed.

Financial Assistance

Doctoral students will receive financial aid in the form of a fellowship. Current stipends are \$18,156 per year plus tuition, fees and insurance.

Ph.D. Program Requirements

Courses

All students are required to take IBS 700, 701, 702, PHY 750 (Molecular Physiology and Medicine), and PHY 704 (Biometry). Each student is also required to take three reading courses (PHY 790, 791, 792) and PHY 796 (Seminars in Physiology). PHY 796 must be taken by all students throughout their graduate studies. All 1st year students must successfully complete GRD 717 "Principles of Scientific Integrity". Exceptions and substitutions must be approved by the program director and/or department chair. The graduate school regularly offers one-day workshops and short courses in scientific writing, communication skills, and scientific ethics that our graduate students are encouraged to attend. Full-time students are required to register for 15 hours per semester for fall and spring; 10 hours for summer semester.

Grades

At the completion of a course, students are normally assigned a Letter Grade. Students must maintain a "B" average. If a student receives one "C" grade or lower, the student will be placed on academic probation. In general, it takes two semesters to clear probation. If a student receives two "C" grades or lower in required courses, the student is subject to dismissal from the program pending an appeal to the Physiology and Biophysics Graduate Committee.

Departmental Seminars

As required for PHY 796, all graduate students must attend and participate in the department seminar series every semester that they are enrolled. Following each seminar, the graduate students meet with the seminar speaker over lunch. Attendance is mandatory. As the seminar program is published well in advance, students should ensure that they are available

for this 2-hour period. The faculty consider the seminar series as one of the more important and essential enrichment activities for the graduate students.

Teaching Requirements

An important aim of the physiology and biophysics graduate program is to provide students with teaching experience. All students in Physiology and Biophysics are expected to participate in the reading courses (PHY 790-792) and teaching programs of the Department of Physiology and Biophysics

Grievances

Although rare, disagreements can arise that may affect a student's progress toward the completion of the degree. The parties involved in such a dispute should make a good faith effort to discuss and resolve the disagreement. Guidelines regarding the handling of grievances as well as arbitration for the graduate program in physiology and biophysics are available on our web site at **grad-program.physiology.uab.edu**. If, for any reason, you have concerns or a grievance about the program, please contact D. Lisa Schwiebert or Dale Benos directly.

Admission to Candidacy

Following completion of required courses, each student must take a qualifying exam subject to review by the student's thesis committee. This qualifying exam should be completed during the student's third year. Specifically, this exam will entail a written thesis proposal and an oral defense of this proposal. Throughout the organization of the thesis proposal-qualifying exam, the amount of direction the student receives is at the discretion of the mentor and the thesis committee members. The thesis proposal should be 10-pages in length and written in an NRSA-style format (i.e. Abstract, Specific Aims, Background and Significance, Preliminary Data, and Research Design). A draft of the proposal should then be handed out to each committee member, the student may then schedule the oral defense of the proposal before the department; it is anticipated that approval of the written proposal by the committee members will occur within a month of having received the proposal. Following the oral defense of the thesis proposal, the committee may recommend corrections to the written proposal within a month of the defense. Upon successful completion of both the written proposal and oral defense, the student may apply for candidacy. It is recommended that no more than 2 months lapse between initial submission of the written proposal to the committee and application for candidacy; if more than two months elapses, the student may have to re-defend the proposal.

Upon entering candidacy, each student must enroll in PHY 799 (Doctoral Level Dissertation Research). Completion of 30 credit hours (i.e., 2 semesters @ 15 hours each) of PHY 799 is required prior to the thesis defense.

Ph.D. Program Completion

Once the mentor, student, and thesis committee agree that the student has completed his/her thesis work, the student may begin to prepare for the thesis defense. In preparation for and completion of the defense, the following steps must be taken:

- The student must 'apply for the degree'. This entails completing the necessary paperwork (See Ms. Charlae Starr, MCLM 966, 934-3969), which requires signatures

from the student's mentor and the graduate program director.

- After the student has applied for the degree, he/she will receive the following items from the UAB Graduate School: thesis formatting instructions, typed signature forms (see Julie Bryant-HUC 511), microfiche form, and graduate student survey. For any questions regarding formatting, the student should contact Mr. Lee Griner at the Graduate School (HUC 511, 975-6511). Upon receipt of the typed signature forms, the student should bring these forms to the graduate program director's office for safe-keeping until the defense. The student should complete the microfiche form and survey at his/her convenience.
- Once the thesis is complete, copies of the thesis must be distributed to each thesis committee member as well as to Dr. Benos and the graduate program director. All copies must be distributed **AT LEAST TWO WEEKS PRIOR TO THE ORAL DEFENSE**.
- To schedule the oral defense of the thesis, the student must contact Ms. Starr (934-3969). She will need the title of the thesis, the date and time agreed upon by the mentor and thesis committee, and the location of the defense. It is the responsibility of the student to reserve a site for the defense and a location to meet with the committee after the defense.
- Upon successful defense of the thesis, the student must turn in a final, corrected draft to the UAB Graduate School with 10 business days following the oral defense. Since the Graduate School may require formatting changes to the thesis after the final draft has been submitted, it is strongly suggested that the student remain at UAB at least two additional weeks to complete these changes.
- Before the student leaves the Department of Physiology and Biophysics, the student must leave a forwarding address with the graduate program director's office

Additional Information

For detailed information contact Dr. Lisa Schwiebert, Graduate Program Director, UAB Department of Physiology and Biophysics, McCallum Building, Room 966, 1530 3rd Ave South, Birmingham, AL 35294-0005.

Telephone 205-934-3970

Fax 205-975-9028

E-mail lschwieb@uab.edu

Web www.physiology.uab.edu

Required Courses

Pathology

IBS 700 IBS I–Biochemistry & Cell Physiology 8 hrs

IBS 701 IBS II–Pathophys & Pharmac of Disease 8 hrs

IBS 702 IBS III–Functional Genomics 8 hrs

Physiology and Biophysics (PHY)

PHY 698 Master's Nonthesis Research 1-13 hrs

PHY 699 Master's Thesis Research 1-15 hrs

PHY 700 Medical Physiology (spring) 8 hrs

PHY 702 Physiology of Optometry Students (spring) 6 hrs

PHY 703 Physiology of Dental Students (spring) 6 hrs

PHY 704 Biometry (TBA) 3 hrs

PHY 750 Molecular Physiology & Medicine 2 hrs

PHY

790-794 Selected Topics in Physiology 3 hrs

PHY 796 Seminars in Physiology 2 hrs
 PHY 796 Student Seminars in Physiology (summer) 2 hrs
 PHY 798 Nondissertation Research 1-13 hrs
 PHY 799 Doctoral Level Dissertation Research 1-15 hrs (Prerequisite: Admission to Candidacy)

Course Descriptions

Unless otherwise noted all courses are for 3 semester hours of credit. Courses numbers preceded with an asterisk indicate courses that can be repeated for credit, with stated stipulations.

Physiology and Biophysics (PHY)

- 698. **Master's Nonthesis Research.** 1-10 hours per term.
- 699. **Master's Thesis Research.** Prerequisite: Admission to candidacy. 1-10 hours per term.
- 700. **Medical Physiology.** General principles of organ system physiology. 8 hours.
- 701. **Physiology Graduate Students.** Physiology for graduate students.
- 702. **Physiology for Optometry Students.** General principles of organ system physiology. 6 hours. (Weigent)
- 703. **Physiology for Dental Students.** General principles of organ system physiology. 6 hours.
- 704. **Biometry.** Statistical concepts and tests for biological data sets. 1-4 hours. (LeDoeuf, Quick)
- 750. **Molecular Physiology and Medicine.** Fundamental insights into common diseases. 2 hours. (Blalock)
- 790-794. **Selected Topics in Physiology.** Literature search, seminars, discussion of research in various areas of physiology. 1-4 hours each.
- 796. **Seminars in Physiology.** Departmental Seminars.
- 798. **Doctoral Nondissertation Research.** 1-15 hours per term.
- 799. **Doctoral Dissertation Research.** Prerequisite: Admission to candidacy. 1-15 hours per term.
- 850. **Summer Seminars.** Mandatory participation. 1 hour per summer semester.

Psychology (Ph.D.)

Director of Behavioral Neuroscience Specialization: *Randich*

Co-Directors of Cognitive Science Specialization: *Sloane and Graham*

Director of Developmental Psychology Specialization: *Wallander*

Director of Medical/Clinical Psychology Specialization (APA Approved): *Milby*

Associate Director: *Vuchinich*

Primary Faculty

Franklin R. Amthor, Associate Professor (Psychology); Neurophysiology of Vision

Karlene Ball, Professor (Psychology); Cognitive Science; Aging

Don Baucum, Research Assistant Professor (Psychology); Lifespan Human Development, Learning

Fred J. Biasini, Assistant Professor (Psychology); Mental Retardation, Developmental Disabilities

Paul D. Blanton, Research Associate Professor (Psychology and Surgery); Neuropsychology, Sports Related Concussion, Traumatic Brain Injury

Edwin W. Cook III, Associate Professor (Psychology); Clinical Psychology, Health Psychology, Anxiety Disorders

James E. Cox, Associate Professor (Psychology); Physiological Psychology, Obesity

Mary Hagan, Assistant Professor (Psychology); Behavioral Neuroscience, Eating Disorders

Joshua Klapow, Associate Professor (Psychology); Health Care Outcomes

Joan F. Lorden, Professor (Psychology); Vice President for Research and Dean, The Graduate School

Carl E. McFarland, Jr., Professor and Chairperson (Psychology); Cognitive and Developmental Psychology

Jesse B. Milby, Jr., Professor (Psychology); Clinical Psychology, Medical Psychology, Behavior Therapy, Addiction Treatment & Outcome

Eun Young Mun, Assistant Professor (Psychology); Developmental Psychopathology and Child Development Risk Behaviors

George E. Passey, Professor Emeritus (Psychology); Industrial Psychology, History of Psychology

Alan Randich, Professor (Psychology); Experimental Psychology

David C. Schwebel, Assistant Professor (Psychology); Clinical Child Psychology, Child and Adolescent Injury

Michael E. Sloane, Associate Professor (Psychology); Visual Perception, Cognitive Science, Applied Gerontology

Edward Taub, Professor (Psychology); Medical Psychology, Biofeedback

Diane C. Tucker, Professor (Psychology); Clinical Psychology, Physiological Psychology, Psycho-oncology and Genetic Testing

Gitendra Uswatte, Assistant Professor (Psychology); Motor Behavior and Rehabilitation

Rudy E. Vuchinich, Research Professor (Psychology); Alcoholism Outcome, Behavioral Economics

Jan Wallander, Professor (Psychology); Clinical Child Psychology

Amanda Walley, Associate Professor (Psychology); Development of Speech and Language

Rosalyn E. Weller, Associate Professor (Psychology); Neuroscience, Visual Perception, Brain Imaging

Margit Wiesner, Research Assistant Professor (Psychology); Adolescent Behaviors

Michael Windle, Professor (Psychology); Life-Span Developmental Psychopathology, Substance Use

Rex A. Wright, Professor (Psychology); Social Psychology

Secondary, Clinical, and Adjunct Faculty

Gerald Anderson, Clinical Associate Professor (Psychology); Clinical Psychology

Steven Bair, Clinical Professor (Psychology); Clinical Associate Professor (Psychology); Clinical Psychology

Alfred Bartolucci, Professor (Biostatistics and Biomathematics); Biostatistics

John M. Beaton, Professor (Psychiatry); Behavioral Pharmacology

William B. Beidleman, Professor (Psychiatry); Clinical Psychology, Medical Psychology, Behavior Therapy, Forensic Psychology

Alan D. Blotcky, Clinical Associate Professor (Psychology); Clinical Psychology

Laurence A. Bradley, Professor (Rheumatology); Medical Psychology, Pain

Carol E. Cornell, Associate Professor (Medicine/Preventive Medicine); Health Behavior

Jeffrey J. Dolce, Assistant Professor (Medicine); Health Psychology

Daniel M. Doleys, Clinical Professor (Nutrition Sciences); Clinical Psychology, Behavioral Medicine, Behavior Therapy

William E. Farrar, Adjunct Associate Professor; Industrial and Organizational Psychology

E. Louis Fleece, Jr., Professor (Psychiatry); Clinical Psychology, Behavioral Medicine

James E. Flege, Professor (Biocommunication); Bio-communication, Psycholinguistics

Paul Gamlin, Professor (Physiological Optics) Eye Movements

George Graham, Professor (Philosophy); Philosophy of Mind, Cognitive Science, Epistemology

Paul B. Greene, Professor (Medicine); Preventive and Behavioral Medicine

John J. Hablitz, Professor (Biophysics); Physiology

Lindy E. Harrell, Professor (Neurology); Neurology, Behavioral Neuroscience

Bart Hodgens, Assistant Professor (Pediatrics); Clinical Psychology, Adolescent Medicine

Nancy Hubert, Clinical Associate Professor (Psychology); Clinical Child Psychology

Gregory R. Jackson, Assistant Professor (Ophthalmology); Photoreceptor Dysfunction in Aging and Macular Degeneration

Sheryl R. Jackson, Assistant Professor (Psychiatry); Adult Clinical Psychology

Gayle Janzen, Clinical Assistant Professor (Psychology); Clinical Psychology

Barbara R. Johnson, Clinical Associate Professor (Psychology); Clinical Psychology

Gail V. W. Johnson, Professor (Psychiatry); Behavioral Neurobiology

Patricia A. Jolly, Clinical Associate Professor (Psychology); Clinical Psychology, Behavior Therapy

Duck-Hee Kang, Assistant Professor (Nursing Graduate Programs); Psychoneuroimmunology, Intervention in Breast Cancer

Connie L. Kohler, Assistant Professor (Public Health); Health Behavior

Susan Kotler-Cope, Clinical Assistant Professor (Psychology); Neuropsychology

Ruth Lyman, Clinical Assistant Professor (Psychology); Clinical Psychology

Nancy B. Marshall, Research Assistant Professor (Medicine); Communication Disorders

Daniel Marson, Associate Professor (Neurology); Neuropsychology

Lawrence E. Mays, Professor (Physiological Optics); Physiological Psychology, Vision, Neurophysiology

Julie McDonald, Clinical Assistant Professor (Psychology); Clinical Psychology

Mark S. Mennemeier, Assistant Professor (Medicine); Rehabilitation Medicine

Ronald L. Meredith, Clinical Professor (Psychiatry); Clinical Psychology, Behavioral Assessment and Therapy

Arnold Mindingall, Clinical Associate Professor (Psychology); Clinical Psychology, Child Psychology

Janie Murray, Clinical Assistant Professor (Psychology); Pain Rehabilitation

David L. Nash, Clinical Assistant Professor (Psychology); Clinical Psychology

Thomas T. Norton, Professor (Physiological Optics); Physiological Psychology, Vision, Neurophysiology

Cynthia Owsley, Professor (Ophthalmology); Vision and Human Aging, Perceptual Development, Spatial Vision

Renee Peacock, Clinical Associate Professor (Psychology); Clinical Child Psychology

G. Vernon Pegram, Jr., Clinical Professor (Psychiatry); Human Psychophysiology, Behavioral Medicine

Robert Pitts, Clinical Assistant Professor (Psychology); Child and Adolescent Psychology

Lucas Pozzo-Miller, Assistant Professor (Neurobiology); Actions of Neurotrophins at Synapses, Neuronal Calcium Signaling and Plasticity

Kevin D. Reilly, Professor (Computer Science); Neural Nets

J. Scott Richards, Professor (Rehabilitation Medicine); Clinical Psychology

Gloria M. Roque, Clinical Assistant Professor (Psychology); Clinical Child Psychology

Joseph E. Schumacher, Associate Professor (Preventive Medicine); Drug Abuse

Allen E. Shealy, Clinical Professor (Psychiatry); Clinical Psychology, Alcoholism

Alan B. Stevens, Associate Professor (Medicine); Gerontology

Katharine Stewart, Assistant Professor (Medicine); HIV

A. Hal Thurstin, Associate Professor (Psychiatry); Clinical Psychology, Eating Disorders, Geriatrics

Lelland C. Tolbert, Associate Professor (Psychiatry); Neurochemistry

Gaye B. Vance, Clinical Assistant Professor (Psychology); Psychology

Laura Whitworth, Clinical Assistant Professor (Psychology); Psychotherapy

Dale W. Wisely, Clinical Associate Professor (Psychology); Clinical Psychology, Child Clinical Psychology

J. Michael Wyss, Professor (Cell Biology); Neuroanatomy, Physiological Psychology

Areas of Specialization

The psychology graduate program offers four specialization options to doctoral students: Behavioral Neuroscience, Cognitive Science, Developmental Psychology, and Medical (Clinical) Psychology. A terminal master's degree is not offered. The Medical/Clinical Psychology Specialization is approved by the American Psychological Association.

Behavioral Neuroscience

Study in the Behavioral Neuroscience specialization is designed to prepare students for independent research and teaching in the neurobiology of behavior. Research training is provided by faculty in the Department of Psychology and in the UAB Schools of Medicine and Optometry, who share an interest in the biological basis of behavior. The course of study includes a core curriculum in neuroscience and recognizes the interdisciplinary nature of this field. Students obtain strong backgrounds in behavioral science and in neuroscience and

gain expertise in the content and techniques of selected areas of neuroscience as they apply to the study of behavior.

Faculty laboratories are equipped for research in behavior, neurophysiology, neuroanatomy, neuropharmacology, neurochemistry, and molecular biology. The research interests of the faculty include neuroanatomy and neurophysiology of the visual system; psychophysics; interactions between the central nervous system and the periphery in the control of feeding and energy balance; neurophysiology of motor systems and movement disorders; chemical senses; neurochemical and immunological approaches to the study of acetylcholine receptors in brain and muscle; models of memory dysfunction; development precursors of nerve-target interactions; hypertension; psychiatric disease; and the neurochemistry and neurophysiology of pain.

Cognitive Science

Study in the Cognitive Science program at UAB is designed to prepare students for independent research and teaching in the interdisciplinary domain of cognitive science. While the program is administered in the Department of Psychology it draws on faculty from Biomedical Engineering, Linguistics, Philosophy, and Psychology as well as on departments in the University Medical Center such as Neurobiology, Physiological Optics, and Radiology.

The diversity of research programs represented by participating faculty greatly enhances the training in cognitive science at UAB. From philosophers to neurobiologists, all participating faculty are at the frontiers of their respective fields. Empirical scientists use state-of-the-art methodologies in modern laboratory facilities. Especially strong areas of research at UAB include, but are not limited to, neurobiology, vision science, functional brain imaging, language, aging, and philosophy of mind.

Developmental Psychology

The Developmental Psychology doctoral program trains scientists to conduct research to discover and apply basic principles of developmental psychology in an interdisciplinary context and to apply those principles to a variety of problems. Graduates are capable of taking positions in institutions of higher learning, medical schools, research institutions. Government agencies, and other research and teaching positions. Research training is provided by the faculty of the Department of Psychology and may occur in collaboration with faculty at the Civitan International Research Center, Center for the advancement of Youth Health, the Center for Aging, the Center for Applied Gerontology, the Comprehensive Youth Violence Center, the Department of Pediatrics, the school of Public Health, and other centers and departments.

The research programs of faculty with interests in lifespan developmental psychology include a wide variety of topics from infancy to the elderly. Much of this research is funded by federal research grants. Research sub-areas include: mental retardation and developmental disabilities (with special interests in prenatal development and exposures, early intervention, improving special education, adolescent psychosocial development and mental health, and how family members adapt to the problems of a handicapped child); adolescence (with special interest in longitudinal studies, interactions between health and development, alcohol and drug use, predictors of depression and suicide, family and peer relations, those with special health care or education needs); aging (with special

interest in visual-perceptual problems of older adults with slow vision, memory skills training with elderly populations, the psychological aspects of chronic illness in the elderly, chronically ill individuals, care giving in families of elderly persons, human factor issues in vision and aging); pediatric psychology (with special interest in influences on injury risk, how handicapped children adapt and develop socially, parental cognition and affective reactions as mediators of behavioral responses toward their young children, and evaluation of behavioral health care interventions); and language and communication disorders (with special interest in the development of speech perception and word segmentation in young children, how word segmentation may relate to beginning reading, and developmental changes in abilities to use computer-assisted communication systems).

Medical/Clinical Psychology

The Medical/Clinical Psychology specialization provides scientist-practitioner training in clinical psychology with an emphasis on investigation and service delivery in a medical setting, oriented toward the prevention and treatment of medical disorders and the enhancement of health. This program of study is cosponsored by the UAB School of Medicine. Coursework, research, and clinical clerkship training are provided by faculty psychologists in the Departments of Psychology, Rehabilitation Medicine, Psychiatry, Neurology, Pediatrics, Surgery (Divisions of Neurosurgery and Cardiovascular Surgery), and Medicine (including the Divisions of General and Preventive Medicine, Rheumatology, Arthritis, and Gastroenterology), the Center for Aging, the Sparks Center for Developmental and Learning Disorders, the Civitan International Research Center; the VA Medical Center, and the UAB School of Public Health. In addition, psychologists in several health psychology-behavioral medicine and mental health centers in the community play an active teaching, research, and clinical supervisory role in this program.

Current research programs in which faculty and students are involved include AIDS treatment-efficacy and compliance; HIV/AIDS-risk reduction; cardiology-hypertension; cardiovascular surgery-open-heart surgery outcome; pediatric virology-congenital infections and mental development; gastroenterology-irritable bowel syndrome and rumination; anorexia-bulimia program; head injury center-rehabilitation, neurovascular surgery research; cocaine and other drug dependence-treatment, development and evaluation; very low birth-weight project; pain clinic intervention program; mental retardation-Down's syndrome parent coping project, Alzheimer's disease diagnosis and caregiver projects; and neuropsychological evaluations of epilepsy surgery; brain injury studies of behavioral and medical interventions and of imaging correlates of psychological processes; improving health status and utilization; cardiovascular risk assessment and reduction in minority populations; access to cancer screening and care in underserved populations; Women's Health Initiative Multi-Center Project; assessing and modifying women's cancer and other health risks; and smoking cessation interventions. This is a representative but not exhaustive list. Most Medical Psychology faculty research is extramurally funded by private foundations and other federal support, especially through the Centers for Disease Control (CDC) and from various institutes of The National Institutes of Health (NIH).

It is possible to enroll in the Master of Public Health degree program concurrently with enrollment in the Medical

Psychology Program; this requires the approval of both the Medical Psychology specialization director and the UAB School of Public Health.

Application

The deadline for receipt of a complete application for admission is **January 15 (December 15 for Medical/Clinical Psychology Program)** preceding the beginning of the program in September. Applications are solicited both from students with bachelor's degrees and from those who may have already completed some graduate study. The GRE General Test is required. The GRE Subject Test in psychology is recommended.

Admission

Admission to the program is highly selective. Successful applicants usually present scores of at least 600 on both the verbal and quantitative portions of the GRE General Test and a minimum 1,200 overall score (verbal plus quantitative). Minimum GPAs of 3.2 (A = 4.0) overall, over the last two years and in psychology courses, are typical for those admitted.

Behavioral Neuroscience. Because of the interdisciplinary nature of the Behavioral Neuroscience specialization, students with diverse backgrounds in psychology, biology, and physical science are encouraged to apply. All students are expected to have undergraduate training in psychology, biology, physics, chemistry, and mathematics. Students not trained in one or more of these areas may be required to make up deficits after enrollment.

Cognitive Science. For admission to the Cognitive Science specialization, the minimal criteria are those of the Graduate School. Given the interdisciplinary nature of the graduate program in Cognitive Science, students having undergraduate degrees in a wide variety of disciplines are encouraged to apply. Previous work in psychology, philosophy, biology, linguistics, or computer science is especially appropriate. Background interest, research experience, letters of recommendation, Undergraduate GPA, and GRE scores represent important aspects of the admission criteria.

Developmental Psychology. Admission to the Developmental Psychology specialization requires undergraduate work in psychology, biology, and mathematics. Students without undergraduate coursework in these areas may be required to take additional coursework after enrollment.

Medical/Clinical Psychology. The criteria for admission to the Medical/Clinical Psychology specialization include a minimum of 18 semester hours in psychology courses (specific courses recommended are Introduction to Psychology, Psychological Statistics, Physiological Psychology, Psychology of Learning, and Abnormal Psychology or Psychology of Personality) and a minimum of 18 semester hours in life science courses (courses in chemistry and biology/physiology). Courses in mathematics through calculus and in computer programming are recommended. Students with deficits in any of these areas may be required to take suitable additional coursework before and/or after enrollment. Relevant research or clinical service experiences are considered important indications of the applicant's motivation and commitment to psychology. The relevance of the student's goals and interests to the research-health psychology orientation of the specialty is also an admission consideration.

Advisement

Behavioral Neuroscience students are advised by the Behavioral Neuroscience specialization director in consultation with a graduate program steering committee and by their research preceptors until the dissertation committee is appointed, usually early in the third year of study.

Cognitive Science students are advised by the Co-Directors of the program in consultation with the Cognitive Science Steering Committee. After the first year a major portion of the advisement is taken over by the mentor chosen by the student. Students accepted in the Developmental Psychology specialization will be assigned an advisor by the Developmental Psychology specialization director. The advisor may be changed upon request of the student and agreement of the Developmental Psychology Specialization director.

Before arriving on campus, Medical (Clinical) Psychology students are assigned an advanced student mentor and a faculty advisor who chairs a Graduate Study Committee. Mentors, advisors, and graduate study committees assigned by the specialization director and Medical Psychology Coordination Committee may be changed upon the request of the student and the agreement of the Medical Psychology Specialization director.

Curriculum

The curriculum in Behavioral Neuroscience provides a student with advanced training that is broadly based in neuroscience. All students have a plan of coursework that includes Overview of Behavioral Neuroscience (PY 753), Cellular and Molecular Neurobiology (NEUR 702), Integrative Neuroscience (NEUR 710), and Neurobiology of Learning (PY 745). Students must also enroll in a statistics sequence (PY 716-717) and an ongoing seminar in current research (PY 756). A basic science elective and two psychology electives complete the academic portion of a student's training. Each student must enroll in a research practicum directed by a member of the graduate faculty during each term in residence. The student initially rotates among faculty and laboratories during the first year to obtain breadth in points of view and experimental techniques. Students then choose a mentor with whom they normally complete the remainder of their research training. Before admission to candidacy, each student must fulfill the predissertation research requirement and pass the qualifying examination. Following acceptance of a proposal for dissertation research, the student is admitted to candidacy. The Ph.D. degree is awarded upon successful defense of the dissertation.

The course of study in Cognitive Science includes some required courses: Overview of Cognitive Science (PY 736), Cognition (PY 707), Cognitive Neuroscience (PY 793), a Philosophy of Mind course (PHL 792 or NEUR 752), a two-course sequence in Statistics (PY 716 & PY 717) and an ongoing Research Seminar in Cognitive Science (PY 730). The student chooses additional courses from a broad menu of courses in various departments to match their areas of interest. For example, one of the additional courses must be a methodology course which can be fulfilled by taking a course in functional brain imaging, computational neuroscience, multivariate statistics, computer modeling, or neurobiological techniques. Students do either two or three research rotations in their first year for exposure to different approaches and experimental techniques before settling with a mentor in their chosen field of interest. Students are encouraged to develop a sys-

tematic line of research that complements that of his or her advisor. Students normally complete the remainder of their research training with this mentor but may opt to change. Before admission to candidacy, each student must fulfill the pre-dissertation research requirement and pass the qualifying examination. Following acceptance of a proposal for dissertation research, the student is admitted to candidacy. The Ph.D. degree is awarded upon successful defense of the dissertation.

Each student in the Developmental Psychology specialization is encouraged to develop a systematic line of research that complements that of his or her advisor. With intense exposure to an important aspect of developmental research, the student acquires skills that can be generalized to a variety of problems. Students are required to complete a lifespan developmental psychology sequence, including an overview course (PY 708), an adolescent developmental course (PY 729), and an aging course (PY 785). An additional 12 hours in general developmental psychology is required from a range of course options (PY 710-715, PY 726-728, PY 758, PY 783). Developmental psychology students are also required to complete two terms of teaching practicum (PY 796), and four-courses in statistics and research design (including PY 716, 717, 719). Additional requirements include at least 9 credit hours of electives in courses such as social psychology, theories of emotion, psychological tests and measurement, introduction to neurobiology, geriatric and gerontology interdisciplinary core curriculum, and reading (theoretical foundations).

Developmental Psychology students must complete a master's thesis. Admission to candidacy for the doctoral degree is based on satisfactory completion of coursework and completion of an area review in the form of a *Psychological Bulletin* or *Psychological Review* article. In some special cases, a coursework option may be substituted for the area review with approval by the student's advisor and the Developmental Psychology specialization director. The doctoral degree is awarded upon successful defense of the dissertation.

The Medical/Clinical Psychology specialization places strong emphasis on integration of biological and behavioral sciences. Research and clinical training require an undergraduate background in both psychology and life science. The program requires continued pursuit of applied biological and psychological skills and knowledge basic to health psychology research and practice. The curriculum includes three broad areas:

1. Basic biological and psychological knowledge, including cognitive biological and social-emotional basis of behavior, individual differences, statistics and research methodology, professional issues, and ethics;
2. Professional skill and knowledge, including assessment, intervention, evaluation, and consultation; and
3. Medical psychology.

Students pursue research and a clinical focus on one or more of the several available health psychology areas through advanced scientific and applied coursework, clinical clerkship, and directed research activities that typically culminate in the doctoral dissertation.

Course requirements for the Medical (Clinical) Psychology specialization include but are not limited to

1. Statistics and Research Design—a four-course sequence;
2. Clinical Psychological Assessment—a one-year modular course sequence;
3. Psychological Intervention—a four-course sequence;

4. General Psychology—History and Systems and three of the following courses: Learning Processes, Cognition, Motivation and Emotion, Developmental Psychology, Sensory and Perceptual Processes, and Social Psychology;

5. Health Psychology—a five-course series, three of which involve choices from alternatives such as neuropsychology, psychopharmacology, psychophysiology, neural and humoral bases of behavior, and health psychology, plus elective seminars in fields such as rehabilitation, aging, neuropsychology; cardiology, and

6. Psychopathology, Theories of Personality, and Professional Issues and Ethics (all required courses).

Additional courses and/or seminars may be taken as electives. The student's advisor may also require additional coursework for a chosen area of emphasis. Courses in many departments of the university are available on an elective basis. Students are required to complete a minimum of 18 semester hours of research and 18 semester hours of clinical clerkship. A master's project is completed in the second year.

Students in Medical (Clinical) Psychology are also required to serve a 12-month internship in clinical psychology in a medical facility. The internship must be in a program, outside of UAB, accredited by the American Psychological Association or be approved by the Medical Psychology Coordinating Committee.

Financial Aid

All students admitted to the Behavioral Neuroscience, Cognitive Science, Developmental Psychology, and Medical/Clinical Psychology specializations may expect to receive financial aid. Sources of support include fellowships and research and teaching assistantships.

Additional Information

Department of Psychology, UAB
415 Campbell Hall, 1300 University Blvd.,
1530 3rd Ave. S., Birmingham, AL 35294-1170.
Web www.psy.uab.edu

Dr. Alan Randich, Behavioral Neuroscience Specialization Director
Telephone 205-934-3850
E-mail arandich@uab.edu

Dr. Michael Sloane, Cognitive Science Specialization Director
Telephone 205-934-3850
E-mail sloane@uab.edu
or Dr. George Graham,
Co-Director, Cognitive Science
Telephone 205-934-4805
E-mail ggraham@uab.edu

Dr. Jan Wallander, Developmental Psychology Specialization Director;
Telephone 205-934-2452 or 3850
E-mail wallande@uab.edu

Dr. Jesse Milby, Medical Psychology Specialization Director
Telephone 205-934-8723 or 3194
E-mail medpsych@uab.edu

Course Descriptions

Unless otherwise noted, all courses are for 3 semester hours of credit. Courses numbers preceded with an asterisk indicate courses that can be repeated for credit, with stated stipulations.

Psychology (PY)

698. **Premaster's Degree Graduate Research.** 1-3 hours.

699. **Master's Thesis Research.** Prerequisite: Admission to candidacy. 1-6 hours.

701. **Professional Issues and Ethics in Psychology.** APA ethical code, manual for service providers in psychology, state and national mental health codes and trends for service providers; ethical practices in research with human subjects. APA organizational structure. 1 hour.

702. **History and Systems of Psychology.** Major schools of psychology; influential figures in psychology.

703. **Theories of Personality.** Survey of theories of personality development and functioning.

704. **Social Psychology.** Interpersonal relationships and effects of social environment on social perception and human behavior.

705. **Learning Processes.**

706. **Sensory and Perceptual Processes.** Sensory physiology; diagnostic techniques for pathophysiology of sensory systems; human psychophysics and principles of perception.

707. **Cognition.** Attention, memory, learning, and information processing; theoretical issues and evaluation of relevant research.

708. **Developmental Psychology.** Human development from prenatal period to old age. Genetic and environmental determinants of behavior; linguistic, cognitive, intellectual, personality, social, and emotional development.

709. **Theory and Research in Emotion.** Contemporary theories of evolutionary, hereditary, behavioral, semantic, and physiological aspects of emotion.

710. **Seminar in Contemporary Issues in Developmental Psychology.** Weekly forum to discuss issues related to developmental research; ethical issues; professional issues. 1 hour.

711. **Seminar in Cognitive Development.** Seminar in the development of memory, perception, learning, and thinking in children.

712. **Seminar in Social Development.** Theoretical models and empirical findings.

713. **Seminar in Language Development.** Research and theory related to normal and deviant language development.

714. **Seminar in Perceptual Development.** Theoretical models and empirical findings in sensory-perceptual development in humans. All sensory modalities covered.

715. **Seminar in Emotional Development.** Contemporary topics in the development of emotional responsivity, attachment, perception, and expression.

716. **Introduction to Statistics.** Probability, descriptive statistics, sampling distributions, null hypothesis testing, comparisons between means; tests on categorical data, bivariate and multiple regression.

717. **Applied Statistical Methods.** Univariate analysis of variance and factorial designs; interpretation of data from multifactor experimental designs. 4 hours.

718. **Research Design.** Traditional and nontraditional approaches; includes univariate and multifactor experimental designs, quasi-experimental designs. No longer offered in Med Psych program.

719. **Multivariate Statistical Methods.** Multiple regression, multivariate analysis of variance and covariance, canonical correlation, principal components, and discriminant analysis. 4 hours.

720. **Human Neuropsychology.** Structure and function of human brain; human behavior; cognitive functions and personality functions; brain-behavior relationships following neurological impairment.

721. **Neuropsychological Assessment.** Evaluation of various types and locations of brain damage and human mental impairment; assessment applications.

722. **Advanced Human Neuropsychology.** Clinical case study and special topic presentation around patients with specific types of neurocognitive deficits. Assessment, intervention, and new research developments.

723. Seminar in Abnormal Child Development.

724. **Motor Control After Stroke and Other Neurological Injuries.** Analysis of motor deficits after stroke and other neurological injuries; the contribution of excess motor disability to these deficits; conceptual basis of constraint induction (CI) therapy; methods of CI therapy; new methods for assessing motor deficits with hands-on training with testing and intervention.

725. **Developmental Research Methodology.** Experimental and correlational, cross-sectional and longitudinal designs; multivariate approaches.

726. **Seminar in Advanced Developmental Psychology.** Advanced issues in developmental research and theory.

727. **Longitudinal Studies Laboratory.** Direct experience analyzing large multivariate, repeated-measures data sets from existing longitudinal studies. Methods range from how to track subjects and adjust for missing and mistimed data to ways to model complex development processes and systems.

728. **Seminar in Family Research.** Family systems theory and assessment techniques suitable for parents and children at different stages of life; combining objective and subjective data from multiple sources; recent findings about development within the family context.

729. **Seminar in Adolescent Development.** Theoretical models and empirical findings related to biological, psychological, and sociohistorical changes in adolescent development.

730. **Research Seminar in Cognitive Science.** Current research, theories, and controversies in cognitive science. Seminar topic changes each term. Prerequisite: Permission of instructor. 1 hour.

731. **Health Psychology I.** Prevention, enhancement, and intervention; environmental factors, marketplace factors, and interpersonal factors.

732. **Health Psychology II.** Physiological and psychological factors influencing disease and disorders; health psychological assessment and intervention strategies applicable to individuals and groups.

733. **Health Psychology III.**

734. **Current Trends in Medical Psychology.** 1 to 3 hours.

735. **Psychology of Addiction.** Causative and developmental factors and treatment approaches for all types of addictions (nicotine, alcohol, drugs, etc.).

736. **Overview of Cognitive Science.** Cognitive science is the interdisciplinary study of mind and intelligence. This course is a comprehensive overview of the historical and conceptual foundations of cognitive science. No previous courses in cognitive science are needed to participate.

739. **Seminar Contemporary Issues in Clinical Medical Psychology (1).**

740. **Adult Personality and Psychopathology.** Theoretical and research issues in maladaptive behavior; description and classification schemes; theories of etiology and maintenance of psychopathology.

741. **Developmental Aspects of Personality and Psychopathology.** Development of aberrant behavior beginning in infancy through adolescence, including GAP and DSM III; categorization schemes and relationship to developmental outcome. 2 hours.

745. **Neurobiology of Learning.** Introduction of data, phenomena, and theory related to associative learning of behaviors. Discussion of issues related to the neurobiology of nonassociative learning, stimulus encoding, and memory.

750. **Psychopharmacology.**

751. **Human Psychopharmacology.** Neurophysiological underpinnings and clinical applications of psychopharmacology.

752. **Neural and Humoral Bases of Behavior.** Interaction of central nervous system and peripheral mechanisms, endocrine and autonomic nervous systems; relationship to human disorders. Topics vary.

753. **Overview of Behavioral Neuroscience.** Neural systems which control behavior will be studied, incorporating knowledge gained from neurobiological and psychological research. Topics will include synaptic communication, regulating behaviors, learning, memory, sensation and perception, movement, emotions, and psychopathology. Prerequisite: Permission of instructor.

755. **Human Psychophysiology.** Basic and applied research topics.

756. **Research Seminar in Behavioral Neuroscience.** Discussion of current literature and presentation of ongoing research by students in the program. 1 hour.

757. **Topics in Behavioral Neuroscience.** Research and methodology in behavioral neuroscience. Topics vary.

758. **Developmental Psychobiology.** Prenatal and postnatal influences on behavioral and physiologic development; psychobiology of mother-infant interactions during early development; research with human populations, primates, other species.

759. **Neural Information Processing Systems for Sensory Coding.**

760. **Interviewing and Behavioral Observation.** Theory and practice of interviewing and behavioral assessment with adult and child populations. 2 hours.

761. **Behavioral Assessment.** Psychometric and observational procedures, relying largely on behavioral theory, to observe, analyze, and assess human clinical behaviors; development of intervention activities. 2 hours.

762. **Psychological Tests and Measurements.** Test construction, norming, standardization, and sampling procedures. 2 hours.

763. **Cognitive Neuroscience.** Prerequisite: Permission of instructor.

764. **Cognitive Assessment: Child & Adult.** Cognitive assessment of children and adults focusing on Wechsler scales, Stanford-Binet, and additional cognitive, academic, memory, and learning tests. 3 hours.

765. **Psychological Assessment: Personality I.** Objective personality assessment, primarily focusing on Minnesota Multiphasic Personality Inventory. 2 hours.

766. **Psychological Assessment: Personality II.** Traditional projective techniques, utilizing Rorschach test following Exner's system. 2 hours.

767. **Psychological Assessment: Health Psychology.** Use of multiple health-related questionnaires, tests; indices in assessing health behavior, quality of life; traditional psychological tests in health context. 2 hours.

768. **Advanced Personality Assessment.** Integration of cognitive and personality evaluation techniques in applied clinical practice setting.

769. **Cognitive Behavior Psychotherapy.** A review of theory-driven manualized cognitive-behavioral therapy interventions with emphasis upon what has been found to work best with what types of patients.

770. **Survey of Psychotherapeutic Methods.** Procedures for changing maladaptive behavior. Research and methodological issues, factors common to most therapy, and major therapeutic techniques.

771. **Interpersonal Psychotherapy.** Psychodynamic, humanistic, existential theories of psychotherapeutic intervention.

772. **Behavior Therapy.** Cognitive and more traditional behavioral approaches in intervention in mental health and medical environment.

773. **Behavior Therapy Seminar.** Behavioral theory; new and experimental technology for alteration in human behaviors. 1 hour.

774. **Family Therapy.** Traditional systems theory, intervention strategies, and family dynamics; case examples and group participation.

775. **Advanced Seminar in Psychotherapeutic Methods.** Intervention modalities; research strategies for outcome evaluation. 2 hours.

776. **Child and Adolescent Psychotherapy.** Application of child psychopathology knowledge and intervention with child and adolescent population; theoretical and applied issues of verbal and nonverbal psychotherapy. 2 hours.

777. **Psychotherapy Practice.** Integration and application of theories in a clinical setting. 1 hour.

778. **Psychotherapy Practice Initial.**

780. **Rehabilitation Psychology.** Rehabilitation of chronic physical disorders; neurological disorders such as cerebrovascular disease, head trauma, and spinal cord injury.

781. **Forensic Psychology.** Interface between psychology and law; civil and criminal procedure; expert witness; insanity, competency, commitment, and malpractice. Experience in criminal justice settings. 2 hours.

782. **Anxiety and Anxiety-Based Disorders.** Behavioral syndromes within traditional mental health area and in variety of medical populations. Includes phobias and anxiety-based medical and nonmedical disorders.

783. **Developmental Disabilities.** Mental retardation, learning disabilities, and other developmental disorders. Re-

search on nature of disabilities and major intervention techniques.

784. **Organizational Psychology.** Behavioral responses to, or correlates of, organizational structures and processes.

785. **Psychology of Aging.** Age differences in perception, memory, intelligence, personality, adjustment, and psychopathology.

786. **Seminar in Aging.** Contemporary topics in aging, including basic science, clinical, and psychosocial issues. 1 hour.

787. **The Dynamics of Pain.** Comprehensive study of physiology, pharmacology, and anatomy of acute and chronic pain. Emphasis on how medical treatments relieve pain. Topics include: stress-induced analgesia, transcutaneous electrical stimulation, acupuncture, inflammation, and psychological approaches to the treatment of pain.

788. **Pediatric Psychology.**

789. **Social/Ethnic Issues in Therapy.**

790. **Internship in Clinical Psychology.** 9 hours.

791. **Special Topics in Psychology.** 1-3 hours.

796. **Practicum in the Teaching of Psychology.** 1-3 hours.

797. **Clinical Practicum in Medical Psychology.** 1-3 hours.

798. **Predoctoral Degree Graduate Research.** 1-3 hours.

799. **Doctoral Dissertation Research.** Prerequisite: Admission to candidacy. 1-6 hours.

Public Administration (M.P.A.)

Graduate program director: *Haque*

Faculty

Janet M. Bronstein, Associate Professor (Health Care Organization and Policy); Health Services Utilization, Health Policy, Community-Based Organizations; Co-coordinator of M.P.A.-M.P.H. degree program, School of Public Health

Steven H. Haeberle, Associate Professor (Government and Public Service); Public Policy, Urban Politics, Intergovernmental Relations, and Research Methodology

Akhlaque Haque, Assistant Professor (Government and Public Service); Economic Development, Geographic Information Systems, Public finance, Information technology and governance, and Health Policy

Michael Howell-Moroney, Visiting Assistant Professor (Government and Public Service); Urban Affairs, Community Development and Planning, Advanced Statistics

James D. Slack, Professor, Department Chair, (Government and Public Service); Human Resources Management, Disabilities Policy, Workplace Ramifications to Anti-discrimination to HIV/AIDS, Workplace Diversity Policy, Anti-discrimination Policy, Local Government

Christopher Stream, Assistant Professor (Government and Public Service); Public Policy, Metropolitan Government, Research Methods

Pamela Valentine, Assistant Professor (Government and Public Service); Research Design, Social Services, and Program Evaluation

Gabriela Wolfson, Assistant Professor (Government and Public Service); Public budgeting (comparative state budget-

ing, state fiscal and tax policy, state budgeting for health care); health policy and finance

Adjunct Faculty

Betty J. Bock, MPA (UAB Center for Urban Affairs) Community Development and Planning

Marshall Farmer, (Regional Planning Commission) Public Sector Information Systems

Sam Gaston, MPA (City of Mountain Brook) Urban Administration

Ellyn Grady, MPA (Girl's Inc) Agency Administration

Judge Vincent Intoccia, (Federal EEOC) Administrative Law

M.P.A. Program Mission

As an essential component of an urban research university, the Master of Public Administration (M.P.A.) program at the University of Alabama at Birmingham provides a department-based multi-disciplinary faculty dedicated to the advancement of the public service through teaching, research, and service.

Program Objective

The Master of Public Administration program prepares individuals for positions of leadership in the public and non-profit sectors of the economy. It is a professional graduate degree for both pre-career students and in-service administrators. The program is designed to develop the insights and skills needed to plan and formulate policy, and to organize, manage, and implement programs and operations. Graduates tend to cluster in three general areas managers, analysts, and policy specialists.

The M.P.A. curriculum is designed to ensure that students: (1) understand the political, economic, social and legal context of the public service; (2) understand and appreciate the transcending values of ethics/morality and diversity in the public service; (3) achieve substantial competence in (i) policy-making processes; (ii) administrative theory and behavior, (iii) human resource management; (iv) budgeting; (v) urban development and planning; (vi) research design and (vii) statistical analysis. To accomplish these objectives, students complete an eight-course core curriculum that provides a foundation for more specialized coursework as well as long-term development and advancement in public service management and leadership positions. The M.P.A. program is accredited by the National Association of Schools of Public Affairs and Administration (NASPAA).

Degree Requirements

Students in the M.P.A. program must complete a total of 51 semester hours or the equivalent, with an overall grade average of at least B. Six of those hours are earned in an internship placement, although that requirement may be waived for students who have full-time paid work experience in public or nonprofit agencies. Previous graduate work at UAB or another institution may be credited toward the degree if it is directly applicable. Students may select the thesis option or the nonthesis option. For students who are interested in both public administration and the delivery of public health services, a coordinated M.P.A.-M.P.H. program is offered; for students who are interested in both public administration and the law, a coordinated M.P.A.-J.D program is offered.

Admission Requirements

Because of its multi-disciplinary nature, persons from all undergraduate majors are considered for admission to the program. Applicants are expected to have achieved an undergraduate GPA of 3.0 or better. Applicants are also expected to have achieved an average score of 500 or better on each of the three sections (verbal, quantitative, and analytic) of the Graduate Record Examination (GRE). Letters of reference are also required to enter the program. Persons failing to meet these admission standards may be considered for admission on probation. Application for admission should be made to the UAB Graduate School (UAB, Birmingham, Alabama 35294-1150; telephone 205-934-8227). Admissions will be made each semester.

Financial Aid

The Department of Government and Public Service has four graduate assistantships, which can be awarded during any semester as vacancies occur. The M.P.A. program also has a grant from the U.S. Department of Housing and Urban Development (HUD) to provide up to four two-year fellowships based on financial need. In addition, every year at least one M.P.A. student is awarded the Ron Casey Fellowship based on his/her academic performance. Also, the M.P.A. Alumni Association provides scholarship to the outstanding student of the year. Other financial resources are available through the Office of Student Financial Aid.

Curriculum

Core Courses All students are required to take the following eight courses:

MPA 659	Environments of Public Service
MPA 660	The Public Policymaking Process
MPA 661	Administrative Theory and Behavior
MPA 664	Human Resources Management
MPA 666	Public and Nonprofit Budgeting
MPA 680	Urban Development and Planning
MPA 686	Research Design
MPA 687	Statistical Analysis

In addition to the core courses, students must complete four courses in one of the following specializations, plus three electives. Total of 15 courses would be required.

Specializations Students should select a specialization based upon their career goals and interests. The specializations that are available are Organizational Management, Urban Planning and Management, Public Policy Analysis, and Public Finance and Economic Development.

Organizational Management The majority of students who choose this specialization are mid-career and wish to improve their management skills. Students may select two different sub-specializations: general organizational management and nonprofit management. The first sub-specialization is designed for those interested in general management, human resources, and organizational development. The second sub-specialization is designed for those who are interested in nonprofit management.

Students must take two of the following three courses:

MPA 667	Public and Administrative Law
MPA 675	Ethics and Morality in Public Service
MPA 676	Financial Management in the Public Sector

Plus two course from either of the following groups:

General Organizational Management

MPA 668	Intergovernmental Relations
MPA 677	Managing Information in the Public and Non-profit Sector
MPA 674	Geographic Information Systems

Nonprofit Management

MPA 672	Agency Administration
MPA 673	Community Planning and Organization
MPA 678	Strategic Planning for Public/Private Action
MPA 690	Seminar in Public Service Issues: Electronic Government

Urban Planning and Management Students interested in city management or planning should select this specialization. Relevant positions include policy development and implementation, budget development, public works management, and economic and community development.

Students must select four from the following courses:

MPA 662	Urban Administration
MPA 668	Intergovernmental Relations
MPA 673	Community Planning and Organization
MPA 674	Geographic Information Systems
MPA 678	Strategic Planning for Public/Private Action
MPA 681	Local Government Planning

Other courses in planning or urban politics may also substitute in this track.

Public Policy Analysis Those who plan to work as management, budget, or research analysts should choose this specialization. Other relevant professions include program planning and development, productivity enhancement, and program evaluation.

Students must select four from the following courses:

MPA 677	Managing Information in the Public and Non-profit Sector
MPA 683	Microeconomic Applications to Policy Analysis
MPA 684	Welfare Policy
MPA 688	Applied Statistical Analysis
MPA 689	Program Evaluation

Public Finance and Economic Development Students interested in economic development, budgeting, fundraising, and financial management should select this specialization. Relevant positions include economic and community development, budget analyst, and financial officer.

Students must select four of the following courses: MPA 671-Special Topics in Public Finance MPA 676-Financial Management in the Public Sector MPA 683-Microeconomic Applications to Policy Analysis MPA 674-Geographic Information Systems MPA 690-Seminar in Public Service Issues: Electronic Government MPA 691-Economic Development

Generalist MPA Degree An alternative to selecting one of the above specializations exists. Students may pursue a generalist M.P.A. degree. This degree should be chosen if the student desires a broadly based degree and some familiarity with subjects in each of the specializations. Students who desire a public administration education transferable to many different public or nonprofit settings may want to take this course of study. To complete this degree, students must take the core curriculum and at least two courses from any three specializations, along with two electives.

Coordinated M.P.A./M.P.H. Program The M.P.A./M.P.H. is designed to train individuals for administrative positions in public health and related health organizations. The Master of Public Administration degree prepares students for careers as administrators in public and nonprofit agencies, and the Master of Public Health provides a background in public health principles and programs. Students must apply to, and enroll in, both programs, meeting each program's entry requirements.

Program Requirements Students are required to complete a total of 60 semester hours for the coordinated degree. A minimum of 24 hours must be completed from each program; the remaining 12 hours may come from either program. The full-time student should be able to complete all degree requirements in three years.

Coordinated M.P.A.-J.D. The M.P.A. program at UAB and the Cumberland School of Law at Samford University offer a coordinated M.P.A.-J.D. program. The offering of this dual degree reflects recognition of the complex interrelationship between the legal system, public policy analysis, and public management. It will be particularly applicable to those pursuing careers in government and/or public interest law.

Students must apply and be admitted to the M.P.A. and JD programs separately. The requirements for each degree must be met. Close communication with both programs is required. Depending on prior experience, a field placement may be required. A thesis is optional.

Comprehensive Examination During the last semester of study, students must successfully complete a comprehensive examination. Such an exam will require the student to synthesize material learned over the course of the program. Should the student need to rewrite any part of the exam, he/she may be required to enroll in the subsequent term for MPA 692 in order to rewrite the questions missed.

M.P.A. Alumni Association

An active alumni association welcomes graduates of the program into membership. The association makes both advisory and financial contributions to the program and seeks to elevate the level of professionalism in public administration through a variety of projects and services.

Internships and Placement

Students may apply for an internship placement at any time following completion of MPA 659. Several paying opportunities exist, although the majority of internships are non-paying. Typical placements are in city and county government, planning departments, public health agencies, social service agencies, state government agencies, and various nonprofit organizations. The department has placed several students in the prestigious Presidential Management Internship Program, which provides an excellent opportunity for eventual employment in the federal government.

Students are encouraged to use the services of the UAB Student Development Office in the University Center for career planning and placement. The faculty in the program also assists students in job placement.

Additional Information

For additional information refer to the web site of the UAB M.P.A. program: www.uab.edu/gps/mpa. Also detailed information can be found in the M.P.A. graduate manual available at the program office. Questions concerning enrollment in the M.P.A. program should be directed to Dr. Akhla-

que U. Haque. Director, M.P.A. Program. Department of Government and Public Service. U 238, 1530 3rd Avenue South. Birmingham, Alabama 35294-3350.
Telephone (205) 934-9680

Course Descriptions

Public Administration (MPA)

Unless otherwise noted, all courses are for 3 semester hours of credit. Courses numbers preceded with an asterisk indicate courses that can be repeated for credit, with stated stipulations.

659. Environments of Public Service. Introduction to the environmental forces that shape the nature and direction of the public service. Examination may include philosophical, historical, intellectual, constitutional, social and cultural, and ethical and moral environmental forces. 3 hours.

660. The Public Policymaking Process. Public Policy as a decision-making process. Examines environmental and organizational factors, the choice of alternatives, and the implementation and evaluation of public policy, with applied references to specific functional areas, e.g., housing, pollution, energy, and transportation. 3 hours.

661. Administrative Theory and Behavior. Theories of organization, management, and administration. Examines both institutional and behavioral elements of organizations as they apply to public, private, and nonprofit agencies. Covers individual behavior, role and leadership theories, decision-making, and communication theories, along with a treatment of bureaucratic practices and behavior. 3 hours.

662. Urban Administration. Covers the multiple dimensions involved in metropolitan governance and administration, to include elements of urban development, public works, public finance, the politics/administration interface, neighborhood participation, and the government/business interface. 3 hours.

664. Human Resources Management. Examines the major concepts, theories, procedures and themes needed for effective management of human resources in the public and nonprofit sectors. Emphasis is on the urban and sub-national settings. Topics may include merit and civil service systems, organized public labor, recruitment, classification, performance appraisal, disciplinary and grievance procedures, training and staff development, diversity and anti-discrimination policy and strategies, ethics/morality and personnel law. 3 hours.

666. Public and Nonprofit Budgeting. Examines the institutions, principles and techniques of governmental budgeting, including the practices and fundamental concepts of public budgeting, budgeting process, financial management and public finance. Budget development and analysis using techniques such as cost-benefit and variance analysis, spreadsheet, and other microcomputer tools. 3 hours.

667. Public and Administrative Law. Explanation of law in society and the legal setting of public administration. Examination of substantive areas of the study of law including regulatory process, administrative adjudication, the administrative procedures acts, administrative due process, judicial review, liability, and citizen's rights. 3 hours.

668. Intergovernmental Relations. The various relations among governments in the U.S. system. Focuses on understanding the interactions, attitudes, and behavior of elected officials and bureaucrats of two or more units of government functioning in their public capacities. 3 hours.

671. **Special Topics in Public Finance.** Seminar focused on specific topics in finance including economics, revenue projection, capital budgeting, project evaluation, and debt management for public and nonprofit agencies. 3 hours.

672. **Agency Administration.** The day-to-day challenges faced by managers of small nonprofit agencies, including the challenge of balancing competing values such as efficiency, effectiveness, and equity. 3 hours.

673. **Community Planning and Organization.** Covers the principles of citizen empowerment in the planning process, performing needs assessments, and organizing citizens for action. 3 hours.

674. **Geographic Information Systems.** Examines the use of Geographic Information Systems (GIS) using GIS software. It integrates theory and socioeconomic applications of GIS in the public and nonprofit sector. 3 hours.

675. **Ethics and Morality in Public Service.** Ethical and moral foundations to public service behavior. 3 hours.

676. **Financial Management in the Public Sector.** The financial management systems used in the public sector, with emphasis on state and local government. Topics include revenue sources, revenue projection, capital budgeting and project evaluation, debt management, nonbudgetary expenditure controls, and fund accounting. The relationship of these topics to operational budgeting is also delineated. 3 hours.

677. **Managing Information in the Public and Nonprofit Sector.** Theory and applications of information management in the public and nonprofit sectors. Focus is on social, organizational, political and constitutional impacts of information today. Emphasizes applications such as database management, communications networks, expert systems, and geographic information systems. 3 hours.

678. **Strategic Planning for Public/Private Action.** Presents the strategic planning process as it is utilized in contemporary urban planning settings. Focuses on how the strategic planning process is applied in the public, private, and nonprofit sectors and the extent to which there is substantial variation. Case study comparisons and group workshops simulate actual planning scenarios. 3 hours.

680. **Urban Development and Planning.** Urban planning as a form of state intervention into urban dislocation caused by the growth and change in the city. Examines the major urban forces that shape planning, theories of urban development, globalization aspects of urban planning. The role that planning and urban development play in the nonprofit sectors in urban settings. 3 hours.

681. **Local Government Planning.** Overview of theories, methodologies, and political aspects of municipal planning. 3 hours.

683. **Microeconomic Applications to Policy Analysis.** Applications of microeconomics to policy analysis. Topics include the production and consumption theory, market structure and regulation, theories of collective choice, and nonmarket decision-making. 3 hours.

684. **Welfare Policy.** History, development and operation of welfare policy in the United States. Special focus on philosophy and service delivery. 3 hours.

685. **Special Topics in Public Administration.** Special topics seminar based on the research and substantive interests of the MPA faculty and students. 3 hours.

686. **Research Design.** Quasi-experimental and experimental research design, including issues of internal and exter-

nal validity, causal analysis, mass and elite interview techniques; archival analysis; problems of measurement. 3 hours.

687. **Statistical Analysis.** Introduction to descriptive statistics and data coding. Nonparametric and parametric statistics, contingency tables, chi-square through correlation, simple regression, and multiple regression. Introduction to inferential statistics via statistical tests for differences between groups (t-test and one-way ANOVA). 3 hours.

688. **Applied Statistical Analysis.** Application of statistical techniques to problems in public affairs. Students will be required to create a research design, apply statistical analyses, and interpret the analyses. Advanced statistical tools will be introduced, including ARIMA, PROBIT, LOGIT, etc. 3 hours.

689. **Program Evaluation.** Analytic tools for evaluating public and nonprofit programs and services. Prerequisite MPA 687. 3 hours.

690. **Seminar in Public Service Issues.** Special topics focusing on current pressing issues in government and governance, and the nonprofit sectors. 3 hours.

691. **Economic Development.** Develops an understanding of the impact of market and noneconomic forces on local and regional economic development. 3 hours.

692. **Independent Study in Public Administration.** One-on-one learning experience between student and an instructor with permission of the program director. 3 hours.

693. **Internship in Public Administration.** Supervised field placement in public or nonprofit agency for directed work experience arranged by the program director. 3 hours.

699. **Thesis Research.** Credit for research and writing of thesis. 1-6 hours.

Public Health (Ph.D.)

In addition to the M.S. in Biostatistics, and the Ph.D. programs in Biostatistics, Environmental Health Sciences, Epidemiology, and Health Behavior (Health Education/Health Promotion) that are described in this catalog, several professional degree programs are offered through the School of Public Health. The Master of Public Health (M.P.H.) degree programs are Biometry, Environmental Health/Toxicology, Occupational Health and Safety, Epidemiology/International Health, Public Health Nutrition, Health Behavior, Behavioral Science, Health Care Organization and Policy, General Theory and Practice, Maternal and Child Health. In addition, several joint degree programs are available that enable students to pursue two degrees simultaneously. These are the M.P.H.-M.D., M.P.H.-Ph.D. (Psychology or Sociology at UAB), M.P.H.-M.B.A., M.P.H.-M.P.A., M.P.H.-J.D., M.P.H.-O.D., M.S.P.H.-Ph.D. (Psychology at UAB or the University of Alabama), M.P.H.-M.S.W., M.P.H.-M.S.N. The Master of Science in Public Health (M.S.P.H.) includes degree programs in Clinical Research, Environmental Health Sciences, Epidemiology, and Health Policy and Outcome Research. The Doctor of Public Health (Dr.P.H.) degree program options are Environmental Health, International Health, Public Health Nutrition, and Maternal and Child Health.

Additional Information

For detailed information about the M.P.H., M.S.P.H., and Dr.P.H. programs, please consult the School of Public Health Catalog, which may be obtained by contacting the Office of Student and Academic Services, UAB School of Public

Health, Ryals Building, Room 120, 1665 University Boulevard, Birmingham, AL 35294-0022.
Telephone 205-934-4993
E-mail osas@ms.soph.uab.edu
Web www.uab.edu/PublicHealth

Sociology (M.A.) Medical Sociology (Ph.D.)

Graduate program director: *Clair*

Primary Faculty

Patricia Baker, Assistant Professor (Sociology, Center for Aging); Gerontology

Jeffrey M. Clair, Associate Professor (Sociology); Medical Sociology, Social Psychology, Policy

William C. Cockerham, Professor (Sociology); Medical Sociology, Theory, Mental Health, International Aspects of Health

Patricia Drentea, Assistant Professor (Sociology); Family, Gender, Aging, Methods

Kevin M. Fitzpatrick, Professor (Sociology); Urban Sociology, Mental Health, Youth-Adolescence, Statistics

Jeffrey E. Hall, Instructor (Sociology); Medical Sociology, Injury Epidemiology, Gender Roles, Human Sexuality.

Sean-Shong Hwang, Professor (Sociology); Statistics and Methodology, Demography, Human Ecology and Urban Sociology

Mark E. LaGory, Professor (Sociology); Theory, Urban and Human Ecology, Mental Health of Special Populations, Homelessness

Robin Lanzi, Assistant Professor, (Sociology, Civitan International Research Center); Child Development, Social Psychology

Ferris J. Ritchey, Professor (Sociology); Medical Sociology, Statistics, Health Care and Illness Among the Homeless

Kenneth L. Wilson, Associate Professor (Sociology); Inequality, Adult Development, Social Psychology

Michele Wilson, Associate Professor (Sociology); Deviant Behavior, Sex Roles, Social Problems, Social Control of Women

William C. Yoels, Professor (Sociology); Social Psychology of Health and Illness, Sociology of Rehabilitation, Life Cycle Issues, Theory

Secondary Faculty

Richard M. Allman, Professor (Medicine; Center for Aging); Gerontology, Doctor-Patient Communication

Affiliated Faculty

Janet Bronstein, Associate Professor (Public Health)

Stuart Capper, Professor (Public Health)

Hughes Evans, Associate Professor (Medicine)

Lynn Gerald, Assistant Professor (Health Related Professions)

Harold Kincaid, Professor (Arts and Humanities)

Michael Morrissey, Professor (Public Health)

John Sloan, Associate Professor (Social and Behavioral Sciences)

Brent Smith, Professor (Social and Behavioral Sciences)

Alan Stamm, Professor (Medicine)

Christopher Taylor, Associate Professor (Social and Behavioral Sciences)

Sociology M.A. Program

Requirements for the M.A. Degree

To be admitted in good standing, candidates must meet all Graduate School admission requirements. Applicants lacking 18 semester hours in social science courses will be evaluated individually for academic deficiencies. Supplemental coursework may be recommended by the graduate faculty.

Students admitted to the Sociology graduate program choose one of three areas of specialization: urban inequality, health and aging, or social psychology.

The program provides both Plan I (thesis) and Plan II (nonthesis) options. The M.A. degree is conferred upon the fulfillment of the requirements outlined below. All students must fulfill the first two requirements. The third requirement differs for Plan I and Plan II students.

1. All four of the following core courses are required for all students:

SOC 701	Data Management and Analysis
SOC 703	Advanced Statistics
SOC 705	Methodology of Social Research
SOC 707	Macrosociological Theory

2. Students must complete at least two courses from one of the four following areas of specialization:

Urban Inequality

SOC 716	Social Stratification
SOC 740	Deviant Behavior
SOC 755	Race and Ethnic Relations
SOC 756	Gender Inequality
SOC 757	International Inequality
SOC 774	The Sociology of Policy Analysis
SOC 775	Urban Ecology
SOC 778	Demography
SOC 779	Experiencing Urban Life

Health and Aging

SOC 721	Social Psychology of Health & Illness
SOC/GER 759	Social Gerontology
SOC/GER 769	Sociology of the Life Cycle
SOC/GER 777	Demography of Health and Aging
SOC 780	Medical Sociology
SOC 787	Sociology of Mental Health
SOC 781	Sociology of Health
SOC 788	Social Medicine
SOC/GER 796	Research Seminar in Health and Aging

Social Psychology

SOC 711	Qualitative Methods
SOC 720	Microsociological Theory
SOC 721	Social Psychology of Health & Illness
SOC/GER 769	Sociology of the Life Cycle
SOC 779	Experiencing Urban Life

Under special circumstances, with written approval from the student's advisor and the sociology graduate program director, an independent study course may be substituted for specialty courses.

3. Students must complete the following additional requirements, depending on whether they are pursuing Plan I or Plan II:

Plan I (Thesis) Option

At least two additional substantive courses (these may be in areas outside of sociology, subject to approval by the Sociology graduate program director);

- 6 semester hours of thesis research (SOC 699);
- an acceptable research-based thesis; and
- a final oral examination based on the thesis.

Plan II (Nonthesis) Option

At least five additional substantive courses (two of these courses may be in an area outside of sociology, subject to the approval of the Sociology graduate program director);

- a comprehensive written examination in the student's area of specialization.

Medical Sociology Ph.D. Program

This program is designed to provide students with the coursework and research experiences to become leading researchers and practitioners in medical sociology. Doctoral training in medical sociology exposes students to the central issues of the field through a variety of methodological techniques encompassing both qualitative and quantitative approaches. Graduate students study the social and cultural bases of health beliefs and behaviors, organizational structures of health care delivery, and patient-practitioner relationships, to name just a few examples. Students acquire expertise in theory formulation and data analysis.

There are abundant research opportunities for graduate students to work with faculty on projects in medical settings across the campus. The department pursues opportunities for graduate student exchange arrangements with medical sociology programs in European and Japanese universities.

Admission

Admission to the Ph.D. program in medical sociology requires a minimum overall score of 1150 on the GRE (verbal and quantitative); minimum GPAs of 3.0 (A = 4.0), or a 3.2 GPA for the last 60 semester hours in a B.A. or B.S. program and 3.5 GPA in all previous graduate coursework. Students should have completed at least 18 hours in social science courses, including social theory, statistics, and research methods. Students entering the program with a master's degree will be granted waivers for a maximum of 24 semester hours of substantive graduate work, with the permission of the graduate program director and the professors who teach parallel courses. Exceptional students who fail to meet any of the above requirements will be evaluated on a case-by-case basis.

Because of the interdisciplinary nature of the Medical Sociology Ph.D. program, students with diverse backgrounds in social science and health-related fields are encouraged to apply. Students lacking adequate backgrounds in theory, research methods, or statistics may be required to make up deficits after enrollment.

Students pursuing the doctoral degree must follow Plan I (thesis plan) of the existing master's degree program by producing a research-based thesis, but two types of documents will be acceptable. The first alternative is a longer, traditional thesis organized in the form of a short book monograph. This option is especially appropriate for qualitatively based research. The second alternative is a manuscript in the standard form of a journal article with appended materials.

Advising

The Graduate Director will provide continuous advisement on academic progress during the student's graduate study, including course selection and research/clinical experiences consistent with the student's developing interests and abilities.

Research supervision is provided by faculty whom students select to chair the master's thesis and Ph.D. dissertation committees. Typically, the student will select persons with whom a close, supportive relationship develops.

The placement of Ph.D. students in research sites is an important part of the Medical Sociology Program. Such sites may involve assisting faculty on research grants or working in a clinical setting under the supervision of a faculty member. Such experiences will provide students with invaluable real-life exposure to medical sociology "in action." As such, they are important accompaniments to the in-class coursework of the Ph.D. program.

Curriculum

The components of the Ph.D. program are as follows:

- Medical Sociology Core (9 hr: SOC 780 and two of the following: 721, 735, 781, 787, 788);
- Sociological Theory Core (6 hr: SOC 707, and either 720 or 722);
- Research Methods and Statistics Core (12 hr: SOC 701, 703, 705, and 711);
- Elective hours (30 hr);
- Professional Proseminar (3 hr);
- Master's thesis credit hours (6 hr); Ph.D. Dissertation Credit Hours (24 hr).

Financial Aid

All students admitted to the Ph.D. program will be considered for financial aid. Sources include graduate fellowships and assistantships.

Additional Information

For detailed information, contact Jeffrey M. Clair, Sociology Graduate Program Director, UAB Department of Sociology, U 237D, 1530 3rd Avenue South, Birmingham, Alabama 35294-3350.

Telephone 205-934-3307 or 934-8680

E-mail jclair@uab.edu,

Web www.sbs.uab.edu/socio.htm

Course Descriptions

Unless otherwise noted, all courses are for 3 semester hours of credit.

Sociology (SOC)

701. Data Management and Analysis. Codebook design; management of data files; orientation to microcomputer software; bivariate statistical analysis. Prerequisite: SOC 310 or permission of instructor.

702. Proseminar on the Profession. Introduction to the profession of sociology. Required for all incoming students. 1 hour.

703. Advanced Statistics. Multivariate statistical analysis. Prerequisite: SOC 701 or equivalent or permission of instructor.

704. **Advanced Quantitative Analysis.** Structural equation modeling. Prerequisite: SOC 701 and SOC 703 or permission of instructor.

705. **Methodology of Social Research.** Prerequisite: SOC 703 or equivalent.

707. **Macrosociological Theory.** Basic theoretical perspectives, functionalism, conflict theory, structural and biosocial theorizing. Prerequisite: SOC 407 or equivalent.

708. **Integrating Qualitative and Quantitative Method.** Triangulated research strategies.

710. **Multivariate Statistical Methods.** Structural equation modeling in general and LISREL in particular. Builds practical skills and a broad awareness of the rationale for statistical methodologies. Prerequisite: SOC 703 or multiple regression equivalent.

711. **Qualitative Methods.** Field research design, observational research; in-depth interviewing strategies, gaining access to research sites.

712. **Theory Construction.** Logic of constructing theories; issues in the philosophy of science.

714. **Survey Research Methods.** Survey design, sampling, instrumentation, data collection and analysis, and report writing.

716. **Social Stratification.** Theories of inequality; race and ethnic inequality, gender inequality, and international inequality.

720. **Microsociological Theory.** Society from individual's perspective; interactionist theory, social exchange, sociology of emotions.

721. **The Social Psychology of Health and Illness.** Socially constructed definitions of health and illness, viewed historically and cross-culturally. Variations across gender, class, and ethnic lines in perceptions of health and illness.

722. **Contemporary Sociological Theory.** Reviews most recent sociological theories accounting for social conditions in the 21st century, including Beck, Bourdieu, Foucault, Giddens, and the postmodernists.

725. **Integrating Sociological Ideas.** Through extensive reading and writing, integration of knowledge acquired in theory and methods courses; facilitation of the dissertation proposal. Prerequisite: completion of the M.A. degree, SOC 701, 703, 705, 707, 711, 780, and SOC 720 or 722.

730. **Comparative Family Systems.** Organization and functions; urbanization and family influences on personality.

734. **International Medical Sociology.** Cross-cultural, comparative analysis of health and health care delivery systems in both industrialized and developing countries.

735. **Special Topics in International Medical Sociology.** Analysis of selected topics in the field of international health and medical sociology.

740. **Deviant Behavior.** Contemporary social psychological theories of deviant behavior; recent empirical findings.

755. **Race and Ethnic Relations.** Income inequality, school and residential segregation, intermarriage, and interracial relationships.

756. **Gender Inequality.** Theories of inequality, applicability to gender stratification; macro and micro research.

757. **International Inequality.** Globalization and economic, political, and ecological bases of inequalities between "developed" and "developing" countries. Racial, ethnic, and gender variations in inequality.

759. **Social Gerontology.** Structural and behavioral implications of older adulthood. Relationship of older adults to political, economic, educational, medical, religious, and other structures in society.

760. **Sociology of Death and Dying.** Sociological, social psychological and existential perspectives on death and dying; recent trends in definition, distribution, and practices surrounding death and dying.

769. **Sociology of the Life Cycle.** Theories of life; social construction of age categories, aging and family life, work, careers, and aging; men, women, and life cycle.

770. **Techniques of Population Analysis.** Composition of population; constructing life tables; population estimation and projection; migration.

771. **Sociology of Disability.** Chronic conditions and injuries leading to disability among elderly persons; societal attitudes toward disability; measuring disability and improving quality of life for older disabled people.

772. **Medical Demography.** Quantitative assessment of health status of populations in clinical, epidemiological, and sociological studies; interrelationships of health with population structure and dynamics. Modeling preventive health strategies.

774. **The Sociology of Policy Analysis.** Theories of policy formation and implementation, social impact analysis, implementation analysis; role of sociology in policy process.

775. **Urban Ecology.** Population distributions and spatial patterns in cities, effects on behavior.

777. **Demography of Health and Aging.** Focus on demographic processes, such as mortality, morbidity, migration, and fertility; how each influences number and proportion of elderly; how such processes shape age-sex structure; other demographic characteristics of older people.

778. **Demography.** Effect of population processes such as birth, death, migration, and marriage on growth, decline, composition, and distribution of populations.

779. **Experiencing Urban Life.** Experiences of persons in cities; major theories of urban life, meanings of community, social organization of daily city life, urban lifestyles, power in cities.

780. **Medical Sociology.** Theory and research in medical sociology; systematic overview of relevant literature.

781. **Sociology of Health.** Subjective experience of illness; predictions of health behavior; social networks and health.

783. **Health Care Delivery Systems.** Sociological methods and concepts in health care institutions; health care policy.

784. **Health Professions.** Interrelationships among health professions, including public health and ancillary industries; historical development and role boundary maintenance of health professions, lay and folk healers, and health marketers.

785. **Family and Health.** How family structure and family process affect health outcomes.

786. **Health and Service Delivery for Disadvantaged Populations.** Prevalence, causes, and consequences of health and mental health problems for special populations, such as homeless, poor, migrants, and African Americans; the stratification of service delivery systems.

787. **Sociology of Mental Health.** Impact of life events and social supports on depression and other mental disorders; racial minorities, women, elderly, homeless.

788. **Social Medicine.** Socioenvironmental factors in etiology of disease; social movements and health policy; medical ethics and broad ethical issues; place of social science in medical care.

GER 790. **Seminar in Gerontological Substantive Areas.** Individually designed research agendas for students wishing to conduct semi-independent research or guided reading in social gerontology. Prerequisite: Permission of instructor. 1-3 hours.

790-793. **Seminar in Sociological Substantive Areas.** Prerequisites: Permission of advisor and graduate education director. 3 hours each.

796. **Research Seminar in Health and Aging.** Conducting social research, gaining access to research settings, getting started, writing grant applications, presenting papers at professional meetings, and thesis and dissertation proposal writing. Lectures and student presentation of research.

798. **Nonthesis Research.** Integration of theory and research methods: synthesis of data into well-written report derived from research activities. Prerequisite: Completion of major requirements. 1-6 hours.

799. **Thesis Research.** Prerequisite: Admission to candidacy. 1-6 hours.

798. **Nondissertation Research.** 1-6 hours.

799. **Dissertation Research.** Prerequisite: Admission to Ph.D. candidacy. 1-6 hours.

Speech and Hearing Sciences

Faculty

Larry E. Adams, Professor (Speech and Hearing Sciences); Resonance Disorders, Motor Speech Disorders, Adult Language Disorders

Paul A. Dagenais, Adjunct Research Professor (Speech and Hearing Sciences); Speech Science, Acquired Disorders of Language, Motor Control

Arthur J. Dahle, Professor Emeritus (Speech and Hearing Sciences); Pediatric Audiology, Auditory Perception

James E. Flege, Professor (Speech and Hearing Sciences); Speech Production, Speech Perception, Speech Acquisition

Samuel E. Fletcher, Professor Emeritus (Speech and Hearing Sciences)

Ronald Goldman, Professor Emeritus (Speech and Hearing Sciences)

Doreen Oyadomari, Associate Professor (Speech and Hearing Sciences); Voice and Laryngeal Video Stroboscopy

Robert E. Roach, Professor Emeritus (Speech and Hearing Sciences)

Mary Helen Southwood, Associate Professor (Speech and Hearing Sciences); Motor Speech Disorders, Aphasia, Resource Allocation (Attention) Deficits

Division Information

Although UAB does not currently offer a program of study leading to a graduate degree in Speech and Hearing Sciences, didactic coursework and clinical education experiences are available to qualified graduate students.

The Division of Speech and Hearing Sciences is committed to the scientific study of (1) system, structures, and functions of human communication; (2) acquisition and development of speech, language, and hearing; (3) normal and disor-

dered communication behavior; and (4) assessment and management of communication disorders.

The division maintains modern, uniquely equipped research laboratories to support scientific investigations related to human communication and disorders.

In addition to the study of normal and disordered human communication, the faculty, many with clinical specialties in speech-language pathology and audiology, have specific interests in the management of these disorders and the application of state-of-the-art rehabilitative procedures.

Additional Information

For detailed information, contact Dr. Larry E. Adams, UAB Division of Speech and Hearing Sciences, CH20, 1530 3rd Avenue South, Birmingham, Alabama 35294-2042.

Telephone 205-934-481

E-mail shs@uab.edu

Course Descriptions

Unless otherwise noted, all courses are for 3 semester hours of credit. Course numbers preceded with an asterisk indicate courses that can be repeated for credit, with stated stipulations.

Speech and Hearing Sciences (BIC)

591. **Communication Disorders Interdisciplinary Seminar.** Evaluation and treatment of individuals with medically related communication disorders. 3-5 hours.

595. **Communication Disorders Internship.** Practicum in diagnosis and treatment of children and adults with communication problems; specific areas such as mental retardation, cleft palate, and hearing-aid delivery systems. 3-9 hours.

598. **Independent Study** (Master's level). 1-3 hours.

791. **Seminar in Speech and Hearing Sciences/Dentistry.** For specialists in dentistry, speech and hearing science, and speech pathology. Phonetics and new instruments for measurement of oral functions and disturbances of dentofacial complex. 2 hours.

798. **Independent Study** (Doctoral level). 1-3 hours.

Theatre

Although UAB does not offer a graduate degree in theatre, courses in this area are available to interested graduate students. For additional information, contact Marc Powers, UAB Department of Theatre, Bell Building 101, 1530 3rd Avenue South, Birmingham, Alabama 35294-3340, Telephone 205-934-3236, E-mail mpowers@uab.edu

Toxicology

Graduate program director: *Lamartiniere*

Faculty

Charles D. Amsler, Associate Professor (Biology); Marine Ecophysiology and Chemotactic Signal Transduction

Robert Angus, Professor (Biology); Endocrine Disrupters in Aquatic Models

Stephen Barnes, Professor (Pharmacology and Toxicology); Nutritional Chemoprevention and Toxicology; Site-Directed Mutagenesis

John Crow, Assistant Professor (Anesthesiology); Biological Reactivity and Pathophysiological Relevance of Peroxynitrite, Nitric Oxide, and Superoxide

Robert B. Diasio, Professor (Pharmacology and Toxicology); Clinical Pharmacology and Toxicology of Antineoplastic Agents

Ada Elgavish, Associate Professor (Comparative Medicine); Influence of Environmental Toxins on Prostate Cancer Causation and Prevention, and Bladder Cystitis

Charles N. Falany, Associate Professor (Pharmacology and Toxicology); Protein Chemistry and Molecular Biology of Drug-Metabolizing Enzymes, Chemical Carcinogenesis

Henry Jay Forman, Professor (Environmental Health Sciences); Exposure to Environmental Pollutants, Oxidants Produced by Drug Metabolism, Reactive Oxygen Species, and Signal Transduction

Joseph J. Gauthier, Associate Professor (Biology); Environmental Toxicology, Microbial Ecology of Waste Treatment Processes

Clinton J. Grubbs, Professor (Nutrition Sciences); Cancer Chemoprevention Using In Vivo Models

Santosh Kastiyar, Assistant Professor (Dermatology); Diet and Cancer

Frances G. Kern, (Pathology); Molecular Tumor Biology of Breast Cancer, Signal Transduction, Growth Factor Signaling and Steroid Receptor Expression

Coral A. Lamartiniere, Professor (Pharmacology and Toxicology); Environmental Toxicology, Molecular Endocrinology, Chemoprevention of Mammary and Prostate Cancers

Thomas M. Lincoln, Professor (Pathology); Role of Nitric Oxide and Cyclic GMP in Signal Transduction

Rui-Ming Liu, Assistant Professor (Environmental Health Sciences); Regulation of g-Glutamyltranspeptidase Gene Expression During Tumor Genesis Caused by Liver Carcinogens

James B. McClintock, Professor (Biology); Marine Invertebrate Chemical Ecology, Reproduction, Nutrition and Physiology

Jay M. McDonald, Professor (Pathology); Pathogenesis of Osteoporosis and AIDS; Signal Transduction

Joanne E. Murphy-Ullrich, Professor (Pathology); Complex Extracellular Milieu That Regulates Cell Differentiation, Adhesion, and Motility; Matrix Proteins and Growth Factors

Dennis J. Pillion, Professor (Pharmacology and Toxicology); Drug Delivery and Toxicology of Diabetic Drugs

Richard Rozmahel, Assistant Professor (Genomics and Pathobiology); Molecular Biology and Genetics of Cystic Fibrosis and Alzheimer's Disease

Deodutta Roy, Professor (Environmental Health Sciences); Environmental Estrogens and Reproductive Health

Douglas Ruden, Associate Professor (Environmental Health Sciences); Genetics in Drosophila, epidermal Growth Factor Receptor

Jeffrey Smith, Professor (Pharmacology and Toxicology); Membrane Transport: Toxicology of Heavy Metals

R. Douglas Watson, Professor (Biology); Effects of Endocrine Disrupters on Neuropeptide Molt-Inhibiting Hormone and Vitellogenesis in Aquatic Systems

Stephen A. Watts, Professor (Biology); Physiology and Biochemistry of Growth and Stress in Aquatic Organisms; Steroid Metabolism and Physiology; Polyamine Metabolism;

Environmental and Hormonal Control of Growth and Reproduction; Physiological Ecology.

Ruiwen Zhang, Associate Professor (Pharmacology and Toxicology); Carcinogenesis; Anticancer Agents; Antisense Oligonucleotides.

Training Program Information

The Graduate Training Program in Toxicology is designed to educate students and provide research experience leading to the Ph.D. in the interdisciplinary field of toxicology. The core courses include biological chemistry and cellular physiology, pathophysiology and pharmacology of disease, molecular medicine and functional genomics, pharmacology, and toxicology. A student in good standing after completing the core curriculum will identify a mentor and complete electives and dissertation research in a participating degree-granting program. Students are expected to conduct original research addressing specific toxicology problems or projects in pharmacology and toxicology, molecular and cellular pathology, nutrition sciences, epidemiology, environmental health sciences, and biology.

UAB has the vision of providing students with diverse and expert toxicological training. Our faculty provide outstanding research opportunities in molecular and cellular toxicology, biochemical and endocrine toxicology, cancer causation and prevention, clinical toxicology, developmental toxicology, environmental toxicology, epidemiology and risk assessment, forensic toxicology, molecular and cellular toxicology, neurotoxicology, and nutritional chemoprevention and toxicology.

Education and research training in UAB's Graduate Training Program in Toxicology is designed to prepare individuals for careers in academia, industry, and government.

Applications for predoctoral studies are considered from students who have received or expect to receive a B.S. or M.S. degree in biology, chemistry, or a related discipline. A minimum GPA of 3.0 on a 4.0 scale and a combined score of 1100 on the verbal and quantitative portions of the GRE are preferred. Interviews and visits are encouraged. Accepted students usually receive stipend and tuition assistance.

Additional Information

For detailed information, contact Dr. Coral A. Lamartiniere, UAB Department of Pharmacology and Toxicology, VH 124, 1530 3rd Avenue South, Birmingham, Alabama 35294-0019.

Telephone 205-934-7139

Fax 205-934-8240

E-mail Coral.Lamartiniere@ccc.uab.edu

Course Descriptions

Unless otherwise noted, all courses are for 3 semester hours of credit. Courses numbers preceded with an asterisk indicate courses that can be repeated for credit, with stated stipulations.

Toxicology (TOX)

711. Principles of Toxicology. Target organ toxicology. Developmental endocrine, reproductive, regulatory toxicology. Spring.

712. Actions and Assessments of Toxicants. Comprehensive information on the origin, distribution, and mechanistic actions of toxicants on the mammalian system. Summer.

720. **Toxicology Laboratory Rotation.** 1-9 hours.

750. **Breast Cancer Causation and Regulation.** Epidemiology, mechanism of therapeutic and chemopreventive drugs, and innovative research and clinical approaches. Fall.

795. **Advanced Toxicology Seminar.** Critical review of recent referred publications in the field of toxicology. 1 hour.

798. **Doctoral Nondissertation Research.** 1-12 hours.

799. **Doctoral Dissertation Research.** Prerequisite: Admission to candidacy. 1-12 hours.

PHR 701. **Graduate Pharmacology I.** Introduction to graduate pharmacology. Pharmacogenetics, drug absorption, disposition and metabolism, drug receptors, agonists and antagonists. Fall. 5 hours.

IBS 700. **Biological Chemistry and Cellular Physiology.** (8 credits). Fall.

IBS 701. **Pathophysiology and Pharmacology of Disease.** (8 credits). Spring.

IBS 702. **Molecular Medicine and Functional Genomics.** (8 credits). Summer.

*Cellular and Molecular Biology I-IV can substitute for the IBS series

Vision Science (Ph.D., M.S.,)

Graduate program director: *Keyser*

Faculty

Franklin R. Amthor, Associate Professor (Psychology); Retinal Physiology, Neural Information Processing

Jimmy D. Bartlett, Professor (Optometry); Low Vision, Ocular Disease

William J. Benjamin, Professor (Optometry); Ocular and Tear Fluid Physiology

David A. Corliss, Associate Professor (Physiological Optics); Eye Movements, Binocular Vision

Christine A. Curcio, Professor (Ophthalmology); Anatomy of Human Retina, Aging

Ramon F. Dacheux, Professor (Ophthalmology); Morphological and Physiological Organization of Mammalian Retina

Kent M. Daum, Associate Professor (Optometry); Eye Movements; Ocular Mobility

Lawrence J. Delucas, Professor (Optometry); Protein Structure

Allan C. Dobbins, Assistant Professor (Biomedical Engineering); Space and Form in Vision

Michael J. Friedlander, Professor (Neurobiology); Molecular Physiology of Synaptic Learning in the Cortex

Patti S. Fuhr, Clinical Assistant Professor (Department of Veterans Affairs); Vision Rehabilitation

Roderick J. Fullard, Associate Professor (Physiological Optics); Corneal and Tear Biochemistry, Dry Eye

Paul D. R. Gamlin, Professor (Physiological Optics); Eye Movements, Pupillary Light Reflex

Timothy J. Gawne, Assistant Professor (Physiological Optics); Central Visual Processing

Christopher A. Girkin, Assistant Professor (Ophthalmology); Optic Nerve and Retinal Imaging

Clyde R. Guidry, Assistant Professor (Ophthalmology); Retinal Wound Healing and Fibroplasia

Kent T. Keyser, Professor (Physiological Optics); Neurotransmitters and Receptors

Robert N. Kleinstein, Professor (Optometry); Myopia, Refractive Errors

Timothy W. Kraft, Assistant Professor (Ophthalmology); Retinal Photoreceptors and Color Vision

Dennis F. Kucik, Professor (Pathology); Integrins

Thomas K. Kuyk, Adjunct Assistant Professor (Department of Veterans Affairs); Visual Psychophysics

Robin A. J. Lester, Professor (Neurobiology); Central Nicotinic Channel Kinetics and Synaptic Function

Michael S. Loop, Associate Professor (Physiological Optics); Human and Animal Psychophysics, Color Vision

Stuart C. Mangel, Associate Professor (Neurobiology); Synaptic Mechanisms

Richard B. Marchase, Professor (Cell Biology); Glucose Metabolism and Calcium Regulation

Richard Mayne, Professor (Cell Biology); Structure and Pathophysiology of Skeletal Muscle, Cartilage, Eye

Lawrence E. Mays, Professor (Physiological Optics); Eye Movements, Oculomotor Neurophysiology

Sthanam V.L. Narayana, Associate Professor (Optometry); Crystallography, Protein Structure

Thomas T. Norton, Professor (Physiological Optics); Regulation of Ocular Development, Emmetropization Myopia

Cynthia Owsley, Professor (Ophthalmology); Visual Psychophysics, Aging

Clyde W. Oyster, Professor Emeritus (Physiological Optics); Neurophysiology, Neuroanatomy, Neural Interactions in Retina

Dennis J. Pillion, Professor (Pharmacology); Ocular Drug Delivery

Steven J. Pittler, Professor (Physiological Optics); Photoreceptor Function in Health and Disease

Douglas M. Ruden, Associate Professor (Public Health); Genetics of Rhabdomyere Development in the Fruitfly *Drosophila*

A. Christopher Snyder, Professor (Optometry); Corneal Physiological Response to Contact Lens Wear

Om P. Srivastava, Professor (Physiological Optics); Cataractogenesis

Trygve O. Tollefsbol, Assistant Professor (Biology); Photoreceptor Function in Health and Disease

Donald B. Twieg, Associate Professor (Biomedical Engineering); MRI Technique Development for Functional Brain Imaging

Thomas R. Unnasch, Professor (Geographic Medicine); Molecular Study of Onchocerciasis

Shu-Zhen Wang, Associate Professor (Ophthalmology); Molecular Mechanisms of Early Neural Development

Rosalyn E. Weller, Associate Professor (Psychology); Neuroanatomy of the Visual System

David R. Whitehart, Professor (Physiological Optics); Corneal Biochemistry, Pharmacology

Program Information

Vision science is a multidisciplinary field encompassing events from the physical stimulus of light—through optical, biochemical, biophysical, and neuronal processes—to visual perception. The primary objective of the graduate program in vision science is to train individuals who will develop innovative approaches to teaching and research in vision science. To meet this objective, the M.S. and Ph.D. degrees require a cur-

riculum covering major topics in vision science along with an original research project.

In addition to the course offerings in vision science, the program offers considerable flexibility in meeting the individual student's needs and career goals. The program encourages students to participate in the wide range of graduate courses offered by other departments of the university. Indeed, the program is interdepartmental in scope, with mentors in eleven different departments ranging from Cell Biology to Psychology.

The graduate program in vision science also offers a 7-year, O.D.-Ph.D. degree program, which combines training in clinical optometry with research in vision science. This is a unique opportunity for students to be trained as clinician-scientists whose knowledge of the eye and central visual pathways will lead to improved diagnosis, treatment, and prevention of blindness and visual impairment.

Although laboratory and research training are emphasized in both the Ph.D. and O.D.-Ph.D. programs, students also have opportunities to gain teaching experience. An appropriate background for study in vision science includes study at the baccalaureate or master's level in a biological, neurological, physical, or health-related science.

The program has an excellent record of preparing students for rewarding careers in teaching, research, or health care.

Admission and Financial Aid

Applications for admission to the graduate program in vision science are reviewed by the Graduate Admissions Committee. The committee looks at the applicants' scores in the Graduate Record Examination (GRE). A combined score of at least 1000 in the verbal and quantitative sections of the GRE exam is required for the M.S. degree, and at least 1200 for the Ph.D. degree. Students currently enrolled in the Ph.D. program have an average GRE score of 1300. Admission also requires undergraduate grades of at least a B average over the previous 60 semester hours of credit, and three letters of recommendation. Applicants should have a strong background in the biological, physical, or health sciences. Students with suitable foreign qualifications are welcome to apply, but must demonstrate a command of written and spoken English, in addition to a score of at least 570 on the TOEFL examination. Over the past fifteen years, 40% of the graduates of the program have been women. We continue to encourage qualified women and underrepresented minorities to apply.

M.S. Degree

Some students may wish to pursue graduate training at the master's level. Two calendar years are needed to complete the M.S. degree in vision science. Each candidate must complete a minimum of 30 hours of credit: 24 credit hours in vision science and 6 credit hours in related graduate courses.

In addition, the candidate must successfully complete a research thesis by the conclusion of the final year.

Selected students in the UAB optometry professional program are encouraged to combine the O.D. degree with the M.S. degree in Vision Science. Financial assistance is available for qualified students. Potential candidates should have completed undergraduate degree in a biological, physical, or health science field.

Ph.D. Degree

The Ph.D. degree is based upon completion of graduate course work, a qualifying examination, research, and a dissertation and defense. There is considerable flexibility in the coursework for the Ph.D. in vision science.

Each student is required to take the first-year core curriculum (VIS 743 thru 748). Students then take three additional courses, selected by the student in consultation with the mentor, and a course in statistics. The program is flexible so that, for example, students who have interests in visual neuroscience may take courses in the neuroscience sequence: VIS 729, Introduction to Neurobiology; Cellular and Molecular Neurobiology; Integrative Neuroscience; and Developmental Neuroscience. Similarly, students interested in the cellular and molecular biology of the visual system may take the Cellular and Molecular Biology (CMB) Program core sequence, or they may select from the upper-level vision courses.

Other courses at a similar level can be substituted so that students can take maximum advantage of offerings in other programs. Individuals with clinical backgrounds will have an opportunity for clinical development. Students are also offered an opportunity to gain teaching experience.

The O.D.-Ph.D. program prepares students for careers that combine clinical optometry and clinical and/or basic research in vision science. This program involves a combination of basic science, research, and clinical training. The program is geared toward students who have outstanding scholastic qualifications and are highly motivated to pursue careers as clinician-scientists.

Because students in this program will receive substantial benefits, admission is highly competitive. Information about admission requirements and application procedures can be obtained by writing to the graduate program director.

Additional Information

For detailed information, contact the graduate program director, UAB Department of Physiological Optics, WORK 626, 1530 3rd Ave S., Birmingham, AL 35294-4390 (office location: Worrell Building, Room 626, 924 18th Street South). Telephone 205-934-6743
E-mail ntravis@uab.edu
Web www.visionscience.uab.edu

Course Descriptions

Unless otherwise noted, all courses are for 3 semester hours of credit. Course numbers preceded with an asterisk indicate courses that can be repeated for credit, with stated stipulations.

Vision Science (VIS)

Core Curriculum

743. Optics and Imaging. Optical properties of the eye. Transparency, aberrations, modulation transfer functions of the eye. Use of coherent optics (lasers) in vision research, MRI in vision research. 2 hours.

744. Ocular Anatomy, Physiology & Biochemistry I. Anatomy of the eye. Biochemistry and physiology of ocular tissues, including tears, cornea, aqueous humor, lens, vitreous and sclera. 2 hours.

745. Ocular Anatomy, Physiology & Biochemistry II. Continued examination of ocular anatomy, biochemistry and physiology of the eye. 2 hours.

746. **Retina and Subcortical Systems.** Retinal circuitry and receptive fields, including color coding, adaptation, circadian rhythms, parallel pathways, and development.

747. **Central Visual Mechanisms I.** Structure and function of geniculostriate parallel pathways, subcortical projections, and the oculomotor system.

748. **Central Visual Mechanisms II.** Analysis of the visual scene by cortical neurons, including temporal coding, motion detection, shape analysis, leading to visual perception.

Elective Curriculum

700. **Vision Literature Review.** Review of vision related literature and preparation for giving presentations.

701. **Visual Sensitivity and Resolution.** Photochemical processes, transduction, absolute and increment thresholds, light and dark adaptation, spatial interactions, spatial resolution and visual acuity, temporal interactions, and temporal resolution.

702. **Color Vision.** Perception of wavelength as color; colorimetry, color vision theories, trichromatic-opponent colors theory, neurophysiology of color vision.

710. **Ocular Biochemistry.** Biochemical components and metabolites in visual system: carbohydrates, proteins, lipids, and nucleic acids; emphasis on scientific inquiry, methodology, and significance of ocular biochemical research. 2 hours.

724. **Applied Statistics in Basic and Clinical Science.**

729. **Introduction to Neurobiology/Marine Biology.** 4 hours.

741. **Special Topics in Visual Neurobiology.** 1 hour.

742. **Special Topics in Corneal Research.** 1 hour.

750. **Special Topics in Retinal Research.** 1 hour.

751. **Retinal Morphology & Physiology.** 3 hours.

790. **Individual Studies and Advanced Topics.** 1-12 hours.

698. **Master's Nonthesis Research.** 1-12 hours.

699. **Master's Thesis Research.** Prerequisite: Admission to candidacy. 1-12 hours.

798. **Doctoral Nondissertation Research.** 1-12 hours.

799. **Doctoral Dissertation Research.** Prerequisite: Admission to candidacy. 1-12 hours.

Appendix I: Policies

August 8, 2000

In addition to the UAB policies contained in these appendixes, other university-wide policies apply to students. These include policies concerning health care for international students and visiting international scholars, AIDS and AIDS-related conditions, a drug-free workplace, alcoholic beverage use, smoking, sexual harassment, electronic data processing security, and computer software use. Copies of these policies are available in the Graduate School Office.

Appendix II: UAB Student Records Policy

The General Education Provisions Act, Section 438, as amended, and the regulations promulgated for the enforcement of the act, found at 45 Federal Register 30911, as amended at 45 Federal Register 86296, provide that all students enrolled or previously enrolled at the University of Alabama at Birmingham have the following rights in relation to their educational records:

I. General Policy

No information from records, files, or other data directly related to a student, other than public information defined below, shall be disclosed to individuals or agencies outside the university without the written consent of the student, except those disclosures set forth in paragraph IX.

II. Definition of Educational Record

Student educational records are defined as those records, files, documents, and other material which contain information directly related to students and which are maintained by UAB or a party acting for UAB. Records of instructional, supervisory, and administrative personnel which are in the sole possession of the maker and accessible only to the maker or a substitute are specifically excluded from this definition of educational record. Educational records of students are not available to UAB Police personnel, and records of the University Police, which, at UAB, are maintained separately from educational records, are maintained solely for purpose of law enforcement, and are not disclosed to individuals other than law enforcement personnel of the same jurisdiction, are not part of the educational record. Records which are made or maintained by physicians, psychiatrists, psychologists, or other professionals or paraprofessionals and which are maintained in connection with treatment and are not available to anyone else are also excluded from a student's educational record, but such records are available to another physician or appropriate professional of the student's choice if requested. Records which only contain information relating to a person after that person is no longer a student are not considered part of the student's educational record.

III. Definition of Student

For the purpose of this policy a student is defined as any individual currently or previously enrolled in any academic offering of UAB. It does not include prospective students.

IV. Public Information

The following is a list of public information which may be made available by the university without prior consent of the student and which is considered part of the public record

of the student's attendance: Name, address (local and permanent), telephone number, date and place of birth, major field of study, participation in officially recognized activities and sports, dates of attendance, degrees and awards received, schedule of classes, and institution most recently previously attended. The information will not be made available if a student directs a written instruction to the appropriate records official prior to the end of the registration period for any given term.

V. Types and Location of Records

Each school maintains a file on each student enrolled, containing applications, grade reports or other performance evaluations, and correspondence. Some departments or programs maintain similar files. The counseling service, placement service, and financial aid office maintain a file on students who use those services. The university has designated the following officials as responsible for student records within their respective areas: University Registrar, Academic Affairs, Room 207, Hill University Center; Dean, Graduate School, Room 511, Hill University Center; Director of Student Affairs, School of Dentistry, Room 207, School of Dentistry Building; Office of the Assistant Dean for Academic and Student Affairs, 604 Webb Building; Associate Director for Records, School of Medicine, Room P100, Volker Hall; Director of Student Services, School of Nursing, Room 105B, School of Nursing Building; Assistant Dean for Student Affairs, School of Optometry, Room 104, School of Optometry Building; Associate Dean for Academic Affairs, School of Public Health, Room 308, Tidwell Hall. The above shall hereinafter be referred to as "records officials." Each of these records officials is responsible for maintaining a listing of student records within such records official's area of responsibility, indicating the location and general content of the records. Any student request concerning records or files, including requests that public information not be disclosed, requests for disclosure to third parties, and requests for access by the student should be directed to this official. Forms for all such requests may be obtained from these officials. These persons will also act as hearing officers when the content of a record is challenged as provided below.

VI. Disclosure of Student Records to the Student

The student is accorded the right to inspect, in the presence of a university staff member, records, files, and data primarily and directly related to the student. To inspect a file a student should go to the office of the appropriate records official and initiate a request in writing. If a student desires to obtain copies of the items in the educational record rather than personally reviewing the record, the written request to the records official for copies must be signed and notarized to prevent disclosure to persons other than the student. A time for inspection shall be granted within forty-five days of the date of the request, and copies will be mailed within the same time period. Copies shall be made and provided to the student at a cost to the student equal to actual cost of reproduction and payable in advance.

The right of inspection does not include financial statements of parents, confidential recommendations placed in the file prior to January 1, 1975, provided that such recommendations were solicited with a written assurance of confidentiality or sent or retained with a documented understanding of confidentiality and used only for the purpose solicited, and other

confidential recommendations, access to which has been waived by the student in accordance with paragraph VIII.

VII. Challenging the Contents of the Record

UAB will respond to any reasonable request for an explanation or interpretation of any item in a student's file. Requests for such explanation or interpretation should be addressed in writing to the appropriate records official.

If, after inspecting a record, a student believes that information contained in the educational record is inaccurate or misleading or violates his or her privacy, the student may request that the record be amended by presenting such request in writing to the appropriate records official. A request that the record be amended shall be answered by the records official within fifteen days of its receipt with information that the record has been amended as requested or that the record has not been amended and that the student has a right to a hearing on the matter. A written request for a hearing should be addressed to the appropriate records official as listed in V, who will set a date and time for hearing with reasonable notice of same to the student within forty-five days of receiving the request.

The request for hearing should identify the item or items in the file to be challenged and state the grounds for the challenge, e.g., inaccuracy, misleading nature, inappropriateness. The records official shall examine the contested item, shall hear the person responsible for placing the item in the file if appropriate, and shall examine any documents or hear any testimony the student wishes to present. A student may be assisted or represented by individuals of his or her choice, including an attorney, at his or her own expense. The records official may decide that the item should be retained or that it should be deleted or altered. The records official shall issue a written decision, based solely on the evidence presented at the hearing, within ten days of the conclusion of the hearing. If the decision is adverse to the student, the notice of decision shall include a statement that the student has the right to place a statement in the record commenting on the information and/or setting forth reasons for disagreeing with the decision.

VIII. Waiver of Access

UAB may request that a student waive the student's right to inspect confidential recommendations respecting that student's application for admission, provided that the student be notified, upon request, of the names of all those providing the recommendations, the recommendations are used only for the purpose solicited, and the waiver is not a condition of admission or any other benefit. Confidential recommendations respecting application for employment or the receipt of an honor or other recognition may also be waived.

A waiver may be revoked with respect to actions occurring after revocation by so notifying the records official in writing.

IX. Providing Records to Third Parties

The general policy of UAB is to refuse access to or disclosure of information from student records to third parties without the written consent of the student. Should a student wish to have such records released, a signed and dated written request must be directed to the proper records official, specifying the records to be released, the reason for release, the party or class of parties to whom records are to be released, and a request for copies to the student, if desired. UAB will then transfer or grant access to the information. The transferred information shall contain a statement that the information may

be used by the receiving party or, if an organization, by its officers, agents, and employees for the purpose requested, but that the party shall not transfer the information to any other party except with the written consent of the student. A charge not to exceed the actual cost of reproduction will be assessed against the student when copies are made for the party or the student.

Student records are available to the following persons with the accompanying conditions without written consent of the student:

1. Instructional or administrative personnel whose duties include responsibilities to students which in the institution reasonably require access to student records.

2. Officials of other schools in which a student seeks to enroll. UAB will make a reasonable attempt to notify the student of the transfer, as well as the student's right to a copy, upon request, and the right to a hearing to challenge the contents if desired.

3. Certain representatives of federal departments or agencies or state educational authorities as provided by the law. In absence of consent or specific authorization by federal law of the collection of personally identifiable data, data collected by excepted officials shall be protected in a manner which will not permit personal identification of students and parents by other than those officials, and personally identifiable data shall be destroyed when no longer needed.

4. Financial aid officers or their assistants in connection with the application for or receipt of financial aid, provided that personally identifiable information may only be disclosed for the purpose of determining eligibility, amount, and conditions and to enforce terms and conditions.

5. Organizations conducting studies for administrative evaluation, tests, etc., provided that studies are not conducted in a manner which will permit personal identification of students or their parents by other than representatives of the organization and that the information will be destroyed when no longer needed for the purposes collected.

6. Accrediting organizations.

7. Other appropriate persons in an emergency to protect health or safety of students or others. In determining appropriateness of disclosure, consideration will be given to the seriousness of the threat to health or safety of the student and others, the need for information to meet the emergency, whether the parties requesting information are in a position to deal with the emergency, and the extent to which time is of the essence.

8. In response to lawful subpoena or court order.

UAB will keep a record, indicating the name and legitimate interest, of all disclosures except those made to a student, those made pursuant to written consent, those designated as public information, and those made to persons at UAB with a legitimate educational interest. This record of disclosure will become a part of the educational record, subject to inspection and review.

X. The UAB Student Records Policy shall be published in the catalog of each school, and a copy shall be displayed prominently on a bulletin board in each school. In order to comply with the requirement that UAB give annual notice of this policy to enrolled students, a short notice of the policy shall be included in the Class Schedule for each term.

XI. Any student who believes that UAB has violated his or her right to access or privacy of educational records as es-

established by the Family Education Rights and Privacy Act of 1974, as amended, the accompanying regulations published at 45 Federal Register 30911, as amended at 45 Federal Register 86296, and this policy may address a complaint to:

The Family Educational Rights and Privacy Act Office
Department of Education
400 Maryland Avenue, S.W.
Washington, D.C. 20202

Appendix III: Non-Resident Tuition Policy

February 9, 1990

The following policy was approved by the Board of Trustees of the University of Alabama as Board Rule 202 on December 5, 1997. For information regarding the implementation of this policy at UAB, see the UAB Non-resident Tuition Policy Statement.

I. Non-resident Tuition Fee

A. All students registering at the University of Alabama, the University of Alabama at Birmingham, or the University of Alabama in Huntsville who do not establish that they are "resident students" shall pay a "non-resident student" tuition which shall be at least twice that of "resident student" tuition.

B. Classification of students as "non-resident students" or "resident students" shall be made at the time of their initial registration and shall continue unchanged through all subsequent registrations at that institution until satisfactory evidence to the contrary is submitted at the time of any subsequent registration.

C. A "resident student" is one who, at the time of registration:

D. Is not a "minor" and is a resident of the state of Alabama and has been a resident of the state for at least one year immediately preceding the date of registration; or

E. Is a "minor" and whose "supporting person(s)" is a resident of the state of Alabama and has been a resident of the state for at least one year immediately preceding the date of registration.

II. Definitions

A. Minor

An individual who, because of age, lacks the capacity to contract under Alabama law. Under current law, this means a single individual under nineteen (19) and a married individual under eighteen (18), but excludes an individual whose disabilities of non-age have been removed by a court of competent jurisdiction for a reason other than establishing a legal residence in Alabama.

B. Supporting person

Either or both of the parents of the student (if they are living together) or if they are divorced or living separate, then either the parent having legal custody or, if different, the parent providing the greater amount of financial support of the two. If both parents are deceased or if neither had legal custody, then supporting person, shall mean, in the following order; legal custodian of the student, and, if none, the guardian, and, if none, the conservator.

C. Resident

One whose residence is in the state of Alabama. Residence means the single location at which a person resides with the intent of remaining there indefinitely as evidenced by more substantial connections with that place than with any other

place. Individuals carrying resident status under this policy shall certify under penalty for perjury that a specific address or location within the state of Alabama is their residence, that they intend to remain there indefinitely, and that they have more substantial connections with the state of Alabama than with any other state. Though certification of an address and an intent to remain in the state indefinitely are prerequisites to establishing status as a resident, ultimate determination of that status shall be made by the institution by its evaluation of the presence or absence of connections with the state of Alabama including the following:

1. Payment of Alabama state income taxes as a resident
 2. Ownership of a residence or other real property in the state and payment of state ad valorem taxes thereon
 3. Full-time employment (not temporary) in the state
 4. Residence in the state of a spouse, parents, or children
 5. Previous periods of residency in the state continuing for one year or more
 6. Voter registration and voting in the state; more significantly, continuing voter registration in the state that initially occurred at least one year prior to the initial registration of the student in Alabama at a public institution of higher education
 7. Possession of state or local licenses to do business or practice a profession in the state
 8. Ownership of personal property in the state and payment of state taxes thereon (e.g. automobile, boat, etc.) and possession of state license plates
 9. Continuous physical presence in the state for a purpose other than attending school and except for temporary absences for travel, military service, temporary employment, etc.
 10. Membership in religious, professional, business, civic, or social organizations in the state
 11. Maintenance in the state of checking and saving accounts, safe deposit boxes, or investment accounts
 12. In-state address shown on selective service registration, driver's license, automobile title registration, hunting and fishing license, insurance policies, stock and bond registrations, last will and testament, annuities, or retirement plans
 13. Location within the state of the high school from which the individual graduated.
- ### III. Authority to Expand the Definition of "Resident Student"

The President of each campus may recommend to the Chancellor for consideration by the Board of Trustees that the term "resident student" may include any one or more of the following categories, at that campus:

A. One who, at the time of registration, is not a "minor" and:

1. Is a full-time employee (not temporary) of the institution at which the student is registering or is the spouse of such an employee;
2. Is able to verify full-time permanent employment within the state of Alabama and shall commence said employment not more than ninety (90) days after registration with the institution, or is the spouse of such an employee;
3. Is a member or the spouse of a member of the United States military on full-time active duty stationed in Alabama under orders for duties other than attending school;
4. Is employed as a graduate assistant or fellow by the institution at which the student is registering; or
5. Is a resident of any county within fifty (50) miles of the campus of the institution at which the student is registering,

and had been a resident of that county for at least one year immediately preceding the date of registration. "Resident" shall have the same meaning, as to the relevant county, which it has as to the state of Alabama in the definitions section of this policy statement.

B. One who, at the time of registration, is a "minor" and whose supporting person(s)":

1. Is a full-time employee (not temporary) of the institution at which the student is registering;

2. Is able to verify full-time permanent employment within the state of Alabama and shall commence said employment not more than ninety (90) days after registration with the institution;

3. Is a member of the United States military on full-time active duty stationed in Alabama under orders for duties other than attending school; or

4. Is a resident of any county within fifty (50) miles of the campus of the institution at which the student is registering, and has been a resident of that county for at least one year immediately preceding the date of registration. "Resident" shall have the same meaning, as to the relevant county, which it has as to the state of Alabama in the definitions section of this policy statement.

IV. Authority to Implement Policy

The Presidents are authorized (and authorized to delegate to admissions officers and others) and directed to implement this policy by appropriate written policies, guidelines, and procedures.

B. Such policy shall provide that classification as a "resident student" shall be based upon the required certificate and other written evidence to be filed in the admissions office and that any decision by an admissions officer may be appealed by the student to a review committee which shall be constituted, appointed, and operated as provided in such policy.

C. The decision of the review committee may be appealed to the President, whose action thereon shall be final.

UAB Non-resident Tuition Policy Statement

UAB students are governed by the Board of Trustees' Non-resident Tuition Policy, above, which applies to students enrolled in each of the campuses of the University of Alabama System. The policy is implemented at UAB in accordance with the following guidelines.

The Board of Trustees has established a "Non-resident Tuition Policy" which addresses non-resident tuition, certification of residency status by campus officials, and establishment of campus policies to administer an appeals process. This UAB policy implements certain provisions of that Board policy.

The Division of Student Affairs, the Graduate School, and the admissions/registration offices of the Health Affairs schools, as appropriate, are designated as the offices empowered at UAB to determine and certify "resident" or "non-resident" student status. These offices are responsible for documenting each residency status evaluation and for maintaining the records used to substantiate that evaluation.

As the provisions of section II. of the Board policy indicate, "though certification of an address and an intent to remain in the state indefinitely are prerequisites to establishing status as a resident, ultimate determination of that status shall be made by the institution by its evaluation of the presence or absence of connections with the state of Alabama..." However, meeting the specific criteria included in section II. of the

Board policy may not in all circumstances result in certification as a "resident student." Also, according to the provisions of the Board policy, UAB has been given the authority to expand, and has by separate Board resolution expanded, the definition of "resident student" to encompass all the categories in sections III.A. and III.B. of the Board policy. [In general, international students who have not been issued a U.S. resident alien card may not be considered for residency status for tuition purposes unless they hold a graduate assistantship or fellowship and meet certain criteria. International students who have been issued a U.S. resident alien card will be considered for residency status for tuition purposes in the same manner as are U.S. citizens.]

The decision by an admissions or registration officer concerning certification of residency status may be appealed in writing by the student to the Vice President for Student Affairs who may overrule the decision or may, at his or her discretion, convene a review committee composed of a representative from the Office of the Dean of Student Affairs, a representative from the Office of the Vice President for Academic Affairs, and a representative from the Office of the Vice President for Health Affairs [or appropriate current UAB officials]. If the decision of the review committee is appealed by the student, the Vice President for Student Affairs may add a recommendation of concurrence or non-concurrence with the review committee and forward the findings to the President for determination. The decision of the President is final.

Appendix IV: Equal Opportunity Policy

August 2, 1993

(Edited January 31, 1996, for change of Faculty Affirmative Action Officer and November 17, 1999, for change of Director of EEO Programs and Compliance)

Replaces the following UAB policies:

"Equal Opportunity Policy" dated February 12, 1993, and all previous versions

"Nondiscrimination Policy" (Long Form) dated January 31, 1990

"Nondiscrimination Policy" (Short Form) dated January 31, 1990

See also the UAB "Sexual Harassment" policy.
Policy Statement

The University of Alabama at Birmingham hereby reaffirms its policy of equal opportunity in education and employment.

Equal Employment Opportunity

The University of Alabama at Birmingham is expressly committed to maintaining and promoting nondiscrimination in all aspects of recruitment and employment of individuals at all levels throughout the University. Specifically, it is the intent of the University to recruit, hire, and promote all faculty and staff without regard to race, color, religion, sex, national origin, disability unrelated to job performance, disabled veteran status, or Vietnam era veteran status. The University will not tolerate any conduct by an administrator, supervisor, faculty, or staff member which constitutes sexual harassment or any form of prohibited discrimination. The University has an affirmative action program for ensuring equal employment opportunity for women, members of racial minority groups, individuals with disabilities, disabled veterans, and Vietnam era veterans. The University complies with all applicable laws and

regulations related to nondiscrimination in employment and educational opportunity.

All personnel actions, programs, and facilities will be administered in accordance with equal opportunity and affirmative action policies.

Implementation

In working toward the implementation of this policy, the University will state its position as an equal opportunity/affirmative action employer in all solicitations and advertisements for employment vacancies placed by, or on behalf of, the University. The University will broadly publish and circulate its policy of equal employment opportunity by including a statement in all correspondence, media communication, and printed matter for employment purposes. Further, the University will consider, through appropriate and designated procedures, complaints or grievances of any individual who has reason to believe that he or she has been affected by prohibited discrimination.

Equal Education Opportunity

As an institution of higher education and in the spirit of its policies of equal employment opportunity, the University hereby declares its policy of equal educational opportunity. All applicants for admission will be considered without regard to an applicant's race, color, religion, sex, national origin, disability unrelated to program performance, disabled veteran status, or Vietnam era veteran status. This policy is noted in all student handbooks. Complaints or grievances of any student who has reason to think he or she has been affected by discrimination will be considered through established procedures.

Inquiries and Complaints

Any inquiries or complaints concerning the application of the Americans with Disabilities Act (ADA); Title VII of the Civil Rights Act of 1964; Executive Order 11246, as amended; Title IX of the Education Amendments of 1972; the Rehabilitation Act of 1973; or other legislation and its implementing regulations as they relate to the University of Alabama at Birmingham should be directed to any one of the following persons, as appropriate:

Dr. Pamela Burks

Director, EEO Programs and Compliance
Staff Affirmative Action Officer
419 Medical Towers Building
205-934-8988

Dr. Virginia D. Gauld

Vice President for Student Affairs
Student Affirmative Action Officer
Title IX and 504 Coordinator
503 Hill University Center
205-934-8146

Dr. Louis Dale

Associate Provost for Minority and Special Programs
Faculty Affirmative Action Officer
401 Campbell Hall
205-934-8762

Effective Date

This revised policy is effective immediately upon its being signed by the president

[August 2, 1993, and edited January 31, 1996, and November 17, 1999].

Appendix V: Policy Concerning the Maintenance of High Ethical Standards in Research and Other Scholarly Activities

January 27, 1997

(Replaces policy dated April 22, 1996.)

See also the following UAB documents:

Institutional Review Board Guidebook

Institutional Review Board Assurance of Compliance

Animal Resources Program Information Manual.

NOTE: This policy has been adapted from a statement on "The Maintenance of High Ethical Standards in the Conduct of Research" published by the Executive Council of the Association of American Medical Colleges and has been revised to be in compliance with the Public Health Service final rule entitled "Responsibilities of Awardee and Applicant Institutions for Dealing With and Reporting Possible Misconduct in Science." It incorporates recommendations of the UAB Faculty Policies and Procedures Committee and the UAB Faculty Senate.

Introduction

The principles that govern scientific research and scholarship have long been established and have been applied by faculties and administrators for the discovery of new knowledge needed by mankind. The maintenance of high ethical standards in research based on these principles is a central and critical responsibility of faculties and administrators of academic institutions. Validity and accuracy in the collecting and reporting of data are intrinsically essential to the scientific process; dishonesty in these endeavors runs counter to the very nature of research, that is, the pursuit of truth.

The responsibility of the academic community to the public is acknowledged. The maintenance of public trust in this pursuit is vital. In short, it is in the best interest of the public and of academic institutions to prevent misconduct in research and to deal effectively and responsibly with instances in which misconduct is suspected.

Policy Statement

1. UAB shall accept as faculty members only those individuals whose career activities clearly demonstrate the highest ethical standards. To this end, the credentials of all potential faculty are to be thoroughly examined by the appropriate department/unit heads or their representatives in order to verify the claimed accomplishments of the candidate. The appropriate department/unit heads or their representatives shall seek further confirmation of the candidate's accomplishments during the normal procedures of personal interviews and letters from references. Proof of faculty credentials shall be maintained by the appropriate dean or department head.

2. Faculty members who are in supervisory positions with regard to colleagues, fellows, technicians, and students are expected to work closely with those individuals to provide them with appropriate guidance and counsel to the end that those individuals continue to maintain the highest professional and ethical standards.

3. The faculty is encouraged to increase student and staff awareness of the importance of maintaining high ethical standards in research and to discuss issues related to research ethics in formal courses, in seminars, and by other informal means.

4. Research results should be supported by verifiable evidence. Faculty and staff should maintain sufficient written records or other documentation of their studies. It is the responsibility of department/unit heads, division directors, and experienced investigators to develop among junior colleagues and students the necessary respect for careful recording and preservation of primary data.

5. The faculty is encouraged to engage in free discussion of results, to share data and techniques, and to avoid secrecy in the conduct of original investigations. It should be remembered that independent confirmation of results is important in direct proportion to the potential significance of the results in question and may be crucial to the establishment of new concepts.

6. Faculty members are responsible for the quality of all reports based on their own efforts or on the collaborative work of students, technicians, or colleagues, especially those which bear the faculty member's name. The term "reports" as used here includes, but is not limited to, manuscripts submitted for publication and abstracts submitted for presentation at meetings. The same standards of scientific integrity apply to abstracts as to full-length publications. Abstracts or other reports of preliminary findings should indicate clearly that the findings are preliminary. No faculty member shall allow his/her name to be used on any report containing results for which that faculty member cannot assume full professional and ethical responsibility.

7. Any UAB employee (including, but not limited to, regular and adjunct faculty, fellows, technicians, and student employees) or any UAB student who has reason to suspect any other employee or student of misconduct with regard to the conducting or reporting of research has the responsibility of following up these suspicions in accordance with the procedures outlined below. For purposes of this policy, "misconduct" means fabrication, falsification, plagiarism, or other practices which seriously deviate from those that are commonly accepted within the scientific community for proposing, conducting, or reporting research. It does not include honest error or honest differences in interpretations or judgments of data. Intentionally withholding information relevant to the investigation of an alleged case of misconduct, intentionally pressuring others to do so, or bringing malicious charges against another individual shall itself be considered misconduct. Also, any act of interference, retaliation, or coercion by a UAB employee against a student or employee for using this policy is prohibited and is itself a violation of this policy.

Procedures To Be Followed

The "Scientific Misconduct Allegation Review Checklist" attached to this policy is to be used in conjunction with the procedures in this section.

It is the responsibility of student employees, trainees, fellows, faculty members, staff members, or other employees who become aware of misconduct in research and other scholarly activities to report such misconduct to one of the following: (a) their department/unit head, (b) the dean of the school in which their department/unit is located, or (c) the UAB Scientific Integrity Officer. In the case of graduate students or of trainees at any level, such evidence also may be reported to the Dean of the Graduate School.

The individual receiving such evidence of misconduct must immediately report such evidence and the allegation of misconduct to the UAB Scientific Integrity Officer, the de-

partment/unit head and the dean of the unit in which the alleged misconduct occurred, and the Provost. If the UAB Scientific Integrity Officer determines that the allegation warrants initiation of the inquiry process, the inquiry shall be initiated immediately, and the Office of Counsel shall be informed.

Allegations of this nature are very serious matters, and all parties involved should take measures to assure that the positions and reputations of all individuals named in such allegations and all individuals who in good faith report apparent misconduct are protected. Details of the charge, the name of the accused, the identity of the individual bringing suspected fraud, and all other information about the case shall be kept confidential as far as possible, compatible with investigating the case. Revealing confidential information to those not involved in the investigation shall itself be considered misconduct.

Because UAB is interested in protecting the health and safety of research subjects, students, staff, and faculty and because UAB is responsible for protecting sponsored research funds and for ensuring that those funds are spent for the purposes for which they were given, if the situation warrants it, interim administrative action may be used prior to conclusion of either the inquiry or the investigation to provide for the protection of individuals and funds in accordance with existing UAB policy. Such action includes, but is not limited to, administrative suspension; re-assignment of student(s); involvement of the Institutional Review Board, the Institutional Animal Care and Use Committee, and the Office of Internal Audit-UAB; or notification of external sponsors when required by federal regulations.

Initial Inquiry. For purposes of this policy, "inquiry" means information gathering and initial fact finding to determine whether an allegation or apparent instance of scientific misconduct warrants an investigation.

1. The department/unit head or dean shall investigate immediately the charges through an inquiry process, including an interview with the suspected individual. The person conducting the inquiry shall ensure that individuals with the necessary and appropriate expertise are consulted concerning technical aspects of the activities in question. At least one of those individuals must be from outside the suspected individual's department. The record of the inquiry shall document the review of relevant evidence.

The department/unit head or dean conducting the inquiry shall keep the UAB Scientific Integrity Officer informed and may request assistance from the UAB Scientific Integrity Officer. The UAB Scientific Integrity Officer shall keep the Office of Counsel informed during the inquiry process, and the Office of Counsel shall provide advice concerning procedural matters. In order to ensure that a real or apparent conflict of interest does not exist, the UAB Scientific Integrity Officer shall review the selection of persons to be involved in the inquiry. If it is determined that a conflict of interest exists, the UAB Scientific Integrity Officer is responsible for designating who will be involved in the inquiry.

If UAB plans to terminate an inquiry for any reason prior to completion of the normal progression of such an inquiry, the UAB Scientific Integrity Officer shall notify the federal Office of Research Integrity and shall include in that notification a description of the reasons for termination of the inquiry.

UAB will make every effort to complete the inquiry within 60 days of its initiation. If the inquiry extends beyond 60 days, the reasons for the extension will be documented by the UAB Scientific Integrity Officer and will be retained with the record of the inquiry.

The written report of the inquiry shall state what evidence was reviewed, shall indicate the relevant expertise of the persons reviewing the evidence, shall summarize the relevant interviews, and shall include the conclusions of the inquiry. The individual(s) against whom the allegation was made shall be given a copy of the inquiry report and shall have an opportunity to make written comment regarding the report. This report, including a conclusion as to whether there is reasonable cause to believe that misconduct has occurred, shall be forwarded to the Provost (with a copy to the UAB Scientific Integrity Officer) through the appropriate dean who should make whatever comment or recommendation is deemed warranted.

2. The Provost, with the advice and counsel of the UAB Scientific Integrity Officer and others as appropriate, shall decide whether to close the matter or to appoint an Investigating Committee. If findings from the inquiry provide sufficient basis for conducting an investigation, the investigation must be started within 30 days of completion of the inquiry. The written report of the inquiry will be made available to the Investigating Committee.

3. If the Provost determines that it is not necessary to undertake an investigation, the Provost will report to the President the reasons for this decision and the findings of the inquiry. The report will be maintained in a secure manner for at least three years by the Office of the UAB Scientific Integrity Officer.

Investigation. For purposes of this policy, “investigation” means the formal examination and evaluation by a committee of all relevant facts to determine if scientific misconduct has occurred.

1. The Investigating Committee is appointed by the Provost and will elect its own chairperson. Members of the Committee shall consist of at least three tenured faculty members who have the expertise to deal with technical aspects of the activities in question. At least two of these faculty members must be from outside the suspected individual's department. The Provost shall take precautions not to appoint any committee member who has a real or apparent conflict of interest with the outcome of the investigation.

The chairperson shall conduct meetings of the Investigating Committee as frequently as required in order to determine whether or not the activities in question do indeed constitute misconduct. All such meetings and the deliberations thereof shall be held in confidence to protect the affected individual or individuals. Those accused of misconduct shall be given a written summary of the charges and supporting evidence and shall be afforded an opportunity to appear before the Committee to comment on allegations. The accused may be represented by counsel. The Office of Counsel shall be kept informed of the investigation process and shall advise the Investigating Committee concerning procedural matters.

The Committee should take no more than 60 days to complete its review and to prepare its report for submission to the President. UAB will make every effort to complete all investigative matters within 120 days from initiation of the investigation. This includes the work of the committee, pre-

paring the report, submitting the report to the President, making the report available for comment by the subject(s) of the investigation, and submitting the final report to the federal Office of Research Integrity. If the investigation cannot be completed within 120 days, the UAB Scientific Integrity Officer shall request an extension from the federal Office of Research Integrity. The extension request will include an explanation for the delay, an interim report on progress to date, an outline of what remains to be done, and an estimated date of completion.

If UAB plans to terminate an investigation for any reason prior to completion of the normal progression of such an investigation, the UAB Scientific Integrity Officer shall notify the federal Office of Research Integrity of UAB's plan to terminate the investigation and shall include a description of the reasons for such termination.

2. The President, based on the Investigating Committee's findings and responses to those findings, shall determine what actions are appropriate. Appropriate actions may include discharge from employment at UAB or expulsion from UAB in the case of a student. Such actions shall be consistently applied throughout UAB. The President will notify the UAB Scientific Integrity Officer who in turn will work with the Office of Grants and Contracts Administration to notify any agencies or foundations supporting the research in question and any journals or other publications which may have been affected by the publication of results of that research.

3. The UAB Scientific Integrity Officer shall submit the report of the investigation to the federal Office of Research Integrity and shall include in that report the policies and procedures under which the investigation was conducted, how and from whom information was obtained relevant to the investigation, the findings of the investigation, and the basis of the findings. Also included will be a description of any sanctions taken by UAB and the actual text of, or an accurate summary of, the views of any individual(s) found to have engaged in scientific misconduct.

Additional Notifications

1. If the Provost initiates a formal investigation, any agency or foundation supporting the research in question shall be notified by the Director of the Office of Grants and Contracts Administration upon receipt of information from the UAB Scientific Integrity Officer. Any such agency or foundation shall be notified immediately if it is ascertained at any time during the initial inquiry or subsequent investigation that there is an immediate health hazard involved; an immediate need to protect federal funds or equipment; an immediate need to protect the interests of the persons making the allegations, the individuals who are the subject of the allegations, or any co-investigators and associates, if any; a probability that the alleged incident is going to be publicly reported; or a possibility that criminal violation has occurred. The agencies also will be given interim reports of any investigation should the circumstances warrant.

2. If the initial inquiry or the subsequent investigation indicates that the allegations are unsubstantiated, UAB will make diligent efforts to restore the reputation of those accused at UAB, with any involved funding agencies and elsewhere.

3. Any involved funding agencies shall be notified of the final outcome of any investigation.

Addition to UAB Catalog: Undergraduate Programs

Until the next printing of the *UAB Catalog: Undergraduate Programs*, the following two sentences are *added* as the second and third sentences in the second paragraph of the "Academic Conduct" section on page 22 of the 1996-1997 edition of that catalog: "A student may be expelled on the first offense. Students should consult the policies of the school in which they are enrolled to determine the circumstances under which expulsion can occur with a first offense."

Attachment

The form entitled "Scientific Misconduct Allegation Review Checklist" as attached to this policy is to be used as a guideline and summary of documentation related to reviews of allegations of violations of this policy. The form may be revised from time to time without affecting the policy itself. The SCIENTIFIC MISCONDUCT ALLEGATION REVIEW CHECKLIST can be found online at www.iss.uab.edu/Pol/HiEthicsMtab.pdf or may be obtained from the Graduate School or the UAB Scientific Integrity Officer.

Appendix VI: Graduate School Policy Concerning Student Participation in Proprietary Research

August 8, 2000

Faculty, staff, and students of a university create, disseminate, and apply knowledge for the benefit of society. When faculty of the university are involved in research, some of which may be of a proprietary nature, particular care must be taken to ensure that the need for graduate students to publicly present and publicly defend the results of their thesis or dissertation research is not compromised. Graduate student advisors, graduate program directors, and graduate students themselves, therefore, share in the responsibility to ensure that graduate students do not become involved in thesis or dissertation research that is, or has the potential to become, proprietary if participation in that research will delay completion of their degree requirements or negatively effect their productivity of future employability.

The policy of the Graduate School and university is that a faculty member or a graduate student cannot enter an agreement that prevents or significantly delays the presentation or publication of research results. Journal publication delays not exceeding three months are acceptable, but publication of Ph.D. dissertation materials through University Microfilms is a requirement of the Graduate School and, thus, cannot be delayed.

In instances where, despite good faith efforts on the part of the graduate student advisor, the graduate program director, and the graduate student, the graduate student's thesis or dissertation research is later found to be of a proprietary nature, the Graduate Dean will be notified immediately. The Graduate School Dean, in turn, will immediately convene a meeting of the graduate student, the graduate advisor, the involved graduate program director, and members of the student's thesis or dissertation committee. This group, in consultation with the Vice President for Research and/or the Executive Director of the Research Foundation, will resolve the problem.

If the situation cannot be resolved through the efforts of this group, a ruling will be made by the appropriate Vice President for Health or Academic Affairs.

Appendix VII: Drug-Free Campus Policy For Students

www.iss.uab.edu/Pol/DrugcampDtab.pdf

December 14, 1991

(Replaces policy dated September 26, 1990.)

NOTE: See also the following related policies: Drug-free Workplace Policy; Drug Screening Policy for Student Athletes; School of Medicine "Policy on Impairment and Chemical Substance Abuse"; School of Dentistry "Policy on Impairment and Chemical Substance Abuse"; School of Nursing "Policy on Impairment and Chemical Substance Abuse."

Policy Statement

This policy is applicable to all students enrolled in credit course(s) or degree-granting programs at the University of Alabama at Birmingham and to all students receiving academic credit at UAB (other than for continuing education units) for study in a program in a foreign country conducted by UAB alone or in conjunction with a foreign university.

Unlawful possession, use, manufacture, distribution, or dispensing of illicit drugs, controlled substances, or alcoholic beverages by any UAB student on UAB property or as part of any UAB-sponsored or UAB-sanctioned activity is prohibited. The legal possession, use, or distribution of alcoholic beverages on UAB property or at UAB-sponsored or UAB-sanctioned activities is governed by the UAB General Policy Regarding the Use and Consumption of Alcoholic Beverages and applicable local, state, and federal laws.

In certain situations, the University is required to report the activities prohibited by this policy to appropriate law enforcement authorities. In all cases, the University may report activities prohibited by this policy to appropriate law enforcement authorities if it appears that the activity is a violation of law.

Disciplinary Actions. Violations of this policy constitute nonacademic misconduct and will be subject to established disciplinary action for nonacademic misconduct in accordance with stipulations in the *Direction Student Handbook* or other applicable procedures. Violations of this policy by students should be reported to the appropriate student affairs office or other office handling student nonacademic misconduct in the same manner in which other instances of nonacademic misconduct are reported.

In some cases of violation of this policy for unlawful use, a student may be given, at the discretion of the University, the option to participate satisfactorily in an approved drug or alcohol abuse assistance or rehabilitation program in lieu of dismissal. Participation in such an assistance or rehabilitation program is at the expense of the student.

Drug-free Awareness Program. At least annually, UAB shall inform students of the dangers of drug and alcohol abuse on campus, of the existence of this policy statement and its penalties for violations, and of available drug and alcohol counseling, rehabilitation, and assistance through the following activities:

Federal Trafficking Penalties

As of November 18, 1988

CSA	PENALTY			DRUG	Quantity	PENALTY	
	2nd Offense	1st Offense	1st Offense			2nd Offense	
I and II	Not less than 10 years. Not more than life. If death or serious injury, not less than life.	Not less than 5 years. Not more than 40 years. If death or serious injury, not less than 20 years. Not more than life.	10-99 gm or 100-999 gm mixture	METHAMPHETAMINE	100 gm or more or 1 kg ¹ or more mixture	Not less than 10 years. Not more than life. If death or serious injury, not less than 20 years. Not more than life.	Not less than 20 years. Not more than life. If death or serious injury, not less than life.
			100-999 gm mixture	HEROIN	1 kg or more mixture		
			500-4,999 gm mixture	COCAINE	5 kg or more mixture		
			5-49 gm mixture	COCAINE BASE	50 gm or more mixture		
			10-99 gm or 100-999 gm mixture	PCP	100 gm or more or 1 kg or more mixture		
			1-10 gm mixture	LSD	10 gm or more mixture		
			40-399 gm mixture	FENTANYL	400 gm or more mixture		
	10-99 gm mixture	FENTANYL ANALOGUE	100 gm or more mixture				
	Drug	Quantity	First Offense			Second Offense	
	Others ²	Any	Not more than 20 years. If death or serious injury, not less than 20 years, not more than life. Fine \$1 million individual, \$5 million not individual.			Not more than 30 years. If death or serious injury, life. Fine \$2 million individual, \$10 million not individual.	
III	All	Any	Not more than 5 years. Fine not more than \$250,000 individual, \$1 million not individual.			Not more than 10 years. Fine not more than \$500,000 individual, \$2 million not individual.	
IV	All	Any	Not more than 3 years. Fine not more than \$250,000 individual, \$1 million not individual.			Not more than 6 years. Fine not more than \$500,000 individual, \$2 million not individual.	
V	All	Any	Not more than 1 year. Fine not more than \$100,000 individual, \$250,000 not individual.			Not more than 2 years. Fine not more than \$200,000 individual, \$500,00 not individual.	

¹Law as originally enacted states 100 gm. Congress requested to make technical correction to 1 kg.

²Does not include marijuana, hashish, or hash oil. (See separate chart.)

1. Publication, at least annually, of this policy in appropriate student publications and distribution to students in UAB's foreign programs and to students in programs conducted in conjunction with foreign universities;

2. Inclusion of this policy in future editions of student class schedules and/or registration materials, student handbooks, and student catalogs;

3. Dissemination of this policy and of information at student orientation and assistance programs regarding the dangers of drug and alcohol use and abuse and available rehabilitation programs; and

4. Continuation, and expansion, of the UAB drug and alcohol awareness program which includes sponsorship of the "Alcohol/Drug Awareness Week" and publication of pamphlets and other materials.

Applicability to Other Policies. Other drug-free policies created to cover specific areas of the University may be more restrictive than this policy but may not be less restrictive. At a minimum, other such policies must include, or reference, the provisions of this policy. Violators will be subject to the provisions of the more stringent policy but will not be punished under more than one policy for the same offense.

This policy does not revoke or otherwise interfere with policies in the health professional schools designed to determine whether health care professionals are impaired and to offer rehabilitation, subject to the above provisions.

The wording in the "Non-academic Conduct" section of the Direction student handbook which relates to causes of

dismissal due to the use, possession, etc. of illicit drugs, controlled substances, or alcoholic beverages references only certain provisions of this more extensive policy. The entire policy is applicable in all cases even if the policy itself is not printed in full.

Attachments. The "Applicable Legal Sanctions," "Drug and Alcohol Use Health Risks," and "Drug and Alcohol Counseling, Treatment, and Rehabilitation Programs" attached to this policy are a part of the policy but may be revised from time to time without affecting the policy itself.

Effective Date and Implementation. This policy is effective immediately upon its being signed by the President.

The offices of the appropriate Vice Presidents are responsible for the development and maintenance of procedures to implement this policy within their areas of responsibility.

In addition to being distributed to students on the UAB campus, this policy will be distributed to students in UAB's foreign programs and to students in programs conducted in conjunction with foreign universities. The Vice President for Student Affairs is responsible for all distributions to students covered by this policy.

Attachment A "Applicable Legal Sanctions" December 14, 1991.

Federal Penalties and Sanctions for Illegal Possession of a Controlled Substance
(55 Federal Register 33589)

Federal Trafficking Penalties - Marijuana

As of November 18, 1988

Quantity	Description	First Offense	Second Offense
1,000 kg or more; or 1,000 or more plants	Marijuana Mixture containing detectable quantity*	Not less than 10 years, not more than life. If death or serious injury, not less than 20 years, not more than life. Fine not more than \$40 million individual, \$10 million other than individual.	Not less than 20 years, not more than life. If death or serious injury, not less than life. Fine not more than \$8 million individual, \$20 million other than individual.
100 kg to 1,000 kg; or 100-999 plants	Marijuana Mixture containing detectable quantity*	Not less than 5 years, not more than 40 years. If death or serious injury, not less than 20 years, not more than life. Fine not more than \$2 million individual, \$5 million other than individual.	Not less than 10 years, not more than life. If death or serious injury, not less than life. Fine not more than \$4 million individual, \$10 million other than individual.
50 to 100 kg	Marijuana	Not more than 20 years. If death or serious injury, not less than 20 years, not more than life. Fine \$1 million individual, \$5 million other than individual.	Not more than 30 years. If death or serious injury, life. Fine \$2 million individual, \$10 million other than individual.
10 to 100 kg	Hashish		
10 to 100 kg	Hashish Oil		
50-99 plants	Marijuana		
Less than 50 kg	Marijuana	Not more than 5 years. Fine not more than \$250,000, \$1 million other than individual.	Not more than 10 years. Fine \$500,000 individual, \$2 million other than individual.
Less than 10 kg	Hashish		
Less than 1 kg	Hashish Oil		

*Includes Hashish and Hashish Oil.

(Marijuana is a Schedule I Controlled Substance)

21 U.S.C. 844(a)

First conviction: Up to 1 year imprisonment and fined at least \$1,000 but not more than \$100,000, or both.

After 1 prior drug conviction: At least 15 days in prison, not to exceed 2 years and fined at least \$2,500 but not more than \$250,000, or both.

After 2 or more prior drug convictions: At least 90 days in prison, not to exceed 3 years and fined at least \$5,000 but not more than \$250,000, or both.

Special sentencing provisions for possession of crack cocaine: Mandatory at least 5 years in prison, not to exceed 20 years and fined up to

\$250,000, or both, if: (a) First conviction and the amount of crack possessed exceeds 5 grams.

(b) Second crack conviction and the amount of crack possessed exceeds 3 grams.

(c) Third or subsequent crack conviction and the amount of crack possessed exceeds 1 gram.

21 U.S.C. 853(a)(2) and 881(a)(7)

Forfeiture of personal and real property used to possess or to facilitate possession of a controlled substance if that offense is punishable by more than 1 year imprisonment. (See special sentencing provisions re: crack.)

21 U.S.C. 881(a)(4)

Forfeiture of vehicles, boats, aircraft, or any other conveyance used to transport or conceal a controlled substance.

21 U.S.C. 844a

Civil fine of up to \$10,000 (pending adoption of final regulations).

21 U.S.C. 853a

Denial of Federal benefits, such as student loans, grants, contracts, and professional and commercial licenses, up to 1

year for first offense, up to 5 years for second and subsequent offenses.

18 U.S.C. 922(g)

Ineligible to receive or purchase a firearm.

Miscellaneous

Revocation of certain Federal licenses and benefits, e.g., pilot licenses, public housing tenancy, etc., are vested within the authorities of individual Federal agencies.

Note: See Attachment A.1 for additional Federal drug trafficking penalties and information.

Note: These are only Federal penalties and sanctions. Additional State penalties and sanctions may apply.

Attachment A, Continued

Summary of State Penalties and Sanctions

Under Alabama law, the possession, purchase, or consumption of alcoholic beverages by a person under 21 years of age is punishable by a fine of up to \$500 and by up to three months in jail. Also under Alabama law, for a first offense, unlawful possession of a controlled substance (that is, illegal drugs) may be punished by imprisonment up to ten years and a \$5,000 fine and unlawful distribution of controlled substances may be punished by imprisonment up to 20 years and a \$10,000 fine. Subsequent offenses may carry more stringent sentences.

Drug-Free Schools and Communities Act

Illegal drug and alcohol use, consumption, distribution, etc. on college and university campuses also are covered by the provisions of the United States Drug-Free Schools and Communities Act Amendment of 1989 (Public Law 101-226).

Legal Sanctions in Foreign Countries

Attachment B.2
(55 Federal Register 33590)

Controlled Substances - Uses & Effects										
DRUGS/ CSA SCHEDULES	TRADE OR OTHER NAMES	MEDICAL USES	DEPENDENCE							
			Physical	Psychological						
TOLERANCE										
DURATION (hours)										
USUAL METHODS OF ADMINISTRATION										
POSSIBLE EFFECTS										
EFFECTS OF OVERDOSE										
WITHDRAWAL SYNDROME										
NARCOTICS										
Opium	II III V Dover's Powder, Paregoric Paregorol	Analgescic, antidiarrheal	High	High	Yes	3-6	Oral, injected	Euphoria, drowsiness respiratory depression, constricted pupils, nausea	Slow and shallow breathing, clammy skin, convulsions, coma, possible death	Watery, eyes, runny nose, yawning, loss of appetite, irritability, tremors, panic, cramps, nausea, chills and sweating
Morphine	II III Morphine, MS-Cotin, Roxanol, Roxanol-SR	Analgescic, antitussive	High	High	Yes	3-6	Oral, smoked, injected			
Codeine	II III V Tylenol w/Codeine, Empirin w/Codeine Robaxin A.C., Fiorinal w/Codeine	Analgescic, antitussive	Moderate	Moderate	Yes	3-6	Oral, injected			
Heroin	I Diacetylmorphine, Horse, Smack	None	High	High	Yes	3-6	Injected, sniffed, smoked			
Hydromorphone	II Dilaudid	Analgescic	High	High	Yes	3-6	Oral, injected			
Meperidine (Pethidine)	II Demerol, Mepergan	Analgescic	High	High	Yes	3-6	Oral, injected			
Methadone	II Dolophine, Methadone, Methadone	Analgescic	High	High-Low	Yes	12-24	Oral, injected			
Other Narcotics	I II III IV V Numbalin, Percodan, Percocet, Tylenol, Tussionex, Fentanyl, Duran, Lomol, Talwin	Analgescic, antidiarrheal, antitussive	High-Low	High-Low	Yes	Variable	Oral, injected			
DEPRESSANTS										
Chloral Hydrate	IV Noctec	Hypnotic	Moderate	Moderate	Yes	5-8	Oral	Slurred speech, disorientation, drunken behavior without odor of alcohol	Shallow respiration, clammy skin, dilated pupils, weak and rapid pulse, coma, possible death	Anxiety, insomnia, tremors, delirium, convulsions, possible death
Barbiturates	II III IV Amytal, Butlet, Fiorinal, Lospate, Nembutal, Secobarbital, Tuinal, Phenobarbital	Anesthetic, anticonvulsant, sedative, hypnotic, veterinary euthanasia agent	High-Mod.	High-Mod.	Yes	1-16	Oral			
Benzodiazepines	IV Alivan, Dalmane, Diazepam, Librium, Xanax, Serax, Valium, Tranxene, Valtran, Versed, Xanax, Xanax, Restoril	Anxiolytic, anticonvulsant, sedative, hypnotic	Low	Low	Yes	4-8	Oral			
Methaqualone	I Quaalude	Sedative, hypnotic	High	High	Yes	4-8	Oral			
Glutethimide	III Doriden	Sedative, hypnotic	High	Moderate	Yes	4-8	Oral			
Other Depressants	III IV Equanil, Miltex, Nodular, Pacinol, Valium	Anxiolytic, sedative, hypnotic	Moderate	Moderate	Yes	4-8	Oral			
STIMULANTS										
Cocaine ¹	II Coke, Flake, Snow, Crack	Local anesthetic	Possible	High	Yes	1-2	Sniffed, smoked, injected	Increased alertness, excitation, euphoria, increased pulse rate & blood pressure, insomnia, loss of appetite	Agitation, increase in body temperature, hallucinations, convulsions, possible death	Apathy, long periods of sleep, irritability, depression, disorientation
Amphetamines	II Biphentamine, Dextrobase, Desoxyn, Dextrostat, Dextrostat	Attention deficit disorders, narcolepsy, weight control	Possible	High	Yes	2-4	Oral, injected			
Phenmetrazine	II Prelludin	Weight control	Possible	High	Yes	2-4	Oral, injected			
Methylphenidate	II Ritalin	Attention deficit disorders, narcolepsy	Possible	Moderate	Yes	2-4	Oral, injected			
Other Stimulants	III IV Adderall, Cylert, Dextro, Lisdex, Mefexil, Plegine, Sarboxen, Tenuate, Tepanil, Prelu-2	Weight control	Possible	High	Yes	2-4	Oral, injected			
HALLUCINOGENS										
LSD	I Acid, Microdot	None	None	Unknown	Yes	8-12	Oral	Illusions and hallucinations, poor perception of time and distance	Longer, more intense "trip" episodes, psychosis, possible death	Withdrawal syndrome not reported
Mescaline and Peyote	I Mesc, Buttons, Cactus	None	None	Unknown	Yes	8-12	Oral			
Amphetamine Variants	I 2,5-DMA, FMA, STP, MDA, MDMA, TMA, DOM, DOB	None	Unknown	Unknown	Yes	Variable	Oral, injected			
Phencyclidine	II PCP, Angel Dust, Hoo	None	Unknown	High	Yes	Days	Smoked, oral, injected			
Phencyclidine Analogues	I TCP, PCPy	None	Unknown	High	Yes	Days	Smoked, oral, injected			
Other Hallucinogens	I Buteferone, Boganine, DMF, DET, Phencyclidine, Phencyclidine	None	None	Unknown	Possible	Variable	Smoked, oral, injected, sniffed			
CANNABIS										
Marijuana	I Pot, Assassin Gold, Grass, Reeler, Siamella, Thai Stick	None	Unknown	Moderate	Yes	2-4	Smoked, oral	Euphoria, relaxed inhibitions, increased appetite, disoriented behavior	Fatigue, paranoia, possible psychosis	Insomnia, hyperactivity, and decreased appetite occasionally reported
Tetrahydrocannabinol	I II THC, Marinol	Cancer chemotherapy antinauseant	Unknown	Moderate	Yes	2-4	Smoked, oral			
Hashish	I Hash	None	Unknown	Moderate	Yes	2-4	Smoked, oral			
Hashish Oil	I Hash Oil	None	Unknown	Moderate	Yes	2-4	Smoked, oral			
¹ Designated a narcotic under the CSA ² Not designated a narcotic under the CSA										

*Designated a narcotic under the CSA. **Not designated a narcotic under the CSA.

Students in a program in a foreign country conducted by UAB alone or in conjunction with a foreign university also may be subject to sanctions under foreign law or under the Uniform Code of Military Justice. Although the legal sanctions described in this policy under United States law may not apply to students in a foreign country, UAB will nevertheless hold such students to the same standards as students within the United States and will take the disciplinary actions described in this policy for violations of these standards.

Attachment B

"Drug and Alcohol Use Health Risks"

December 14, 1991

General

Although there has been recent change in American health habits and societal attitudes toward recreational drug and alcohol use, problems continue to exist and experimentation is starting at an earlier age. An important piece of information to surface in recent years is that even moderate, non-prescribed use of alcohol and nonprescribed use of drugs can have an adverse effect on overall health and well-being. Consider the following facts:

Drinking more than one or two alcoholic beverages a week promotes more visible signs of aging;

Consuming one and one-half or more alcoholic beverages per day increases the risk of breast cancer;

Drinking alcoholic beverages poisons the heart muscle, counteracts the benefits of exercise, increases male impotence, and depresses the body's immune system;

Tobacco use is a contributing factor in the development of chronic bronchitis, emphysema, circulatory problems, and

coronary disease, as well as being the leading cause of lung cancer;

Cocaine use is responsible for kidney damage, stroke, lung and heart diseases, seizures, and intense psychological problems.

Many forms of narcotics are highly addictive to users.

Marijuana use creates certain dysfunctions related to thinking, learning, and recall; aggravates asthma, bronchitis, and emphysema; contributes to fertility problems; and contributes to the development of lung cancer;

The nonprescribed use of tranquilizers, barbiturates, and amphetamines is dangerous and may cause major health problems, including death;

Extended drug and/or alcohol use may result in substance dependency and loss of control of an individual's life.

Source: Compiled by UAB Substance Abuse Program from the following resources: *Drug Data: What Everyone Needs to Know about Mood-altering Drugs*, Comp Care Publications, Minneapolis.

You Are What You Drink, Allan Luks and Joseph Barbato, Villard Books, New York.

You Can Stop, Jacquelyn Rogers, Simon & Schuster, New York.

Attachment B.1

Alcohol-Effects

(55 Federal Register 33591)

Alcohol consumption causes a number of marked changes in behavior. Even low doses significantly impair the judgment and coordination required to drive a car safely, increasing the likelihood that the driver will be involved in an accident. Low

to moderate doses of alcohol also increase the incidence of a variety of aggressive acts, including spouse and child abuse. Moderate to high doses of alcohol cause marked impairments in higher mental functions, severely altering a person's ability to learn and remember information. Very high doses cause respiratory depression and death. If combined with other depressants of the central nervous system, much lower doses of alcohol will produce the effects just described.

Repeated use of alcohol can lead to dependence. Sudden cessation of alcohol intake is likely to produce withdrawal symptoms, including severe anxiety, tremors, hallucinations, and convulsions. Alcohol withdrawal can be life-threatening. Long-term consumption of large quantities of alcohol, particularly when combined with poor nutrition, can also lead to permanent damage to vital organs such as the brain and the liver.

Mothers who drink alcohol during pregnancy may give birth to infants with fetal alcohol syndrome. These infants have irreversible physical abnormalities and mental retardation. In addition, research indicates that children of alcoholic parents are at greater risk than other youngsters of becoming alcoholics.

Uses and Effects of Controlled Substances

See Attachment B.2 for additional information concerning health risks involved in drug use.

Attachment C

"Drug and Alcohol Counseling, Treatment, and Rehabilitation Programs"

December 14, 1991

[This page revised August 5, 1998]

Student Services

The Campus Assistance Program is designed to address the following issues: continued longitudinal needs assessments, campus community awareness, enlistment of support from all campus segments, identification of high-risk students, early intervention, development of peer counseling and support groups, and referral to on/off campus resources and treatment facilities when indicated. The following are on-campus programs available to students:

Campus Assistance Program

Wellness Center

Hill University Center–Suite 460

934-5816

UAB Mental Health Services

Center for Psychiatric Medicine

1713 Sixth Avenue, South

Birmingham, Alabama 35294-0018

ACCESS line 934-7008

UAB Substance Abuse Program

401 Beacon Parkway West

Birmingham, Alabama 35209

917-3733

Other non-UAB, off-campus services are available in the Birmingham area and in many of the foreign countries in which UAB conducts programs of study. Such counseling, treatment, and rehabilitation services are too numerous to list here, but anyone needing assistance with locating such off-campus or foreign country services may contact one of the programs listed above or the UAB Center for International Programs, as appropriate.

Appendix VIII: Immunization Policy

www.iss.uab.edu/Pol/ImmunizItab.pdf

March 20, 2002

Introduction

The American College Health Association recommends that students be immunized against certain diseases. Therefore, UAB hereby establishes this policy on immunization.

For purposes of this policy, immunization against Rubeola (Red Measles) includes an initial vaccine plus a second dose of vaccine (see below).

First-time Entering UAB Students

All first-time entering students born on or after January 1, 1957, who enroll in credit courses on UAB's main campus must show proof of immunization against Rubeola (Red Measles). (Two doses are required for proof of previous immunization: dose 1 must have been given at 12 months after birth or later, and Dose 2 must have been given after 1980.) Enrolling students must show proof of these immunizations with either an official certificate of immunization, a photocopy of an immunization certificate, or written documentation from their physician. If the person has never been immunized, two injections of the vaccine at least one month apart are required.

International Students and International Scholars

Because of the disparity of immunization requirements among many foreign countries, all UAB international students and international scholars are required to be immunized against Tetanus, diphtheria, Mumps, Rubeola (Red Measles), and Rubella (German Measles). In lieu of being re-immunized, such individuals may present proof of having had such immunizations. If they do not have such proof or have not been immunized, they must be immunized against these diseases prior to attending, enrolling, or participating in UAB academic, research, observing, or clinical programs and activities.

Furthermore, all international students and international scholars must show proof of a non-reactive Tuberculin skin test (or appropriate treatment if positive) within three months prior to enrollment or visiting. Individuals who have a history of reactive Tuberculin skin testing must provide a current chest X-ray (taken since their last reactive skin test but within three months prior to enrollment or visiting) indicating that the person currently is clear of Tuberculosis.

Students Enrolled in Health-related Schools

Because of the nature of their work, students engaged in health professional training programs could have a higher risk of contracting Rubeola, Mumps, Tetanus, Diphtheria, Varicella (Chickenpox), Tuberculosis, and Hepatitis B. Therefore, all UAB students in the Joint Health Sciences programs and in the Schools of Medicine, Dentistry, Optometry, Public Health, Nursing, and Health Related Professions are required to be immunized against Tetanus, Diphtheria, Varicella (Chickenpox), Mumps, Rubeola (Red Measles), Rubella (German Measles), and Hepatitis B. In lieu of being re-immunized, such individuals may present proof of having had such immunizations. Proof must be either official medical documentation or certificates of immunization or positive titer. If students do not have such proof or have not been immunized, they must begin the immunization process against these diseases prior to being admitted, attending, enrolling, or participating in UAB academic, research, or clinical programs and activities.

Students completing their Hepatitis B series of vaccines must obtain Hepatitis B titer 1 to 2 months after their third vaccine to see if additional boosters are necessary. If the titer is negative, students will be given the option either to repeat the entire Hepatitis B series or to take 1 to 2 Hepatitis B “booster” shots to try to attain a positive titer. Students who have completed their Hepatitis B vaccine series prior to matriculation are required to take a Hepatitis B titer prior to participating in a clinical environment to see if additional boosters or labs are required.

All students enrolled in health-related schools must have had a Tuberculin skin test with negative results (or appropriate treatment if positive) within three months prior to matriculation. Students participating in clinical environments with patients will be required to obtain a two-step Tuberculin skin test before starting clinical rotations and are mandated to renew their Tuberculin one-step skin test once per year.

General

The UAB Student Health Service will provide such immunizations and titer testing on a fee-for-service basis for any student who needs to meet his or her UAB immunization or titer requirements. Students may choose to fulfill these requirements at the Jefferson County Health Department or with a private physician.

Individual UAB schools may impose additional immunization requirements as needed for their students.

Exceptions

Exceptions to this policy will be made only for those students who can document medical or religious contraindications to the vaccine. Such documentation must be submitted to the appropriate admissions or registration office as indicated in the procedures to implement this policy.

Implementation

The Provost (in conjunction with the Vice President/Dean, School of Medicine and the Assistant Vice President for Enrollment Services and University Registrar) is responsible for procedures to implement this policy for students in the Joint Health Sciences programs and in the Schools of Medicine, Dentistry, Optometry, Public Health, Nursing, and Health Related Professions.

The Vice President for Student Affairs (in conjunction with the Assistant Vice President for Enrollment Services and University Registrar and the Associate Vice President for Enrollment Management) is responsible for procedures to implement this policy for all other UAB students.

Appendix IX: Computer Software Copying And Use Policy

July 13, 1999

(Replaces policy entitled “Computer Software Copying Policy” dated June 1, 1994.)

See also the following related policies:

“Computer Software Policy” [Software Development and Ownership]

“Electronic Data Processing Security Policy”

“Search Policy” in the You and UAB Handbook for Administrative, Professional, and Support Personnel

Introduction

Respect for the intellectual work of others is a tradition at UAB. UAB values the free exchange of ideas but not plagiar-

ism or the unauthorized copying of computer software, including programs, applications, and data. Under the federal copyright law, it is illegal to make a copy of computer software except for archival or back-up purposes without the permission of the copyright holder. Therefore, unauthorized copying of computer software or its documentation is illegal, and, if discovered, individuals and institutions who break this law can be liable for substantial damages. The *person* responsible may be held liable.

All state and federal laws and UAB policies must be adhered to in the use of UAB's computer equipment and systems. Any use of UAB equipment that violates copyright law or licensure contracts, that compromises or attempts to compromise the integrity of UAB-based or any other computers or computer systems, or that involves gambling or other illegal activity also is forbidden and may subject the computer user to criminal, civil, and/or UAB sanctions. Any use of UAB's software, including shareware, must comply with all copyright laws and with the terms of the license granted by the software owner, including any prohibitions against simultaneous use on multiple computers. Unauthorized use or copying of any software (whether or not owned by UAB) is not permitted on any UAB equipment.

This policy covers computer software which has been purchased by, acquired by, donated to, and/or licensed to, UAB and includes software that is bundled with, or preloaded on, computer systems purchased by UAB. It also includes software downloaded from networks (including the Internet), and in those instances it is important for UAB users and departments/units to ensure that any such commercial software or shareware may legally be downloaded, that the software is freeware, or that the software is in the public domain. UAB and individuals must comply with all terms and conditions of software downloaded from networks, including the Internet.

If computer software carries a UAB copyright, it may be used and distributed by UAB as long as such distribution is in keeping with the desires of the originating department/unit and is not in violation of the “Computer Software Policy.” If a UAB determination of interest in licensing the software is pending, the software would be considered non-UAB software for the purposes of this policy until such time that UAB determines its interest in licensing the software. This policy does not alter the categories of software and the rights pertaining thereto as indicated in the UAB “Computer Software Policy.”

Definitions

For purposes of this policy, the following definitions apply:

“*Computer software*” includes, but is not limited to, purchased or commercial software, sound, graphics, images, or datasets; shareware; freeware; and electronically stored documentation and the media that hold it. *Not* included in the definition as used in this policy are noncopyrighted computer data files that have no significance beyond the individual or department/unit.

“*UAB software*” is defined as computer software purchased or acquired by a UAB department or unit or by a UAB employee as part of his or her role at UAB. It includes software donated to UAB or software purchased by related foundations and donated for use by UAB. It includes computer programs written by UAB employees or students if creating such software is a UAB-associated effort.

"Non-UAB software" is defined as computer software purchased, acquired, or created by an individual(s) and not officially acquired by a UAB department or unit.

"UAB-associated efforts" (related to computer software development) is defined relative to the UAB "Computer Software Policy" as UAB-assisted efforts and UAB-assigned efforts.

Policy Statement

It is the policy of the University of Alabama at Birmingham to comply with copyright law and license agreements entered into with vendors or authors of computer software. No illegally obtained or illegally copied (often referred to as "pirated") computer software is allowed at UAB. UAB does not, and will not, condone illegal copying of computer software or the use of illegally copied or obtained computer software. Anyone connected with UAB who causes unauthorized computer software to be installed or loaded in connection with his or her role at UAB or who acquires unauthorized computer software in connection with his or her role at UAB is in violation of this policy.

Whenever a staff member, faculty member, contractor of services to UAB, student, or visitor to the campus, in connection with his or her role at UAB, receives a copy of computer software from UAB, requests software to be loaded or installed on a UAB computer, or loads or installs computer software on a UAB computer, he or she must abide by the stipulations included in the license agreements associated with that computer software. It is the responsibility of anyone requesting installation of, or installing or loading, computer software onto a UAB computer to be familiar with the license agreements for that computer software, as documented by the vendor. *Individual employees are accountable for software they load or install on UAB computers or which they supply for loading or installing on the department's or unit's computers or networks. They also are accountable for any existing software on UAB computers over which they have control.*

The installation or use of non-UAB software on UAB computers is prohibited unless approved in writing by the department/unit head. The department/unit head may choose to give blanket permission to an individual on a per-machine basis. The non-UAB software should be free of viruses or other destructive mechanisms to the greatest extent possible and must be used for legitimate UAB purposes directly related to UAB's instruction, research, and service activities.

Taking UAB-owned computer software home or elsewhere off campus to use on a non-UAB computer, even if the purpose is to perform UAB-related work, also is prohibited unless such use is authorized in writing and is permitted in the license agreement associated with the computer software. This constitutes theft of UAB property unless the software license specifically allows concurrent use and such use has been approved in writing by one's supervisor or department/unit head. If the software license does not allow such use and a department/unit requests an employee to perform such work, the department/unit should purchase a separate copy of the software for installation on the employee's computer.

A computer lab or a department/unit with publicly accessible computers which allows non-UAB software to be installed *temporarily* on the network or computers for purposes such as completing class assignments, printing documents, converting document formats, etc., must have documented procedures in place for removing any non-UAB software in-

stalled on the computers. This practice is not considered a violation of this policy as long as use of the non-UAB software on such UAB computers is directly related to UAB's instruction, research, and service activities.

Proof of Ownership of Software

Computer software purchased by, and/or licensed to, UAB is an institutional resource and, therefore, should be safeguarded and accounted for in the same manner as other UAB resources. All commercial computer software license agreements, records of purchase, and original and back-up disks (or other software distribution media) must be kept by the department/unit in a safe place and must be made available for review or inspection. All license or use agreements for shareware or freeware computer software also must be available for inspection. Likewise, any written authorizations for the use of UAB-owned software on non-UAB computers must be available for inspection.

The following are examples of documents which can be used to show ownership or right to use software:

The dated purchase order, invoice, or sales receipt for purchased software or proof of a site-license agreement covering all copies in use or accessible by users in the department.

The original software distribution media.

The original documentation.

For software that is bundled with, or preloaded on, computer systems purchased by UAB, an itemized listing of the software on the dated purchase order, invoice, or sales receipt for the computer.

For software downloaded from external networks or acquired from noncommercial sources, a statement indicating the nature of the software (for example, downloadable commercial software, shareware, freeware, or public domain), the use and registration requirements for the software, and proof of registration of the software, when applicable. Acquisition of software universally known to be available free to educational institutions and/or to the general public does not have to be documented. (Note: Examples of statements to document legality of downloaded software include, but are not limited to, receipts for payment of shareware registration, printed copies of e-mail messages if the user is required to e-mail the author, screen prints of the status of freeware or public domain software, etc.) It is recognized that the extent of documentation needed for freeware or public domain software will not be as extensive as for other types of software.

These proofs of purchase/ownership must cover *all* copies in use or accessible by users in the department.

Software License Registration

Registration with the author(s) or vendor(s) of computer software purchased by, or received from, UAB for installation on a UAB computer in connection with one's role at UAB must include UAB or one's department/unit as the licensee.

Applicability

This policy applies to all staff, faculty, students, contractors of services to UAB, and visitors.

Disciplinary Action

A violation of this policy by employees, including faculty, shall result in disciplinary action according to established UAB disciplinary procedures up to, and including, discharge for nonfaculty employees and termination for cause for faculty employees. A violation of this policy by a student constitutes nonacademic misconduct, and the student will be subject to established disciplinary action.

Implementation

The Vice President for Planning and Information Management is responsible for overall procedures to implement this policy. The Executive Director of the UAB University Hospital is responsible for specific procedures to cover implementation in Hospital departments/units.

Appendix X: Graduate Council

August 8, 2000

The Graduate Council of UAB shall be constituted as follows: (a) the director, or designated representative, of each program in the Graduate School⁹; (b) for graduate students entirely under UAB jurisdiction, elected by the graduate students at large¹⁰; and (c) the Graduate School dean. The Graduate School dean shall serve as the chair of the Graduate Council. In the absence of the Graduate dean, the dean may designate a temporary chair.

The Graduate Council shall meet as required, but at least once each regular term. Additional meetings may be called by the Graduate dean. A minimum of fourteen (14) calendar days notice to all members is required for each meeting. Twenty-five percent of the Graduate Council members shall constitute a quorum. A member of the staff of the Graduate School shall be appointed by the Graduate School dean to record minutes of each meeting and be responsible for distributing these minutes to all members of the Graduate Council and others as deemed appropriate. The rules contained in Robert's Rules of Order (Revised) shall govern the Council in all cases which they are applicable.

Appendix XI: Ownership of Intellectual Property Rights

May 18, 2000

UAB recognizes that research and scholarship should be encouraged and carried out without regard to financial gain from licensing fees, royalties, or other such income. However, UAB also recognizes that patentable inventions, discoveries, software programs, and other intellectual property often arise from UAB-related staff or faculty efforts.

The policies governing the administration of inventions are included in the Board of Trustees Rule 509. Other institutional policies govern other forms of intellectual property including computer software. Those policies also provide recognition and incentive to inventors and at the same time ensure that UAB shares in the rights pertaining to inventions in which it has an investment. Any income accruing to UAB is used in the furtherance of its academic mission.

Disclosure of discoveries and inventions which appear to have commercial value and/or utility should be made to the UAB Research Foundation. Any such invention or discovery (1) which is the result of research carried on by, or under the

direction of, any employee of the University and/or having the costs thereof paid from University funds or from funds under the control of, or administered by, the University, or (2) which is made by an employee of the University and which relates to the inventor's field of work at the University, or (3) which has been developed in whole or in part by the utilization of resources or facilities belonging to the University shall be assigned to the University. Therefore, employees or students may not themselves assign or grant any option to any such intellectual property developed during the course of their employment without a release from UAB.

Questions concerning intellectual property rights should be directed to the UAB Research Foundation.

Appendix XII: Sexual Harassment Policy

January 27, 1999

(Replaces policy dated April 17, 1996)

Introduction

The University of Alabama at Birmingham is firmly committed to providing an environment that is free of discrimination, including sexual harassment. Sexual harassment includes unwelcome sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature when (1) submission to such conduct is made, either explicitly or implicitly, a term or condition of an individual's employment or academic evaluation, (2) submission to, or rejection of, such conduct by an individual is used as the basis for employment or academic decisions affecting such individual, or (3) such conduct has the purpose or effect of unreasonably interfering with an individual's work performance or of creating an intimidating or hostile working or educational environment. Such behavior may violate federal law and/or give rise to personal liability for the results of such behavior. Consequently, UAB prohibits all forms of sexual harassment and will investigate complaints thoroughly and with the utmost seriousness.

A violation of this policy may result in the taking of disciplinary action up to, and including, discharge.

Sexual Harassment in the Workplace

It is a violation of UAB policy for any employee, including faculty, to engage in sexual harassment in the workplace or in work-related situations. Employees who believe that they have been sexually harassed by a supervisor, co-worker, or other employee of UAB should report the incident promptly to the Human Resource Management Relations Office. Only Human Resource Management has the responsibility for coordinating and conducting an investigation of sexual harassment claims in the workplace and also for recommending corrective action to the UAB administration.

Sexual Harassment in the Instructional Setting

UAB prohibits sexual harassment of students by the teaching staff or other employees of UAB. For purposes of this policy, the term "teaching staff" means all those who teach at UAB and includes, but is not limited to, full-time faculty, part-time faculty, students functioning in teaching roles (such as graduate assistants), and academic administrators.

A student who believes that he or she has been sexually harassed should report the incident promptly to the Vice President for Student Affairs. Sexual harassment by a student is considered nonacademic misconduct, and the alleged student

⁹ The term "program" used above is to signify each approved graduate degree offering (as listed in the inside front cover), without regard to the UAB unit responsible for its implementation. (Where there is more than one director for a program, there shall only be one vote.)

¹⁰ The elected student members are to be in good standing, enrolled and registered, each in a different program.

offender will be subject to the disciplinary process contained in the *Direction: Student Handbook*.

Sexual Harassment—General

Full and prompt reporting is necessary for effective implementation of this policy, and UAB encourages such reporting. However, UAB's duty to protect employees and students exists when UAB's supervisory personnel know, or have reason to know, of unreported sexual harassment. Supervisors therefore are directed to take all appropriate steps to prevent sexual harassment in their areas of responsibility and to take corrective action, including disciplinary action, in response to inappropriate behavior which may constitute sexual harassment even in the absence of a complaint.

This policy seeks to encourage students, staff, and faculty to express freely and responsibly, through established procedure, complaints of sexual harassment. All such complaints shall be treated as confidential information and shall be disclosed only to those with a need to know as part of the investigatory and resolution process. Any act of interference, retaliation, or coercion by a UAB employee against a student or employee for using this policy interferes with such free expression and is itself a violation of this policy.

Implementation

This policy will be published regularly in the *UAB Reporter* and in the *Class Schedule*. The policy will be included in revisions of handbooks relating to staff, faculty, and students. The Vice President for Financial Affairs and Administration is responsible for implementation of this policy as it relates to sexual harassment in the workplace. The Vice President for Student Affairs is responsible for implementation of this policy as it relates to sexual harassment in the instructional setting.

Appendix XIII: Policy Concerning Employee Falsification Of UAB Records And Documents

April 20, 1998

(Replaces "Policy Concerning Falsification of UAB Records and Documents" dated June 27, 1996.)

See also the following related items: "Policy Concerning the Maintenance of High Ethical Standards in Research and Other Scholarly Activities" Regulations and procedures governing faculty credentials Board of Trustees Board Rule 105 Ownership and Preservation of Records and Files.

NOTE: Falsification of documents and records by a student who is not functioning in a UAB employee capacity is considered nonacademic misconduct and is handled in accordance with regulations covering nonacademic misconduct. See *Direction Student Handbook*.

Introduction

As a health-care, research, and educational institution, the University of Alabama at Birmingham is acutely interested in issues relating to the integrity of its employees.

For purposes of this policy, falsification of records exists when a UAB employee is discovered to have provided false information on the employment application; to have failed to disclose requested information; knowingly to have falsified

information; or knowingly to have recorded false information on any UAB document or record, regardless of format and including electronic communications. The following is a partial list of infractions which are specifically prohibited: falsifying information on an application for initial employment or for transfer; falsifying employee recruitment/credential records; falsifying employee expense account records or other reimbursement records; falsifying personnel/payroll documents (including, but not limited to, pay records, time sheets, or other types of time records); clocking the time card/time record of another employee or completing and submitting for approval the time sheet/time record of another employee; falsifying health records or vacation/sick leave records; falsifying research records, medical records, or departmental administrative records; and falsifying student records (including, but not limited to, admissions application materials, transcripts, grade sheets, registration documents, and student identification documents).

Policy Statement

Falsification of UAB records or documents is prohibited. Any knowing or negligent misrepresentation of a material fact or any failure to make a complete disclosure of any requested information are causes for immediate discharge without notice or pay in lieu of notice for nonfaculty employees or termination for cause for faculty employees. Any exception to the immediate and automatic discharge of nonfaculty employees for these reasons must be approved in writing by the Associate Vice President for Human Resource Management. Any exception to the recommendation of termination for cause for faculty for these reasons must be approved in writing by the Provost and by the Associate Vice President for Human Resource Management.

Implementation

The Office of the Vice President for Financial Affairs and Administration is responsible for procedures to implement this policy as it relates to employee or departmental administrative records. The Office of the Provost is responsible for procedures to implement this policy as it relates to academic records, research records, or faculty recruitment/credential records.

Appendix XIV: Health Care Policy For International Students And Scholars

May 1, 2000

(Replaces policy dated February 12, 1997)

See also UAB Immunization Policy.

Introduction

The purpose of this policy is to ensure that international students and scholars have appropriate health-care opportunities and health insurance coverage while they are enrolled as UAB students or are participating in UAB activities.

Students/Scholars Covered by this Policy

1. All UAB degree-seeking international students, regardless of courseload, school, or degree program, must participate in the UAB Student Health Service and must have adequate health insurance coverage.

2. All transient and temporary international students must have a dequate health insurance coverage. Those students may use the services of the UAB Student Health Service on a fee-for-service basis.

3. International scholars who participate in activities at UAB for longer than four weeks should be encouraged to participate in the UAB Student Health Service and must have adequate health insurance coverage. International scholars here for four weeks or less who do not participate in the UAB Student Health Service may use the services of Student Health on a fee-for-service basis. The inviting UAB department will be offered the opportunity to accept responsibility for the fee-for-service charges incurred. If the department does not wish to pay the fee-for-service bills, the international scholar will be responsible for the bills.

Definitions

For purposes of this policy, the following definitions apply:

“Transient international students” are defined as international students who are in the United States under the authorization of another institution or organization but who are taking coursework at UAB.

“Temporary international students” are defined as international students who are taking less than a full-time course of study at UAB and who are not pursuing an official UAB degree or certificate.

“Adequate health insurance” is defined as follows:

a. Insurance provided through the UAB Student Health Service, *OR*

b. Equivalent personal health insurance, the evidence for which must be shown to, and verified by, the UAB Student Health Service.

Implementation

The Vice President for Student Affairs is responsible for procedures to implement this policy.

Appendix XV: Policy Concerning AIDS and HIV Infection

April 24, 1998

(Replaces “Policy Concerning AIDS and AIDS-related Conditions” dated September 21, 1989)

NOTE: See also UAB University Hospital policies concerning prevention of transmission of HIV infections.

Definitions

The following are definitions or explanations of terminology used in this policy:

AIDS—Acquired immunodeficiency syndrome occurs in someone with HIV infection when one or more of certain diseases or infections occurs or when a CD4 (also known as T4 helper) lymphocyte cell count is below 200.

HIV—Human immunodeficiency virus (the virus which causes AIDS).

HIV antibody—A protein in the body produced in response to infection with HIV. (There are tests which look for HIV antibody in a person infected with HIV.)

HIV infection—A condition involving asymptomatic (without symptoms) or symptomatic (with symptoms) stages of infection.

Introduction

Human immunodeficiency virus (HIV) is the virus which causes the disease, AIDS. Infection with that virus damages the human body's immune (defense) system and allows life-threatening infections to develop. HIV has no known cure or

vaccine for prevention. Available medical knowledge indicates that transmission of HIV is primarily through sexual contact or sharing intravenous drug paraphernalia with someone who has an HIV infection. It also can be spread from an infected mother to her baby before, or during, delivery and through breast feeding. HIV cannot be transmitted through casual contact such as sharing food or drink, touching surfaces, shaking hands, dry kissing, or working together. HIV cannot be transmitted by mosquitoes or other insects.

Even if there are no symptoms, an HIV-infected person can transmit HIV to a sexual partner or to a needle-sharing partner.

Because of the seriousness of the HIV/AIDS issue, the University of Alabama at Birmingham has established this policy which focuses on prevention (through detailed education of students, faculty, and staff) and on the compassionate care of people with infection or AIDS.

A supervisor or anyone in the UAB community who becomes aware of an HIV/AIDS-related situation involving an employee, student, or visitor shall follow the guidelines stated in this policy.

Policy Statement

1. Admissions or Employment

The University of Alabama at Birmingham accepts otherwise-qualified individuals presenting themselves for admission or employment, irrespective of their HIV status.

2. Handicapping Conditions

Persons with AIDS (and, possibly, those with other manifestations of HIV infection) will be considered as having handicapping conditions as defined in the Rehabilitation Act of 1973 and the Americans with Disabilities Act. In determining policy and in making related decisions, UAB officials shall properly attend to the legal rights of these individuals and shall make reasonable accommodations as are appropriate for individuals with handicapping conditions.

Decisions regarding the continuation of employment of faculty and staff with HIV infection or AIDS will be made on the basis of job-related criteria. Within current UAB policies and procedures, individuals may be reassigned to accommodate a disabling condition. Termination will be pursued only when the employee, even with reasonable reassignment of responsibilities, can no longer perform the duties and responsibilities of his or her position. Any such termination action will be taken in accordance with established UAB procedures.

3. Student Attendance

UAB students who have HIV infections, whether they are symptomatic or asymptomatic, will be allowed regular classroom attendance as long as they are physically and mentally able to attend classes as determined by current UAB academic standards. HIV-infected students enrolled in UAB health profession schools may have their educational program modified by their school to limit the risk of disease transmission, in accordance with the Alabama Infected Health-care Worker Management Act.

4. Access to Facilities

There will be no unreasonable restriction of access on the basis of HIV infection to student or employee facilities, theaters, restaurants, snack bars, gymnasiums, swimming pools, saunas, recreational facilities, or other common areas.

5. Student Housing

Currently available medical information does not indicate that there exists a risk of transmission of infection by casual

contact which would preclude sharing a residence with a person with AIDS or HIV infection. However, there may be reasonable concern for the health of students with immune deficiencies (of any origin) when those students might be exposed to certain contagious diseases (for example, measles or chicken pox) in a close living situation. For these reasons, decisions regarding housing and private rooms for students with HIV infections will be made on a case-by-case basis by UAB Student Housing and Residential Life officials. It is the responsibility of the student to make his/her HIV status known to UAB in order for any accommodation request to be considered. It also is the responsibility of an HIV-infected student to take necessary precautions to avoid exposure of others to infection through known means of transmission.

6. Self-disclosure

In general, students, student applicants, employees, and applicants for employment at UAB will not be asked to respond to questions concerning the existence of HIV infection. However, both students and employees with HIV infection are encouraged to inform campus health-care providers so that UAB may provide information about proper medical care, medical care availability, support, counseling, and education. This, like any other medical information, will be handled in a strictly confidential manner in accordance with established UAB policy and Alabama law.

7. Immunizations

Incoming students known to have HIV infection need not be exempted from UAB requirements for nonlive virus vaccinations. However, because of potentially serious consequences for HIV-infected persons' receiving live virus vaccines, persons who are recommended to receive such immunizations should consult the UAB Student Health Center or the Jefferson County Department of Health for current recommendations.

8. Information, Testing, and Counseling

A. Testing. Students or employees requesting HIV antibody testing will be referred to the Jefferson County Department of Health. UAB University Hospital employees also may receive such testing through the Employee Health Services.

B. Services. Counseling, information, and education are available through various UAB units including the Student Health Service, the Division of Student Affairs, the Hospital Employee Health Service, and the Office of Human Resource Management. These services currently are made available to the students or employees at no cost and in accordance with the guidelines in each unit.

9. Confidentiality of Information.

A. Standards

No information concerning HIV infection or AIDS or their diagnoses will be provided to any third party other than an employee's immediate supervisor without the expressed written consent of the infected person. Medical information cannot be released to any person, group, agency, insurer, employer, or institution without specific written consent of the patient or legal guardian, except as required by law. All disclosures of diagnoses of HIV infection or AIDS to individuals functioning in supervisory roles must be treated as confidential information. According to present law, UAB physicians and other health-care providers are mandated to protect the confidentiality of medical information with exceptions being made only if the need arises to protect others in very specific, life-threatening circumstances. Also, disclosure by persons

other than health-care providers that an individual has HIV infection or AIDS may be considered an invasion of that individual's privacy. Situations in which disclosure will be made will be determined on a case-by-case basis in consultation with the chair of the AIDS Activities Coordinating Committee and the Office of Counsel, if needed.

B. Public Health Reporting Requirements

UAB will observe the public health reporting requirements of the Alabama State Department of Public Health. Individuals known to have HIV infection will be reported to the State Department of Public Health according to prevailing statutes.

C. "Need to Know"

According to the American College Health Association, current medical information concerning HIV neither justifies nor requires warning others of the presence of someone with HIV infection or AIDS. Given the absence of any evidence of transmission of HIV by casual contact, there is no need or justification for warning individuals in the academic workplace, administrative officers, or instructors of the presence of such an individual.

Therefore, the number of people at UAB who will be aware of the existence and/or identity of students or employees who have HIV infection will be kept to an absolute minimum, both to protect the confidentiality and the privacy of the infected persons and to avoid the generation of unnecessary fear and anxiety among faculty, staff, and students.

10. Education

Training requirements for employees deemed at-risk by the AIDS Activities Coordinating Committee shall consist of sessions sufficient in number and depth to comply with prevailing Centers for Disease Control and Prevention recommendations and "Bloodborne Pathogens Standards." In the absence of such guidelines, the AIDS Activities Coordinating Committee shall determine educational standards. Records of AIDS education training for at-risk employees shall be maintained in the appropriate UAB Human Resource Management office.

11. Safety Precautions

A. Personnel

Since many people with HIV infection are not identified in advance, universal precautions as defined by the Centers for Disease Control and Prevention and by the Occupational Safety and Health Administration will guide the procedures for the handling of blood and body fluids containing viable blood of any student, employee, or patient. Questions regarding these safety guidelines should be directed to the Department of Occupational Health and Safety, the Hospital Employee Health Service, the Office of Human Resource Management, the Hospital Committee on Infections, or the UAB Biosafety Committee. Each unit has the responsibility for developing department-specific directives and procedures. Departments also have the responsibility for compliance monitoring and staff education to prevent the transmission of HIV infection.

B. Equipment

Manuals and procedures already in use at UAB cover the precautions which should be taken when handling infectious materials. Certain of those procedures are re-emphasized here especially as pertains to the transmission of HIV infection. UAB personnel will use disposable, single-use needles and other equipment whenever such equipment will puncture the skin or mucous membranes of patients, employees, or stu-

dents. Extreme caution should be exercised when handling sharp objects, particularly in disposing of needles. All used needles should be placed in puncture-resistant containers designated for this purpose. Needles should never be bent or re-capped after use. Any needles which are made to be re-used or other equipment that punctures skin or mucous membranes should be appropriately cleaned and sterilized before re-use. Blood-soaked articles should be placed in leak-proof bags with biohazard labels before being sent for reprocessing or disposal in accordance with established UAB infection control guidelines.

C. Teaching Laboratories

Laboratory courses requiring exposure to blood, such as biology courses in which blood is obtained by finger prick for typing or examination, should use disposable equipment, and no lancets or other blood-letting devices should be re-used or shared. No students, except those in health-care professions, should be required to obtain or process the blood of others.

12. Job Performance

Faculty, staff, students, and all other persons affiliated with UAB shall perform the responsibilities of their positions irrespective of the HIV status of patients, students, or co-workers. Failure to comply with this policy will be considered a failure to adequately perform the responsibilities of one's position and may result in disciplinary action up to, and including, discharge.

13. Behavior Risk

UAB students, faculty, and staff with HIV infection or AIDS who are aware of the potential danger of their condition to others and who engage in behavior (while performing their employee-related or student-related activities) which threatens the safety and welfare of others may be subject to disciplinary action in accordance with established UAB disciplinary procedures and/or applicable law.

Applicability to Other UAB AIDS Policies

More specific, written guidelines and procedures are the responsibility of individual departments and may be developed, as needed, by department/unit heads. All unit policies must be compatible with this UAB-wide policy and may not be in conflict with it.

Graduation Deadline Dates, 2002-2004

These dates are subject to change. Check the UAB Class Schedule each semester for any changes to these dates. Also check with your department because some programs have earlier deadline dates for submission of the application for degree.

Plan I Graduate school deadlines for students completing a thesis or dissertation. (Revised: 1/23/2001)					
Semester	Year	Diploma date	Deadline for application for degree	Last day for public defense of thesis or dissertation	Approval version of thesis or dissertation to Graduate School
FALL	2002	December 14	September 13	November 8	November 18
SPRING	2003	May 10	January 31	April 4	April 14
SUMMER	2003	August 16	June 20	July 7	July 18
FALL	2003	December 13	September 12	November 7	November 17
SPRING	2004	May 8	January 30	April 2	April 12
SUMMER	2004	August 14	June 25	July 9	July 19

Plan II Graduate school deadlines for students not completing a thesis or dissertation. (Revised: 1/23/2001)				
Semester	Year	Diploma Date	Deadline for application for degree	Last day for receipt of final papers
FALL	2002	December 14	September 13	December 6
SPRING	2003	May 10	January 31	May 2
SUMMER	2003	August 16	June 20	August 1
FALL	2003	December 13	September 12	December 5
SPRING	2004	May 8	January 30	April 30
SUMMER	2004	August 14	June 25	August 6

PLEASE NOTE:

Failure to meet these deadlines will require the filing of a “NEW” Application for Degree Form (reorder) and registration in subsequent semesters. The Application for Degree form (approved at the department level and received in the Graduate School) should be filed prior to the beginning of the semester the student plans to graduate. **It is the student’s responsibility to see that the above deadlines are met.** Students will not be cleared for graduation until all paperwork has been processed, all grades have been finalized, and all fees (e.g., binding and microfilm) have been paid. Fee payment receipts for binding, microfilming, and copyrighting must be turned into the Graduate School office. The above dates are subject to change. Check with the Graduate School, 511 Hill University Center, or call 934-8234 if you have any questions concerning graduation.

