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* degree awarded by UA or UAH

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The University of Alabama at Birmingham is a comprehensive urban institution in Alabama's major city. With a student enrollment exceeding 16,000 and faculty and staff numbering more than 15,000, UAB has become a nationally and internationally respected center for educational, research, and service programs. Our campus encompasses a 70-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.

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.

UAB attracted more than \$300 million in active grants and contracts in FY 2000, ranking us among the top institutions in the country in this respect. Nationally, UAB ranks 18th in NIH support and 28th in all federal research and development expenditures. 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.

Campus life at UAB is characterized by the bustle and diversity of the university's urban setting. More than 3,000 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 Gene Bartow Arena seats more than 8,000 for concerts, sports events, graduation exercises, and other special events.

The Alys Robinson Stephens Performing Arts Center houses the 1,400-seat Jemison concert hall and the 350-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 houses the 150-seat Reynolds-Kirschbaum 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.

Seven musical performing groups (a pep band, a jazz ensemble, a wind ensemble, a community wind band, and three choral groups) 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 four times a week, 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 basketball, football, baseball, tennis, soccer, golf, volleyball, track, rifle (co-ed), and cross country. Both men's and women's teams have won many 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.

International Programs

The Center for International Programs (CIP) is dedicated to providing quality services, programs, and activi-

ties that enhance cultural awareness, international educational and research opportunities, and global perspectives for students, faculty, and staff from the United States and other countries. The CIP serves as a collaborative community resource that facilitates, promotes, and strengthens international understanding. The center is also responsible for the consideration of all issues relating to the international activities and programs that affect the university as a whole.

General services include coordination of international exchanges between UAB and universities abroad; Fulbright workshops to inform faculty and students of opportunities to teach, conduct research, or study abroad; cross-cultural communication workshops; scheduling of distinguished international guests who present lectures on a wide variety of topics; and the sale of International Student Identity Cards. The CIP staff offer a wide range of services for foreign nationals, including immigration and nonresident alien tax advising, orientation, seminars on legal issues, notary public services, and publication of a quarterly newsletter with the latest updates on immigration and tax laws and campus activities. The center also operates the Smolian International House (1600 10th Avenue South), which serves as a venue for activities and programs that foster international understanding. The CIP is located on the second floor of Hill University Center Room 250. For additional information, call 205-934-3328 or visit www.uab.edu/cip.

UAB Study Abroad

UAB Study Abroad offers opportunities for international study either through UAB or non-UAB programs which 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 in the CIP for further information concerning various programs, the CIP resource room, 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.

Oak Ridge Associated Universities

Since 1971, students and faculty of University of Alabama at Birmingham have benefited from its membership in Oak Ridge Associated Universities (ORAU). ORAU is a consortium of 86 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, as well as faculty enjoy access to a multitude of opportunities for study and research. Students can participate in programs covering a wide variety of disciplines including business, earth sciences, epidemiology, engineering, physics, geological sciences, pharmacology, ocean sciences, biomedical sciences, nuclear chemistry, and mathematics. Appointment and program length range from one month to four years. Many of these programs are especially designed to increase the numbers of underrepresented minority students pursuing degrees in science and engineering-related disciplines. 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.ornl.gov/orise/resgd.htm, or by calling either of the contacts below.

ORAU's Office of Partnership Development seeks opportunities for partnerships and alliances among

ORAU's members, private industry, and major federal facilities. Activities include faculty development programs, such as the Ralph E. Powe Junior Faculty Enhancement Awards, the Visiting Industrial Scholars Program, and various services to chief research officers.

For more information about ORAU and its programs, contact: Dr. Krishnan Chawla, ORAU Councilor for University of Alabama at Birmingham (205-934--A3-46); Ms. Monnie E. Champion, ORAU Corporate Secretary (865-576-3306); or visit the ORAU Home Page (www.orau.org).

Birmingham

Birmingham is a dynamic, progressive urban center of great natural beauty. Almost a million people live in the metropolitan area, ranking it in the top 58 cities nationwide. Birmingham is the cultural and entertainment center of the state and offers beautiful residential neighborhoods and parks, a thriving business climate, and a relatively low cost of living.

Birmingham's high quality of life has been recognized nationally for many years. In 1989 and 1993, the U.S. Conference of Mayors awarded Birmingham its Most Livable City designation. 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 two decades by the phenomenal growth of UAB. The cost of living in Birmingham compares very favorably with cities in other regions of the country. According to a recent American Chamber of Commerce report on 246 U.S. cities, Birmingham is below the national average in cost of grocery items, housing, transportation, health care, and miscellaneous goods and services; this places Birmingham below the cost of living in most other major U.S. cities. U.S. News and World Report recently ranked Birmingham in the top five in the U.S. among cities where business is best. 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 the central Alabama area, with rapid suburban growth and massive revitalization and renovation of historic structures downtown. Construction completed in 1999 totaled over \$1.3 billion. Birmingham is the leading city in a state that is estimated to have 10% of the nation's natural resources and 10% of the nation's navigable waterways.

The Birmingham area has over 1,300 churches and synagogues, 10 institutions of higher education, 5 county and 13 major city public school systems, over 50 private and denominational schools, and over 20 hospitals with a combined total of approximately 6,500 beds. Birmingham is in the geographic heart of the Southeast—two-and-a-half hours by interstate from Atlanta, four hours from Nashville, six hours from New Orleans, five hours from the Smoky Mountains, and five hours from the beaches of the Gulf of Mexico. Birmingham lies within 500 miles of 60% of the nation's population.

The Graduate School

More than 43 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 46 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.

The Graduate Council has developed policies and procedures to ensure that high standards for graduate study are maintained at UAB. These policies and procedures are the joint responsibility of the Graduate Council and the Graduate School dean and can be found at www.uab.edu/graduate/polproc.htm

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 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, thesis and dissertation photocopying, and interlibrary loans. The or-

ganization 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 440 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 visit the GSA web site at www.uab.edu/graduate/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 that is dedicated to fostering a greater awareness of career opportunities outside academia.

Its goal 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, seek advice from non-academics, stimulate students to begin career development early in their educational experience, and to provide information to students about alternative career opportunities. More information is available at www.uab.edu/graduate/roundtable

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

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 Evaluation 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 and the Test of Written English (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

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.

³ Evaluation forms are not required for the Business programs.

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.

Readmission

The records of former students who have not registered for and passed at least one course at UAB in a year will be removed from the UAB computerized registration system. Such students must apply for readmission 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 Readmission to a Graduate Degree Program and pay the required processing fee. These readmitted students must meet the degree requirements operative at the time of readmission. 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 readmitted, 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 non-degree-seeking student) will be considered until at least two regular terms 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.

POSTDOCTORAL SCHOLARS

Services and benefits that are available to postdoctoral fellows are coordinated through the Office of Postdoc-

toral Education. Fellowship scholars can contact the office at 205-975-7020 or at www.uab.edu/postdoc

General Academic Requirements

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

General

Graduate Credit

For purposes of academic accounting, credits expressed in "semester hours" are assigned to each course. The guideline for lecture courses is that 1 semester hour of credit is awarded for 13-15 contact hours. Laboratory credit is assigned on the basis of 1 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 Students Taking Graduate Level Course Approval Form can be obtained online or from the Graduate School, Room 511, Hill University Center. Credits earned by undergraduate students 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, practicums, individual studies and projects, internships, and residencies will generally carry numbers in the upper range of these centuries.

Time Limitations

Credits more than seven years old may be used to satisfy Graduate School degree requirements only with the approval of the graduate committee program director and the graduate dean. Doctoral students are generally expected to complete all degree requirements within seven years of matriculation. One extension of this time limit can be requested when mitigating circumstances preclude completion of requirements within seven 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 Graduate Dean for consideration and approval.

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 6 semester hours of work each regular term. The university publishes the UAB Class Schedule four times per year, approximately two weeks before the beginning of registration for the approaching term. 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 term until the date specified in the UAB Class Schedule. Procedures are also specified in that publication. A processing fee is normally 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 normally 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, since 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.

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 term, a temporary grade of N will be recorded. If no permanent grade has been reported by the end of the following regular term, 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 because of 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 regular term, because at the end of that term 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

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.

Grade Point Average

The grade point average is determined by dividing the total quality points awarded by the semester hours attempted.

Academic Performance

Good Academic Standing

For a student to maintain good academic standing in the Graduate School, a grade point average 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 the earning of at least as many hours of P grades as hours of NP grades.

Satisfactory Progress

Each graduate program should establish standards for satisfactory progress toward the degree. Students who do not meet these standards may be dismissed from the graduate program.

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 term 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 regular term 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 regular terms 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.

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 School 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 UAB Policy Concerning the Maintenance of High Ethical Standards in Research and Other Scholarly Activities

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' nonacademic misconduct.

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.

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 flexi-

ble 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.) When used, 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 guide the student. Recommendations for graduate study committee membership are submitted by the advisor and the student to the graduate program director, who subsequently submits these recommendations to the Graduate School dean. Graduate study committee appointments are made by the graduate dean, who is an *ex officio* member of all graduate study committees.

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.

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 problem posing and problem solving and to use these insights to prepare a written report.

Supervising Committees

The Graduate School dean will appoint each master's program student a supervising committee upon the recommendation of the appropriate graduate program director. The committee will consist of at least three members of the graduate faculty, 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 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.

The committee is responsible for the design of the student's program. The supervising committee conducts the final thesis examination for thesis degree-plan candidates and determines the scope, content, and form of the final master's comprehensive examination for thesis substitute and nonthesis degree-plan candidates.

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 obtained in the Graduate School, Room 511 Hill University Center. An application for transfer of credit will not be considered until the student has completed at least 6 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 grade point average in the student's current UAB program.

Graduate credit earned with a grade of B or above while 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. In the case of Plan I, 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 regular term before the expected graduation. Students must be admitted to candidacy before they can register for thesis research hours (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 two weeks into the term of expected graduation. Students must be registered for at least 3 semester hours of graduate work during the term that graduation requirements are met. See deadline dates.

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 at www.uab.edu/graduate/thesguid.htm

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. This copy will be examined carefully, and the Graduate School reserves the right to require changes to bring the document up to the standards 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 25% cotton, acid-free 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.

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 term 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 term 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.

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—no later than two weeks into the expected term of graduation
- 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 25% cotton, acid-free paper to Graduate School office (Plan I only)—no later than 10 days after the return of the unbound thesis
- Conferring of degree

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 regular term.

Residence Requirement

The usual minimal period in which the doctoral degree can be earned is three 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 (three regular terms).

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, which 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 individual examinations in several appropriate areas or of 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 term in which the comprehensive examination is taken.

Admission to Candidacy

When the student has passed the comprehensive examination, has satisfied any program requirements for foreign language proficiency or special tools of research, and has 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 three regular terms before the expected completion of the doctoral program. Students must be admitted to candidacy before they can register for dissertation research hours (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 two weeks into the expected term of graduation. Students must be registered for at least 3 semester hours of graduate work during the term that graduation requirements are met. See deadline dates.

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 at www.uab.edu/graduate/thesguid.htm

The Graduate School has the responsibility for ensuring that the final version of the dissertation meets the stan-

dards 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 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 25% cotton, acid-free paper. These copies must be received no later than 10 days after the return of the finalized unbound dissertation copy to the student.

Microfilm and copyright contract forms, the Survey of Earned Doctorates form, and one completed dissertation abstract 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.

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 term 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 term 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.

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 three regular terms before expected graduation
- Application for degree—no later than two weeks into the expected term 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 dissertation to Graduate School Office no later than 20 days before expected graduation
- Survey of Earned Doctorates and microfilm contract
- Two copies of final version of dissertation on 25% cotton, acid-free paper to Graduate School
- Conferring of degree

Facilities and Services

Lister Hill Library of the Health Sciences

The **Lister Hill Library (LHL) of the Health Sciences**, established in 1945, is the largest biomedical library in Alabama and one of the leading such libraries in the South. In addition, the library serves as a Resource Library in the National Network of Libraries of Medicine (NN/LM) for the Southeast/Atlantic region. Its collections span seven centuries of knowledge from the 10,000 old and rare books, including 33 incunabula, to electronic textbooks and full-text journals. LHL holds books, bound journals, microforms, and other media that total approximately 340,000 volumes; 1800 current print journal subscriptions; and an increasing number of electronic resources. Access to electronic resources is available across campus and remotely to authorized users. Within the library are approximately 150 public workstations, including a 30-seat electronic classroom. The present library structure, built in 1971, completed a major expansion and renovation project in the spring of 1997.

The library maintains a World Wide Web site at www.uab.edu/lister, and a variety of services and information may be obtained through this site. Remote access to electronic resources is available the Library's "Virtual Desktop" which can be accessed through the main library web site.

UAB Historical Collections, a department of the Lister Hill Library, includes the Reynolds Historical Library, Alabama Museum of the Health Sciences, and the UAB Archives.

The **Reynolds Historical Library** is a nationally respected collection of rare and important books, manuscripts, and artifacts in the medical sciences. The Reynolds collection, originally formed by Dr. Lawrence Reynolds (1889-1961), ranks among the top collections of its type in the United States.

The **Alabama Museum of the Health Sciences** was established to document the growth and development of education, research, and practice in the field of the health sciences in Alabama. The museum maintains a web site at www.uab.edu/historical/museum.htm. The Reynolds Historical Library & Alabama Museum are located on the 3rd floor of Lister Hill Library. Individuals wishing further information may contact the staff at 934-4475 or visit the Reynolds Historical Library homepage at: www.uab.edu/reynolds.

The **UAB Archives** is the official repository for the records of the University and also collects manuscript materials that document the history of the health sciences. The UAB Archives is physically separate from the library and is located in Mortimer Jordan Hall. Individuals wishing to use the resources of the UAB Archives may contact the staff for further information, Voice: 934-1896 or 934-9671 or Email: archives@uab.edu. Additional contact information and lists of all archival and manuscript collections may be found on the web site at www.uab.edu/historical/archives.html.

Lister Hill Library maintains a branch facility, **Lister Hill Library at University Hospital**, located in Room P-235 of UAB University Hospital. This facility, formerly referred to as the West Pavilion Branch, is officially named the Lister Hill Library at UAB University Hospital.

The library has about 100 clinically oriented journal subscriptions and approximately 350 textbooks. Photocopiers and computers are also available for patron use.

Twenty-four-hour access is available to staff and students with direct patient care responsibilities through the library's security system. For more information, contact Tracy Powell at 934-2275 or by email at tracypow@uab.edu.

The web site for the branch library is located at www.uab.edu/lister/wpweb.

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 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. The user may access the system from the library or remotely. Study areas and photocopying machines are located throughout the library, which is located at 917 13th Street South. 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. Access to the Sterne catalog is available through the Internet.

Education Technology Services

Education 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, 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 SE 30s and IBM-PC. 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 inter-institutional 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 www.mhsl.uab.edu

Student Housing and Residential Life

Student housing facilities at UAB include a traditional residence hall (Hixon Hall), four apartment-style resident halls (Blazer Hall, University Hall, Denman Hall, and Camp Hall), a suite-style residence hall (Rast Hall), and 62 apartment units for students with children (Garden Apartments). Student housing is centrally located within UAB and within walking distance of all classroom buildings, libraries, and the medical center.

The cost of student housing ranges from \$175.00 to \$514.00 per month, depending on the type of housing (traditional residence hall, efficiency or one-bedroom apartment, suite, or two-bedroom furnished or unfurnished). Graduate and professional students are eligible for single occupancy in all residence halls except Rast Hall.

Each resident of student housing must be a regularly enrolled, full-time UAB student. Full-time status is defined as 6 hours for graduate students and 8 hours for undergraduate students. Health-professions students, as well as interns, residents, and fellows, must meet hourly requirements defined by the schools in which they are enrolled or the areas in which they are receiving post-graduate training.

To establish a position on the waiting list, prospective students are encouraged to apply for student housing whether or not they have been admitted to UAB. All assignments are made on a date-of-application basis.

For additional information about on-campus housing or assistance with information about off-campus housing, contact the UAB Student Housing and Residential Life Office, 1604 Ninth Avenue South, Birmingham, Alabama 35294-1230 (telephone 205-934-2092).

Student Health and Insurance Programs

Student Health Service

A Student Health Service, currently supported by student fees at the quarterly rate of \$45 (subject to change) per individual, is mandatory for all graduate students registered for 6 or more semester hours per quarter. All international students, regardless of the program in which they are enrolled, are also required to participate in the Student Health Service. All UAB graduate students are also required to have an acceptable hospitalization insurance program (see information below on Hospital and Major Medical Insurance Programs).

Medical center graduate students taking fewer than 6 semester hours per quarter may, if they wish, 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, Request 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 Wellness Center.

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 and Insurance Information

All full-time graduate students in programs outside the health sciences are required to enroll in the Student Health Service 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 (this waiver is printed in red ink); 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 non-health center students who will not be participating, the waiver of Student Health Service and the health insurance form must be completed and returned to the Graduate School office (511 Hill University Center, 1400 University Boulevard, Birmingham, Alabama 35294-1150) before registering 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 19th Street South, Birmingham, Alabama 35294-2041 (telephone 205-934-3580).

Student Dental Health Program

The UAB Student Dental Health Program is supported by annual fees of \$81 (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 (endodontics), non-elective extractions, postoperative care, and dental health counseling. Other services may be provided at the discretion of the Student Dental Health Office. Ser-

vices 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 is composed of the following areas: UAB Career Center, Disability Support Services, Veteran's Affairs, Testing Office, Wellness Center, and the Women's Center.

In the UAB Career Center, 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 resumes and cover letters, developing credentials files, and researching employers. Personnel in these offices conduct numerous free seminars each term 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 graduate students as requested.

The 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.

The Women's Center provides assistance to women in a variety of ways, such as acting as a referral service for education/career opportunities, providing a resource library, implementing educational programming, and establishing a speakers bureau.

The Student Development Office is open from 8:00 a.m. to 6:00 p.m., Monday through Thursday, and until 5:00 p.m. on Friday. All offices are located on the fifth floor of the Hill University Center, except for the Wellness Center and Women's Center, which are located on the fourth floor. For more information, call 205-934-8170.

Financial Information

Tuition and Fees

Payment Deadline

Each quarter, all outstanding tuition and fees must be paid in full by a deadline date approximately four weeks after the beginning of classes (the exact date is shown in the UAB Class Schedule, published quarterly). Payment may be made by mail or in person at the Student Accounting Office, Suite 322, Hill University Center, 1400 University Boulevard, Birmingham, Alabama 35294-1150 (telephone 205-934-3570).

There are substantial financial penalties for failure to pay tuition and fees by the deadline.

Further, if any student has an unpaid financial obligation to any program, school, or library of the university, no transcripts will be issued for that student and the student will not be permitted to register at UAB.

Estimated Quarterly Fees⁴, 1998-2000

General Fees Paid by All "Resident"⁵

Graduate Students

Graduate School Fees, per semester hour	\$ 107.00
School of Public Health Fee	\$110.00
School of Nursing Fee	\$129.00
School of Health Related Professions Fee	\$139.00
Student Service Fee	\$ 23.00
	(plus \$5 per semester hour)
Building Fee, Academic Health Center Students	\$ 18.00
Building Fee, All Other Students	\$ 18.00
	(plus \$3 per semester hour)

General Fees Paid by All "Nonresident"⁶

Graduate Students

Graduate School Fees, per semester hour	\$214.00
School of Public Health Fee	\$220.00
School of Health Related Professions Fee	\$278.00
School of Nursing Fee	\$258.00
Student Service Fee ⁶	\$ 23.00
	(plus \$5 per semester hour)

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

⁵ See Nonresident Tuition Policy (Appendix III) for definition of residency.

⁶ Regular UAB employees are exempt from Student Service Fee.

Building Fee, all other students	\$ 18.00
	(plus \$3 per semester hour)

Special Fees, Paid Where Applicable

Nondegree Application Fee	\$ 25.00
Domestic Application Fee	\$ 35.00
Domestic Application Fee, MAC, MBA	\$ 50.00
Domestic Application Fee, MSHA	\$ 60.00
International Application Fee	\$ 60.00
International Application Fee, MAC, MBA	\$ 75.00
International Application Fee, MSHA	\$ 85.00
Readmission Application Fee	\$ 25.00
Student Health Service Fee (per quarter)	\$ 45.00
	(plus initial processing fee of \$25.00)
Annual Insurance Fee	\$ 631.00 (student)
	\$ 1315.00 (spouse)
	\$ 937.00 (each child)
Late Payment Fee ⁷	\$ 30.00
Late Registration Fee ⁷	\$ 15.00
Change of Course Fee ⁷	\$ 10.00
Withdrawal Fee ⁷	\$ 20.00
	(for total withdrawal during first two weeks of each quarter)
Reinstatement Fee ⁷ (for 3 hours or less)	\$ 30.00
(for over 3 hours)	\$100.00
Computer Science, Natural Science, Social Science, and Engineering Laboratory	\$ 50.00
(for each laboratory)	
Returned Check Fee	\$ 25.00
Transcript Fee (except intercampus)	\$ 5.00
Degree Completion Fee ⁸	\$ 250.00
	(per quarter)

Diploma Fees

Graduate Degree Fee	\$ 40.00
Reorder Diploma Fee	\$ 15.00
	(if graduate requirements are not met after diploma has been ordered)
Duplicate Diploma Fee	\$ 7.50
Thesis Binding Fee	\$ 24.00
	(per copy)
Dissertation Microfilming Fee	\$ 60.00

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

⁸ This fee is assessed when students fail to complete theses or dissertations within one quarter following the final defense.

Optional Copyright Fee \$ 45.00

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 from a Course Without Paying Full Tuition and Fees" (specified 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 quarter of registration to obtain in-state tuition status for the entire program; otherwise, in-state tuition status will be awarded beginning with the term 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 at 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.

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 460, Hill University Center, 1400 University Boulevard, Birmingham, Alabama 35294-1150, telephone 205-934-8115.

Graduate Degree Programs

Program and Course Information

The online program descriptions available at www.uab.edu/graduate/catalog give details of degree requirements beyond the general statement in previous sections. Specific courses are also listed.

Course Listings

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

Faculty Rosters

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 provides overall, university-wide information on primary academic appointments held by graduate faculty members: www.uab.edu/graduate/gradfac

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 Graduate 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

For the most up-to-date program descriptions, course descriptions, and faculty rosters, see the online Graduate School Catalog: www.uab.edu/graduate/catalog

Graduate Program Descriptions

These program descriptions are updated between printings of the catalog. The online descriptions at www.uab.edu/graduate/catalog are the definitive descriptions.

Accounting (M.Ac.)

Graduate Program Director: *Turpen*

Faculty

Nell Adkins, Assistant Professor (Accounting); Tax

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

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

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

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

Mission and Objective

The accounting programs 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. It is designed for those individuals with a knowledge base in accounting and business who desire to broaden their technical and interpersonal skills. Offered in an evening format, the program is a blend of the theoretical and the practical and emphasizes critical thinking, collaborative analysis, and oral and written communication. The Master of Accounting Program is accredited by the American Assembly of Collegiate Schools of Business--The International Association for Management Education (AACSB, www.aacsb.edu).

Admission Requirements

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

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

All academic work must have been completed within the last ten years, although consideration may be given to significant postgraduate accounting experience. A catalog match 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 Graduate Management Admission Test (GMAT, www.gmat.org) is required of all applicants. In addition, a minimum score of 550 on the Test of English as a Foreign Language (TOEFL, www.toefl.org) is required of those whose degrees are from foreign institutions. Test scores on these exams 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 grade point average. Past academic performance in account-

ing course work will be considered 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 Requirements

The program consists of 30 semester hours of graduate credit in either of two concentrations—General or Taxation: 18 hours of accounting courses (as specified for each concentration), 9 hours of MBA electives, and 3 hours of other electives. Of these 30 hours, no more than 9 may be taken at the 500 level. With the exception of AC 580, which is a required course, enrollment in 500-level accounting courses for program credit requires prior approval by the M.Ac. Program Director.

Courses required in the General concentration are AC 580, Financial IV; AC 601, Cost; AC 603, Systems; AC 604, Research and Communication; AC 606, Auditing; and AC 620, Tax Research. Those required in the Taxation concentration are AC 580, Financial IV; AC 600, Financial; AC 604, Research and Communication; AC 620, Tax Research; AC 621, Corporate Tax I; and one accounting course selected from AC 622, 623, or 628.

Uniform CPA Exam

The state of Alabama requires that applicants for the Uniform CPA Exam 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 at the upper-division or graduate level.

There are two ways that UAB students may meet these requirements:

(1) *By obtaining a Master of Accounting degree.* Under the state's 150-hour law, holders of graduate degrees from AACSB-accredited accounting programs such as UAB's automatically qualify to sit for the Uniform CPA Exam.

(2) *By obtaining an undergraduate accounting degree (or its equivalent) and completing certain additional course work as specified under the state's 150-hour law.* Students interested in this option should contact the undergraduate advisor's office in the School of Business for specific guidance. Students interested in this option who already hold degrees from other institutions also should contact the undergraduate business advisor and apply to the University as an undergraduate seeking a second degree.

Other Professional Accounting Certifications

Other exams 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 the undergraduate business advisor or any member of the Accounting Faculty for further information.

Contact

For detailed information contact the Graduate School of Management, School of Business, SOB 219, 1530 3rd Avenue South, Birmingham, AL 35294-4460.

Telephone 205-934-8817

E-mail raturpen@uab.edu

Web www.business.uab.edu

Course Descriptions

Unless otherwise noted, all courses are for 3 semester hours of credit.

Accounting (AC)

The general enrollment requirement for Master of Accounting courses is graduate standing and an undergraduate accounting major or its equivalent. In addition, enrollment in 500-level courses (for program credit) requires prior approval by the M.Ac. Program Director. Graduate accounting courses are not open to nondegree students.

514. **Fund Accounting.** Budgetary and fund accounting as applied to municipalities, other governmental units, and institutions operating as nonprofit entities.

533. **Advanced Internal and External Auditing.** Advanced study of selected topics in controlling and auditing electronic data processing, statistical sampling techniques in auditing, compliance auditing, operational auditing, and other current auditing topics.

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

564. **Accounting Internship.** Work experience enabling students to better integrate academic knowledge with practical applications by exposure to accounting practice and business environment. Prerequisites: Permission of instructor and 3.0 GPA in AC courses. Pass/fail credit only.

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

600. **Current Problems in Financial Accounting.** Consideration of recent pronouncements from various

authoritative bodies such as the FASB and SEC through research projects and case discussions.

601. **Current Problems in Cost Accounting.** Emphasis on theory and practice of cost accumulation and allocation.

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

604. **Professional Research and Communication.** Methods of applied accounting research and analysis of financial reporting problems, with emphasis on written and oral communication of findings. Prerequisite or corequisite: AC 580.

606. **Current Problems in Auditing.** Development of auditing to its present state; authoritative bodies influencing auditing; new developments. Prerequisite: AC 604.

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

621. **Corporate Tax I.** Federal income taxation of corporations. Major topics include formation and liquidation, distributions, and Subchapter S corporations. Prerequisite: AC 620.

622. **Corporate Tax II** (continuation of AC 621). Includes reorganizations, consolidated returns, and accumulated earnings tax. Prerequisite: AC 621.

623. **Taxation of Partners.** Federal taxation affecting partners and partnerships. Major topics include formation and termination, distributions, sale of interest, and withdrawal. Prerequisite: 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.

649. **Directed Research.** Supervised study of topic not covered in regular courses. Prerequisites: AC 604 and AC 620.

For MBA courses, see MBA information.

Administration Health Services (Ph.D.)

Graduate Program Directors: *Hernandez* and *McGee*

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

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

James Dilworth, Professor (Management), Production and Operations Management, Just-In-Time Management

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

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. Hiatt, 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

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

Charles L. Joiner, Professor (Health Services Administration), Health Care Labor Relations, Human Resource Management in Health Care Organizations

Susan Key, Assistant Professor (Management), Business and Society, Ethics, Business Law, Business Policy and Strategy

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

Henry N. McCarl, Professor (Economics), Mineral Economics, Economic Forecasting, Economic Impact

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. Morrisey, 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

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

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

Lynne Richardson, Professor (Marketing), Customer Service, Uses of Power in Marketing Channels,

Woodrow Richardson, Associate Professor (Management), Strategic Management, Case Research

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, L.R. Jordan Professor of Health Services Administration, Organizational Behavior, Culture, Leadership

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

Sanjay Singh, Assistant 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

Aaron A. Stinnett, Assistant Professor (Health Care Organization and Policy), Cost Effectiveness Analysis, Cost Benefit Analysis, Decision Analysis, Utility Theory

John E. Swan, Birmingham Business Associates Professor of Marketing, Consumer Attitudes and Complaining Behavior

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

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

Fredrick Trawick, Jr., Professor (Marketing), Customer Satisfaction and Dissatisfaction, Marketing Ethics, Trust in Buyer-Seller Relationships

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

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

Joseph Van Matre, Professor (Economics), Total Quality Management, Healthcare 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

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

Program Information

The Doctor of Philosophy (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 coursework, 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 coursework 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.** Although applications may be considered after that date, 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.

Financial support in the form of research assistantships, hospital residencies, or Graduate School fellowships may be available to full-time students needing such assistance. Awards are based on merit and are made annually. Students in good standing are eligible to receive a second year of funding. Funding for a third year is available only if resources permit.

Prerequisites

Each student must show proficiency in each of the areas specified as prerequisites in the student's area of specialization. Most students will need no more than two or three prerequisite courses. These courses may be taken before admission to the program or during the first year in the program.

Program of Study

The program of study consists of five components (general program requirements, health systems, research methodology and statistics, specialization requirements, and the doctoral dissertation). Specializations are currently available in strategic management and health services research. Coursework in the first four areas must be completed 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.

Contact

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

Email phdha@uab.edu

Web www.hsa.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.

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. **Health Services Research.** 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. **Continuing 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 Marketing.** 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

Jack R. Bergstresser, Sr., Research Assistant Professor (Anthropology); Industrial Archaeology, Historical Archaeology, Cultural Resource Management, North America

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

Scott Brande, Associate Professor (Geology); Geoarchaeology

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

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

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

Thomas M. McKenna, Associate Professor (Anthropology); Social Anthropology, Political Economy, Southeast Asia

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 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, 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.

Contact

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

Email 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.** Joint American Studies International Studies seminar which surveys international perceptions of U.S. culture. (Hesse)

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

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. (McKenna)

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)

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.

621. **Field School in Industrial Archaeology.** Students will be introduced to field excavation techniques, field reconnaissance, and much of the technology used in this sub-field of Historical Archaeology. Field measurements will be taken using a total station surveying instrument and GPS unit. Drawings and a large area map of the survey area will be produced using Civil Engineering software (PacSoft), CAD (AutoDesk Mini CAD), and GIS (ArchView). (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)

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)

642. Archaeology of the American Industrial Revolution. Techniques for interpreting and documenting the archaeological and other material remains of the American industrial revolution with a particular emphasis on the blast furnaces, mines, and other sites in the mineral region of central Alabama. (Bergstresser)

650. Nationalism, Ethnicity and Violence. Social and cultural analysis of ethnicity and nationalist ideologies particularly 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. Primatology. Biology, behavior, and distribution of living non-human 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)

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)

680. Anthropology of Slavery and Servitude. Slavery as social and cultural phenomenon in context of broader investigation of relations of domination and exploitation in human social life. (McKenna)

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: *McPherson*

UAB Faculty

Alan G. Atkinson, Assistant Professor (Art History); Asian Art

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

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

John M. Schnorrenberg, Professor (Art History); Medieval Art, Modern Architecture

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

Eloise Angiola, Associate Professor (Art History); Medieval Art, Renaissance Art

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

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

Mindy N. Taggard, Associate Professor (Art History);
Renaissance Art, Baroque 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.

Degree Requirements

Courses

Students must complete 24 semester hours in art history; 6 of these hours may be taken in a related field. 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.

Contact

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 205-934-4941
Email hmcphers@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 quarterly class schedule for announcement of subjects). Prerequisite for admission to a seminar is permission of the instructor.

516. **Gothic Architecture.** (Schnorrenberg)

519. **Medieval Manuscript Painting.** (Schnorrenberg)

521. **Renaissance Art in Italy: 1300-1490.** Painting, sculpture, and architecture from Giotto to Leonardo da Vinci. (McIver)

522. **Renaissance Art in Italy: 1490-1600.** Painting, sculpture, and architecture of the High Renaissance (Leonardo di Vinci, Michelangelo, and Titian) and the later sixteenth century. (McIver)

523. **Renaissance and Baroque Art in Italy:** Study Abroad Program. (McIver)

524. **Renaissance Art in Northern Europe.** Painting and sculpture in the Netherlands and Germany. (McIver)

530. **Eighteenth-Century Art in Europe** (Primarily France and England). Art and social history of England and France using works in the Birmingham Museum of Art. (McPherson)

531. **Northern Baroque Art.** Flemish, Dutch, and French Art of the Seventeenth Century; Rococo. (McIver)

535. **Italian Baroque Art.** Painting, sculpture, and architecture, including works by Caravaggio and Bernini. (McIver)

540. **Nineteenth-Century Art I: Neoclassicism, Romanticism, and Realism.** (McPherson)

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

555. **American Decorative Arts.** Ceramics, metals, furniture, and textiles; identification and connoisseurship of objects; work with Birmingham Museum of Art and other collections.

560. **Twentieth-Century Art to 1945.** Overview of the major modern movements including Fauvism, Cubism, Futurism, Dada, and Surrealism. (McPherson)

564. **Art Since 1945.** Examines the major post-World War II movements from abstract expressionism to postmodernism. (McPherson)

567. **Modern Architecture.** (Schnorrenberg)

569. **Architecture of Birmingham.** (Schnorrenberg)

573. **Japanese Prints and Printmakers.** (Atkinson)

574. **Chinese Painting.** Overview of evolution of painting in China from its inception until the eighteenth century. (Atkinson)

575. **Japanese Art.** Art and culture of Japan. (Atkinson)

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

580. **Art Criticism.** Art theory and critical writings focusing on contemporary art. (McPherson)

582. **Great Masters.** Lives and works of selected outstanding artists.

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. (Atkinson)

590. **Seminar Art History.**

610. **Seminar: Medieval Art.** (Schnorrenberg)

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

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

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

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

670. **Seminar: Asian Art.** (Atkinson)

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. (Schnorrenberg)

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 Bert Brouwer, Chair, UAB Department of Art and Art History, Humanities Building, Room 112,900 13th Street South, Birmingham, AL 35243-1260 (telephone 205-934-4941).

Art Studio (ARS)

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

Course Descriptions

Each of the following courses, except ARS 580 and 590, may be taken for 3 or 6 hours of credit at a time for a total of 9 hours of credit for each course, preferably with two different instructors.

500. **Drawing.** 3 or 6 hours. (Brouwer, Chapman, Kluge)

510. **Painting.** 3 or 6 hours. (Chapman, Brouwer)

520. **Sculpture**. 3 or 6 hours. (Alexander, Kluge)

530. **Ceramic Sculpture**. 3 or 6 hours. (Alexander)

540. **Printmaking**. 3 or 6 hours.

560. **Graphic Design**. 3 or 6 hours. (Weaver)

570. **Photography**. 3 or 6 hours. (Rieger)

590. **Studio Problems**. May be taken more than once for a maximum of 12 hours of credit. 3 or 6 hours.

Biochemistry (Ph.D.)

Graduate Program Director: *Horabin*

Faculty

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

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

Vytas Bankaitis, Professor (Cell Biology); Phospholipid Transfer Proteins, Phospholipid Secretion, Phospholipid Biosynthesis

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

Joseph S. Beckman, Professor (Anesthesiology); Role of Nitroxide, Superoxide, and Peroxynitrite in Pathology

David Borhani, Adjunct Professor (Southern Research Institute); X-ray Crystallography; Protein Function Integrating; Biophysical & Structural Data and Its Use Toward Drug Design

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

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

George Brown, Professor (Psychiatry); Biomedical Applications of Mass Spectrometry, Biochemistry of Excitable Tissues

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, Assistant Professor (Biochemistry and Molecular Genetics); Mouse Models of Human Genetic Diseases

Elizabeth A. Eklund, Assistant Professor (Medicine); Myeloid Gene Regulation and Leukemogenesis

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

Jeffrey A. Engler, Professor and Interim Chair (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

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

Jacob Lebowitz, Professor (Microbiology); RNA Polymerase Promoter Interactions, HIV-1 Reverse Transcriptase Binding

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

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

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

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

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

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

De-Chu Tang, Assistant Professor (Pulmonary Medicine); Development of Skin-Targeted and DNA-Based Noninvasive Vaccines

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 (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, or in microbiol-

ogy. Alternatively, prospective students with a specific interest in biochemistry may choose to apply directly to the Department of Biochemistry and Molecular Genetics for admission to graduate study. Each program provides a comprehensive first-year curriculum to students interested in biochemistry, cell biology, microbiology, virology, and immunology.

Both the CMB and the biochemistry admissions committee consider 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 grade point averages 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 1998-1999 academic year, entering students will be provided with stipends of \$17,000 per year, single health coverage and funds for tuition and fees. These amounts are reviewed yearly.

Contact

For detailed information, contact Dr. Jamila I. Horabin, Graduate Program Director, UAB Department of Biochemistry and Molecular Genetics, MCLM 558, 1530 3rd Avenue South, Birmingham, Alabama 35294-0005.

Telephone 205-975-8156

Email jhorabin@bmg.bhs.uab.edu

Web www.uab.edu/biochem

Course Descriptions

Cellular and Molecular Biology (CMB)

Request CMB information for complete course descriptions.

700. Cellular and Molecular Biology I. Biochemistry. 5 hours.

701. Cellular and Molecular Biology II. Prokaryotic genetics and molecular biology. 5 hours.

702. Cellular and Molecular Biology III. Eukaryotic molecular biology and virology. 5 hours.

703. Cellular and Molecular Biology IV. Cell and developmental biology. 5 hours.

704. Cellular and Molecular Biology V. 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. Winter. (Barnes)

745. Bioorganic Chemistry. Principles of individual chemical reactions and coordinated syntheses relating to important areas of biological chemistry. Prerequisite: CMB 700-701 or permission of instructor. Winter. (Barnes)

746. **Transcriptional Factors.** Prerequisite: Permission of instructor. Winter. (Eklund)

747. **Connective Tissue Biochemistry.** Properties of major connective tissue macromolecules, including collagen, elastin, proteoglycans, and fibronectin. Prerequisite: CMB 703 or permission of instructor. Spring. (E. Miller)

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

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. Winter. (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.** Winter. (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)

793. **Journal Club in DNA Virology.** 1 hour. (Engler)

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.** 1-10 hours.

799. **Doctoral Level Dissertation Research.** Prerequisite: Admission to candidacy. 1-10 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 and Biophysics); Endocrinology, Metabolism

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

[Larry R. Boots](#), Professor (Obstetrics and Gynecology); Reproductive Endocrinology

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

Jeannette E. Doeller, Research Assistant 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

Robert 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 or with inclusion of analytical score a total of 1720 on the GRE General Test, and a personal statement of career goals. The Biology Graduate Program Director 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 quarter.

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 satisfactorily 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 prima-

ry 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).

Contact

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

Email 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 Listings

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. 4 hours.

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.

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.

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.

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 levels. 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.

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 con-

ducting 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.

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.

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.

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.

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.

671. **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.

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
Email 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. 3 hours.

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. 3 hours.

622. **Chemical Oceanography.** An in-depth examination of the chemistry of seawater and its relationship with biological, geological and physical processes in the oceans. 3 hours.

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. 3 hours.

625. **Physical Oceanography.** Physical properties of the world's oceans. Waves, tides, circulations, fluctuations, and interactions of the sea with the atmosphere and landmasses. 3 hours.

626. **Biological Oceanography.** Chemical, physical, and geological patterns and processes important in the interaction of organisms and the sea. 3 hours.

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. 3 hours.

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. 3 hours.

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. 3 hours.
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. 3 hours.
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. 3 hours.
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. 3 hours.
722. **Chemical Oceanography.** An in-depth examination of the chemistry of seawater and its relationship with biological, geological and physical processes in the oceans. 3 hours.
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. 3 hours.
725. **Physical Oceanography.** Physical properties of the world's oceans. Waves, tides, circulations, fluctuations and interactions of the sea with the atmosphere and landmasses. 3 hours.
726. **Biological Oceanography.** Chemical, physical and geological patterns and processes important in the interaction of organisms and the sea. 3 hours.
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 sub-disciplines. 3 hours.
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731. **Sediment Biogeochemistry.** Sediment biogeochemical processes and their effects on nutrient cycles, plant production and animal distribution. Lecture and laboratory. 3 hours.
732. **Ocean Variability and Global Change.** Examination of large-scale, spatial and temporal variability in the earth/ocean system. 2 hours.
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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

Graduate Program Director: *Kirk*

Faculty

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

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

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

Karan P. Singh, Professor (Biostatistics); Cancer Modeling, Logistic Models, Risk Assessment, Survival Analysis, AIDS Research

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

O. Dale Williams, Professor (Biostatistics); Public Health Education, Cardiovascular Disease Epidemiology, Clinical Trials

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, Biochemistry; Ph.D. (Rutgers); Mathematical and Biochemical Models

J. Michael Hardin, Adjunct Professor, Biostatistics; Ph.D. (Alabama); Linear Models, Data Warehousing, Informatics

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; Ph.D. (Alabama, Birmingham); Applications in Cardiovascular Surgery, Parametric Survival Analysis

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

Seng-jaw Soong, Adjunct Professor, Biostatistics; Ph.D. (Alabama, Birmingham); Biometry, Cancer Clinical Trials

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

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

Program Information

The Department of Biostatistics offers programs through the Graduate School leading to the M.S. and Ph.D. degrees in Biostatistics. 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.

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. They must have a demonstrated proficiency in computing. It is preferred that students have additional advanced mathematics courses (e.g., 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.

Contact

For detailed information, contact Dr. Katharine A. Kirk, UAB Biostatistics Graduate Program Director, RB 327 J, 1530 3rd Avenue South, Birmingham, Alabama 35294-0022.

Telephone 205-975-5048

Fax 205-975-2540

Email kkirk@uab.edu

Course Listings

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.

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.

521-524. 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.

560. Introduction to Biomathematics I. Formulation of mathematical models in the study of selected biolog-

ical systems. Modeling issues, model crafting, model evaluation. Prerequisite: MA 244.

561. Introduction to Biomathematics II. Deterministic and probabilistic models with discrete and continuous variables. Comparisons using selected examples. Prerequisite: BST 560.

562. Introduction to Biomathematics III. Analysis of selected models. Parameter estimation. Interplay between experiments and models. Prerequisite: BST 561.

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.

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, discriminate analysis and simple genetic analyses. Epidemiological topics include risk functions, adjustments for confounding and their relationships to statistical techniques discussed. Prerequisites: BST 601-602.

605-606. Methodology in Research I and II. Probability and statistics from the viewpoint of the medical and biological investigator; sampling models; decision making; analysis and interpretation of research data.

607. Environmental Sampling and Exposure Assessment. Application of statistical techniques including use of the log normal 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.

610. Modeling Biological Systems I. Deterministic mathematical models in study of biological processes.

Formation and analysis of models with emphasis on relationship to biological systems. Prerequisite: Differential Equations.

611. Modeling Biological Systems II. Probability theory and probabilistic modeling; convolution, compounding, birth and death processes. Application of statistical inference to biomathematics. Prerequisites: BST 610 and BST 631.

612. Modeling Biological Systems III. Useful mathematical concepts including power series expansions, asymptotic expansions, nonlinear transformations for acceleration of convergence of series expansions, general orthogonal systems and expansions, Fourier series and integrals, Walsh functions, fast Fourier transforms and spectral analysis. Prerequisites: BST 610-611.

613. Modeling Biological Systems IV. Systems analysis. Element identification, physical and chemical principles governing interactions. Relation between biological reality, systems models and mathematical models. Prerequisites: BST 610-612.

617. Design and Analysis of Clinical Dental Research. Provides an overview of the basic statistical skills required in the reading of medical/dental literature. Emphasis is on understanding concepts and not on computational techniques.

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.

621-622. Statistical Analysis I and II. 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 622. 4 hours each, includes 1 hour for required laboratory.

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 621-622. 4 hours, includes 1 hour for required laboratory.

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 621-623. 4 hours, includes 1 hour for required laboratory.

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: Full 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: Full calculus sequence and BST 631.

633. Theory of Linear Models. Treatment of linear statistical models from the point of view of infinite model theory; obtaining of results about model components; introduction to nonlinear models. Estimation by general least squares; minimum absolute deviations; maximum likelihood; weighted least squares; generalized least squares. Prerequisites: Full calculus sequence, linear (matrix) algebra, BST 631 and BST 632.

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. Prerequisite: BST 601 and 602 or equivalent.

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; log-linear 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 621-624 and BST 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.

660. Simulation Laboratory I. Prerequisite: Concurrent registration in BST 610. 1 hour.

661. Simulation Laboratory II. Prerequisite: Concurrent registration in BST 611. 1 hour.

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 and BST 602 or equivalent.

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. 3 hours.

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. 1-3 hours.

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.**

***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. Intermediate Topics in Analysis of Variance. Experimental design and analysis of variance. 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.

707. Models of Ecological Systems. Single-species population dynamics. Continuous and discrete predator-prey systems. Trophic levels and energy flow. Community diversity and similarity. Statistics for model parameters. Prerequisites: BST 601-602.

708. Applied Multivariate Analysis I: Multivariate Linear Models and Introduction to Longitudinal Data Analysis. Conduct, using SAS, and interpretation of 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 or equivalent. BST 603 and BST 706 (or BST 623 and BST 624) strongly recommended. May be taken independently of BST 709.

709. Applied Multivariate Analysis II: Discrimination, Scaling, Ordination and Clustering. Conduct, using SAS, and interpretation of linear, quadratic and logistic discriminate 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 and BST 602 or equivalent. BST 603 and BST 706 (or BST 623 and BST 624) strongly recommended. May be taken independently of BST 708.

710-711. Biological Models I and II. Construction of mathematical models for biological processes; methods and examples, including both deterministic and stochastic models from biochemistry, physiology and ecology. 3 hours each term.

714. Compartmental Analysis. Development of plausible compartmental models and analytic theory for biologic systems that can be approximated by a finite number of interconnected homogeneous subsystems. Prerequisite: BST 610.

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 621-624 and BST 631-633.

720-721. Advanced Experimental Design I-II. Methods of constructing and analyzing designs for experimental investigations; various multiple factor and incomplete designs; designs related to experiments with

attributes. Prerequisites: BST 621-624 and BST 631-633. 3 hours each term. May be taken independently of each other.

725, 726. Advanced Analysis of Variance I-II. First term: the general linear hypothesis with relation to multi-way classifications with unequal subclass numbers; weighting schemes; affects of violations of model assumptions. Second term: Estimation of variance components. Prerequisites: BST 621-624 and BST 631-633. 3 hours each term.

730, 731. Advanced Probability I-II. Prerequisites: BST 621-624 and BST 631-633. 3 hours each term.

735, 736. Advanced Inference: Seminar in Comparative Statistical 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 621-624 and BST 631-633 or permission of instructor. 3 hours each term.

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 621-624 and BST 631-633. 3 hours each term.

750, 751. Stochastic Processes I and II. Normal processes and covariance stationary processes; Poisson processes in non-homogeneous and compound form; Markov chains with discrete and continuous parameters; application. Prerequisites: BST 621-624 and BST 631-633. 3 hours each term.

754. Biochemical Kinetics. Coupled reactions in biological systems. Enzymes, protein-protein interactions, ligand binding to macromolecules. Computer modeling. Application of fast reaction methods. Prerequisite: CH 321-323.

760, 761. Multivariate Analysis I and II. Theoretical bases for multivariate regression, multivariate analysis of variance and multivariate analysis of covariance, canonical correlation; discriminate analysis; principal components; internal dependencies; factor analysis, multidimensional scaling, multiple correspondence analysis and clustering techniques. Prerequisites: BST 621-624 and BST 631-633. BST 760 is a prerequisite for BST 761. 3 hours each term.

765. Computationally Intensive Statistical Methods. Modern computationally intensive methods for hypothesis testing and confidence interval estimation, in-

cluding randomization tests, bootstrap, jackknife among others. Prerequisites: BST 621-624 and BST 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 621-624, BST 626/7, and BST 631-633.

***790, *791. Advanced Analysis I and II.** Diverse and nonstandard problems in the application of statistics. Prerequisites: BST 621-624 and BST 631-633. 3 hours each term. May be repeated for credit.

***795. Directed Studies in Statistics.** 3 hours.

***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, 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

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

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 Non-invasive Vaccinations Against Breast Cancers

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 lab 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 pro-

gram. 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 of \$17,000 and paid 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.

Contact

For more information on the Interdisciplinary Breast Cancer Training Program, contact Dr. Coral Lamartiniere, VH 124, 1530 3rd Avenue South, Birmingham, Alabama 35294-0019.

Telephone 205-934-7139

Email coral.lamartiniere@ccc.uab.edu

Business Administration (M.B.A.)

Graduate Program Director: *McGee*

Faculty

Nell Adkins, Assistant Professor (Accounting); Corporate Taxes

James L. Beeland, Associate Professor (Management); International Business

Theodore Bos, Associate Professor (Economics); Quantitative Analysis

Michael R. Bowers, Professor (Marketing); Sales, Product, and Quality Management

Richard M. Burns, Associate Professor (Finance); Financial Management, Financial Institutions

Vickie Cox Edmondson, Assistant Professor (Management); Strategic Management

Manabendra Dasgupta, Professor (Economics); Economic Theory

James B. Dilworth, Professor (Management); Production and Operations Management

Rexford H. Draman, Assistant Professor (Management); Operations Management

W. Jack Duncan, University Scholar and Professor (Management); Strategic Management

Thomas A. Fetherston, Professor (Finance); Investments, International Finance

Myron D. Fottler, Professor (Management); Human Resource Management

Peter M. Ginter, Professor (Management); Policy and Strategic Management

K. Patrick Hill, Associate Professor (Finance); Financial Management

George Ignatin, Associate Professor (Economics); Public Policy (Antitrust, Utilities, etc.)

Susan Key, Assistant Professor (Management); Social, Legal, and Ethical Environment of Business

Seung-Dong Lee, Associate Professor (Economics); International Economics, Applied Economic Theory

Frank M. Messina, Associate Professor (Accounting); Fraud Prevention

Warren S. Martin, Professor (Marketing); Survey Research, Marketing Research, Industrial Distribution

Michael K. McAlister, Professor (Management); Management Information Systems

Henry N. McCarl, Professor (Finance); Economic Education

Gail W. McGee, Professor (Health Services Administration); Organizational Behavior

George M. Munchus, III, Professor (Management); Human Resource Management, Labor Relations

Lance Nail, Assistant Professor (Finance); Wealth Creation

Thomas L. Powers, Professor (Marketing); International Marketing, Strategic Marketing

Lynne D. Richardson, Associate Professor (Marketing); Selling, Channels of Distribution

Woodrow D. Richardson, Associate Professor (Management); Strategic Management and Business Ethics

Julio C. Rivera, Associate Professor (Management); Management Information Systems

Robert A. Scott, Associate Professor (Management); Administrative Theory and Practice, Organizational Design and Development

Sanjay K. Singh, Assistant Professor (Management); Management Information Systems

Jay A. Smith, Jr., Professor, Ben S. Weil Chair of Industrial Distribution (Marketing); Logistics, Industrial Distribution

Robert E. Stanford, Professor (Economics); Operations Research

John E. Swan, Birmingham Business Associates Professor, (Marketing); Consumer Attitudes and Complaining Behavior

I. Fredrick Trawick, Jr., Professor (Marketing); Marketing Policy

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

Joseph G. Van Matre, Professor (Economics); Multivariate Analysis, Total Quality Management

Joe Walker, Associate Professor (Finance); Financial Management

Bradley Wilson, Assistant Professor (Economics); Macroeconomics

Kelly Zellars, Assistant Professor (Management); Organizational Behavior

Program Objectives

The Master of Business Administration (M.B.A.) Program is accredited by AACBB--The International Association for Management Education. 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. The M.B.A. Program is designed to provide competency in management 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. 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.

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 Math Boot Camp. 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 54 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 609, 631, 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

Most courses are offered in the evenings. Students employed full-time usually can complete the program within 6 to 10 quarters. A very limited number of assistantships are available to qualified full-time students. Additional information about assistantships should be directed to the Graduate School of Management Office.

Contact

For detailed information, contact the UAB Graduate School of Management, School of Business, Room 203, 1150 South 10th Avenue, Birmingham, Alabama 35294-4460.

Telephone 205-934-8817

Email Graduate@business.uab.edu

Web www.business.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.

Master of Business Administration (MBA)

609. **Accounting for Management.** Role of accounting in external and internal reporting; planning, control, and decision making from point of view of user of accounting information.

610. **Cost and Control.** Determination and use of cost data for decision making, control and evaluation of performance, and formulation of goals and budgets. Prerequisites: MBA 609 and 640.

611. **Management Information Systems.** Applications of information and management sciences to design and use of decision-oriented systems.

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 609, 640, and 660.

630. **Social, Ethical, and Legal Environment.** Social, ethical, and legal environment in which business enterprise operates domestically and internationally.

631. **Administrative Theory and Practice.** Advanced theories of organization and management with emphasis on applications.

632. **Organizational Behavior.** Elements of organizational behavior and their dynamic interaction. Emphasis on individual and small group behavior in organizations. Prerequisite: MBA 631.

633. **Production and Operations Management.** Introduction to management planning and control techniques applicable to operations portion of various enterprises.

634. **Business Policies and Simulation.** Integration of management, finance, accounting, marketing, economics, production, and decision-making concepts through study of business policy and business simulation. Prerequisite: Last quarter in MBA program.

635. **International Business Analysis.** Problems and strategic considerations of firms engaged in international business. Prerequisites: MBA 609, 620, 631, 640, 650, and 660.

640. **Applied Microeconomic Analysis.** Application of economic theory and methodology to decision making: theoretical and empirical analysis of demand, production, costs, and pricing behavior.

641. **Macroeconomic Analysis and Decision Making.** Macroeconomic analysis; modern theory of aggregate demand and supply; forecasting and link between business firm and microenvironment. Prerequisites: 640 and 660.

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.

651. **Seminar in Marketing Policy.** Problems of marketing managers; planning, implementing, evaluating, and controlling marketing activities. Prerequisite: MBA 650.

660. **Quantitative Methods I.** Selected statistical techniques, including statistical inference, regression, and decision theory. Application to business problems.

661. **Quantitative Methods II.** Introduction to topics in operations research. Prerequisite: MBA 660.

Electives

614. **Taxation for Management.** Tax issues affecting business management and decision making. Fundamentals of taxation introduced with emphasis on economic significance of taxes. Prerequisite: MBA 609.

621. **Topics in Corporate Finance.** An advanced course in finance with emphasis on special topics such as financial planning, working capital management, leasing, hybrid financing, and international capital budgeting. Case studies are used. Prerequisite: MBA 620 and 660.

622. **Investments.** Theoretical and practical aspects of investments and portfolio management. Prerequisites: MBA 620 and 660.

623. **Finance Seminar.** In-depth examination, study, and analysis of current issues and problems in selected areas of finance. Prerequisites: MBA 620 and 660, or permission of instructor.

624. **International Financial Management.** Financial analysis and decision making in international context. Prerequisite: MBA 620.

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 631.

639. **Seminar in Management.** Current issues and problems in selected areas of management. Prerequisite: MBA 631, 632, or permission of instructor.

653. **Services Marketing.** An examination of the generic differences between goods and services, with appropriate marketing strategies for services developed. Prerequisite: MBA 650.

654. **International Marketing.** Examination of international marketing activities, including environmental issues, marketing strategy, and tactical considerations in entering foreign markets. Prerequisite: MBA 650.

669. **Foundations of Total Quality Management.** Reviews essential elements of TQM and emphasizes their interrelatedness. What thought processes of management must be changed, why, and how is discussed with application to manufacturing and service sectors. Prerequisites: MBA 660 and MBA 631, which may be taken concurrently, or permission of instructor.

673. **Product Planning, Development, and Management.** Introduction of the process of new product development, managing existing products and product deletion decisions. Prerequisite: MBA 650 or HA 671.

698. **Directed Study (Nonthesis Research).** Prerequisite: Approval of Graduate School of Management.

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.

EC 520. **Applied Forecasting.** Practical use of various forecasting techniques on business and economic data; dynamic regression models, exponential smoothing, moving averages, seasonality, univariate Box Jenkins ARIMA modeling. Prerequisite: MBA 660.

MG 507. **Management of the Information Resources.** Managerial aspects of management information systems; planning and controlling information resources, organizing information resource function, computer hardware, and environment of computer industry. Prerequisite: MBA 611.

MG 518. **Quality Control.** Concepts, techniques, and organizational requirements to ensure that quality is provided to consumer; breadth of quality efforts, statistical quality control methods, quality circle principles, and quality assurance activities in various enterprises. Prerequisite: MBA 633.

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 635.

MK 520. **Sales Management.** Management of personal selling function. Nature of selling task; recruiting, selecting, training, compensating, and evaluating sales personnel. Prerequisite: MBA 650.

MK 540. **Small Business Consulting and Research.** Applied field work integrating all of the functional business fields. Prerequisites: MBA 620, MBA 631, MBA 650, and permission of instructor.

QM 525. **Applied Regression Analysis.** Simple, multilinear, and polynomial regression analysis. Model selection, inferential procedures, and application with computer. Prerequisite: QM 214, MBA 660.

Cell Biology (Ph.D.)

Graduate Program Director: *Benveniste*

Faculty

Con Beckers, Assistant Professor (Geographic Medicine); Cell Biology of *Toxoplasma gondii*

Vytas A. Bankaitis, Professor (Cell Biology); Signal Transduction and Phospholipid Transfer Proteins

David M. Bedwell, Associate Professor (Microbiology); Mitochondrial Biogenesis, ABC Transporters

Etty N. Benveniste, Professor (Cell Biology); Neuroimmunology, Cytokine Production in the Central Nervous System

J. Edwin Blalock, Professor (Physiology and Biophysics); Molecular Recognition, Immune Network, Immune Neuroendocrine Interactions

Francois M. Booyse, Professor (Medicine); Cell Biology of Endothelial Cell-Mediated Thrombosis and Fibrinolysis

Daniel Bullard, Assistant Professor (Comparative Medicine); Adhesion Molecules in Inflammatory Disease

James F. Collawn, Assistant Professor (Cell Biology); Molecular Mechanisms of Protein Trafficking, Antigen Processing and Presentation

John R. Couchman, Professor (Cell Biology); Impact of Extracellular Matrix on Cell Behavior

Christine A. Curcio, Associate Professor (Ophthalmology); Relations of Human Retinal Anatomy and Spatial Vision

Douglas M. Cyr, Assistant Professor (Cell Biology); Intracellular Protein Trafficking and Molecular Chaperone Proteins

Ramon Dacheux, Professor (Ophthalmology); Physiology and Morphology of the Mammalian Retina

Stuart J. Frank, Associate Professor (Medicine); Growth Hormone Receptor Structure-Function, Growth Hormone Signaling

Gerald M. Fuller, Professor (Cell Biology); Inflammatory Cytokine Signaling Pathways in Hepatocytes and Synoviocytes

Craig C. Garner, Associate Professor (Neurobiology); Structure and Function of CNS Synaptic Junctions

G. Yancey Gillespie, Professor (Surgery); Cell and Molecular Biology of Malignant Brain Tumors

Clyde R. Guidry, Assistant Professor (Ophthalmology); Cell Biology of Retinal Wound Repair

Thomas Howard, Professor (Pediatrics); Regulating Microfilamentous Cytoskeletal Organization, Determining Cell Shape and Motility

Gail V. W. Johnson, Professor (Psychiatry); Phosphorylation, Function and Metabolism of Neuronal Cytoskeletal Proteins

Ronald L. Johnson, Assistant Professor (Cell Biology); Cell Signaling; Developmental Biology; Tumor Formation

Karen M. Kozopas, Assistant Professor (Cell Biology); Muscle Patterning; Cell Signaling; Developmental Biology

Jeffrey Kudlow, Professor (Medicine); Transcriptional Control of Growth Factor Gene Expression

Alfred Maier, Professor Emeritus (Cell Biology); Skeletal Muscle and Mechanoreceptor Structure, Muscle Development

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

Martin M. Pike, Associate Professor (Cardiovascular Disease); Nuclear Magnetic Resonance Studies of Myocardial Ion Regulation

Steven S. Rosenfeld, Associate Professor (Neurology); Structure-Function Studies of Eukaryotic Molecular Motors

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, Associate Professor (Neurobiology); Regulation and Function of Ion Channels in Glia

Erik Schwiebert, Assistant Professor (Physiology & Biophysics); Extracellular Nucleotide Signaling and Epithelial Cell Biology and Physiology

Lisa Marshall Schwiebert, Assistant Professor (Physiology & Biophysics); Inflammatory Responses

Elizabeth S. Sztul, Associate Professor (Cell Biology); Intracellular Membrane Sorting and Fusion

W. Anne B. Theibert, Assistant Professor (Neurobiology); Inositol-Phosphate Second Messengers in Neurotransmitter Action in the Brain

David S. Weiss, Associate Professor (Neurobiology); Structure/Function Relationship of Ion Channels

John N. Whitaker, Professor (Neurology); Immunological Analysis of Myelin Proteins in Multiple Sclerosis

Anne C. Woods, Research 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

Program Information

The Department of Cell Biology participates in the 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. 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 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 metho-

dologies 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.

Contact

For detailed information, contact Dr. Ety N. Benveniste, UAB Cell Biology Graduate Program Director, MCLM 350, 1530 3rd Avenue South, Birmingham, AL 35294-0005.

Telephone 205-934-7667

Email tika@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.

711. **Cell Adhesion and Extracellular Matrix.** Journal club. 1 hour. Pass/Fail. (Couchman)

712. **Developmental Biology.** Journal club. 1 hour. Pass/Fail. (Mayne)

713. **Growth Factors.** Journal club. 1 hour. Pass/Fail. (Gillespie)

715. **Biochemical Approaches to Cell Biology.**

716. **Molecular Basis of Signaling in the Nervous System.** Journal club. 1 hour. Pass/Fail. (Theibert)

720. **Developmental Neurobiology.** Journal club. 1 hour. Pass/Fail.

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)

726. **Genetics in Cell Biology.** 2 hours. (Bankaitis)

728. **Advanced Cell Biology.** 3 hours (Callawn/Cyr)

729. **Mechanisms of Signal Transduction.** (Fuller/Theibert)

740. **Research in Cell Biology.** 1 hour. Pass/Fail.

747. **Cell Biology Seminar.** 1 hour. Pass/Fail.

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.

752. **Graduate Histology.** Light microscopic features and ultrastructure of cells, fundamental tissues, and organ systems. 5 hours

755. **Graduate Neuroanatomy.** Gross and microscopic preparations of brain and spinal cord. Functional significance of tracts and nuclei. 4 hours. (Wyss)

756. **Molecular Biology of Cell Adhesion.** 3 hours.

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.** 1-10 hours.

799. **Doctoral Dissertation Research.** Prerequisite: Admission to candidacy. 1-10 hours.

Cellular and Molecular Biology

Program Manager: *Sirles*

Faculty

CELL ADHESION AND MATRIX

John Baker, Professor (Biochemistry & Molecular Genetics); Proteoglycans in Cartilage and the Artery Wall

Steve Barnes, Professor (Pharmacology); Bile Acids and Isoflavonoids

John Couchman, Professor (Cell Biology); Cellular Sensing and Response to the Extracellular Environment

Richard Mayne, Professor (Cell Biology); Development and Structure of Mesenchymal Tissues

Edward Miller, Professor (Biochemistry & Molecular Genetics); Biochemical Properties of the Collagens

Cary Wu, Assistant Professor (Cell Biology); Integrin-Mediated Extracellular Matrix Assembly

CELL PHYSIOLOGY AND SIGNALING

Daniel Balkovetz, Assistant Professor (Medicine); Epithelial Cell Biology

Vytas Bankaitis, Professor (Cell Biology); Phosphatidylinositol Phosphatidylcholine Transfer Proteins

Tika Benveniste, Professor (Cell Biology); Bidirectional Communication Between the Immune and Nervous Systems

Edward Blalock, Professor (Physiology & Biophysics); Immune, Neuroendocrine Interactions, Molecular Recognition

Daniel Bullard, Assistant Professor (Comparative Medicine); Role of Leukocyte/Endothelial Cell Adhesion Molecules in Inflammatory Disease

James Collawn, Assistant Professor (Cell Biology); Intracellular Protein Sorting

Doug Cyr, Assistant Professor (Cell Biology); Protein Folding and Human Disease

Elizabeth Eklund, Assistant Professor (Medicine); Myeloid Gene Regulation and Leukemogenesis

Stuart Frank, Associate 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

Ronald Johnson, Assistant Professor (Cell Biology); Cell Signaling, Developmental Biology, Tumor Formation

Richard Jope, Professor (Psychiatry); Neuronal Signaling Systems, Mechanisms and Abnormalities in Neuronal Disorders

Karen Kozopas, Assistant Professor (Cell Biology); Muscle Patterning, Cell Signaling, Developmental Biology

Richard Marchase, Professor and Chairman (Cell Biology); Glucose Metabolism and Cytoplasmic Glycosylation

Steven Rosenfeld, Associate Professor (Cell Neurology); Structure of Molecular Motors

Erik Schwiebert, Assistant Professor (Physiology & Biophysics); Extracellular Nucleotide Signaling and Epithelial Cell Biology and Physiology

Lisa Schwiebert, Assistant Professor (Physiology & Biophysics); Inflammatory Responses

Elizabeth Sztul, Associate Professor (Cell Biology); Organellar Biogenesis and Membrane Traffic

John Thompson, Professor (Surgery); Molecular Mechanisms of Angiogenesis

GENE REGULATION AND EXPRESSION

Patrick Higgins, Professor (Biochemistry & Molecular Genetics); Mobile DNA Structure, Enzymology and Regulation

Jamila Horabin, Assistant Professor (Biochemistry & Molecular Genetics); Sex Determination in *Drosophila*

Susan Lobo-Ruppert, Assistant Professor (Biochemistry & Molecular Genetics); The Determination of RNA Polymerase Specificity

Joseph Prchal, Professor (Medicine); Congenital Blood Disorders, Hematopoietic Stem Cells

Kenneth Taylor, Associate Professor (Biochemistry & Molecular Genetics); Fermentation, Genetic Engineering, Enzyme Mechanisms

Tim Townes, Professor (Biochemistry & Molecular Genetics); Developmental Regulation of Gene Expression

Chuch Turnbough, Professor (Microbiology); Gene Expression and Regulation

IMMUNOLOGY

Prescott Atkinson, Associate Professor (Pediatrics); Signal Transduction in Lymphocytes

Scott Barnum, Assistant Professor (Microbiology); Role of Complement

Louis Bridges, Assistant Professor (Medicine); Immunoglobulin Gene Expression, Rheumatoid Arthritis

Patrick Bucy, Associate Professor (Pathology); T Cell Development, Immune Regulation

Peter Burrows, Associate Professor (Microbiology); B Cells, Developmentally Regulated Genes, Isotype Switching

Robert Carter, Assistant Professor (Medicine); Molecular Mechanisms of Control of B Lymphocyte Responses

Max Cooper, Professor (Medicine); Immune System Ontogeny and Phylogeny

Vithal Ghanta, Professor (Biology); Tumor Immunology, Immune System and Aging, CNS & Immune System Interactions

Raymond Hiramoto, Professor (Microbiology); Cancer Immunotherapy, CNS-Immune System Communication

Susan Jackson, Associate Professor (Microbiology); Mucosal Immunology, AIDS, IgA

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

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, Soluble Fas, Transgenic Mice

Michael Russel, Research Professor (Microbiology); Mucosal Immunology, Immunoglobulin A Mucosal Vaccines, Streptococcal Antigens

Harry Schroeder, Associate Professor (Medicine); Developmental Genetics, Clinical Immunology

Casey Weaver, Associate Professor (Pathology); T Cell Development

MACROMOLECULAR STRUCTURE AND FUNCTION

Christie Brouillette, Associate Professor (Biochemistry & Molecular Genetics); Protein Structural Cooperativity and Energetics

Herbert Cheung, Professor (Biochemistry & 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 & Molecular Genetics); NMR Studies of Intact Hearts

Stephen Harvey, Professor (Biochemistry & Molecular Genetics); Macromolecular Structure and Dynamics

Mark Jedrzejak, Assistant Professor (Microbiology); Microbial Pathogenesis, X-ray Crystallography, Structure-Based Drug Design

Rama Kirshna, Professor (Biochemistry & 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, Assistant 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

Peter Detloff, Assistant Professor (Biochemistry & Molecular Genetics); Mouse Models of Human Genetic Disorders

Kevin Dybvig, Associate 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); Growth Factor Gene Transcription

Elliot Lefkowitz, Research Associate Professor (Microbiology); Bioinformatics; Microbial Genomics and Evolution

Carl Pinkert, Associate Professor (Comparative Medicine); Transgenic Animal Modeling

Michael Rupert, Assistant Professor (Medicine); Oncogenes and Tumor Suppressor Genes in Breast Cancer

Theresa Strong, Research Instructor (Medicine); Gene Therapy for Cancer and Inherited Disease

Bradley Yoder, Assistant Professor (Cell Biology); Polycystic Kidney Disease

MOLECULAR PATHOGENESIS

Con Beckers, Assistant Professor (Medicine); Cell Biology of *Toxoplasma gondii*

Joseph Beckman, Professor (Anesthesiology); Pathological Roles of Nitric Oxide and Peroxynitrite in Neurodegeneration, Ischemia and Inflammation

William Benjamin, Assistant Professor (Pathology); Genetics of Host, Bacterial Relationship

David Briles, Professor (Microbiology); Bacterial Pathogenesis, Virulence, Immunity, Pneumococcus, Tuberculosis

Page Caufield, Professor (Oral Biology); Pathogenesis, Genetics, Dental Caries, Transmission, Acquisition

Noel Childers, Professor (Pediatric Dentistry); Oral Immunization, Dental Caries

Steve Hajduk, Professor (Biochemistry & Molecular Genetics); Biochemistry and Molecular Biology of Parasites

Susan Hollingshead, Research Associate Professor (Microbiology); Mechanisms of Variation in Microbial Pathogenesis

Naomi Lang-Unnasch, Assistant Professor (Medicine); Molecular Biology, Parasitology, Eukaryotic Differentiation, Biochemistry

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

Thomas Unnasch, Professor (Medicine); River Blindness, Evolution, Immunotherapy, Diagnosis

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

Craig Garner, Associate Professor (Neurobiology); Molecular Neurobiology

John Hablitz, Professor (Neurobiology); Cellular Mechanisms of Neurotransmission

Gail Johnson, Professor (Psychiatry); Phosphorylation and Function of Cytoskeletal Proteins

Robin Lester, Assistant Professor (Neurobiology); Nicotinic Receptors in the CNS

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, Assistant Professor (Neurobiology); Regulation of Proteins Involved in Neuronal Signaling

Harold Sontheimer, Associate Professor (Neurobiology); The Role of Neuroglia in Brain Function

Anne Theibert, Assistant 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); The Limbic Cortex and Neural Cardiovascular Control

VIROLOGY

Andrew Ball, Professor (Microbiology); Negative-Strand RNA Viruses

William Britt, Professor (Pediatrics); Herpesvirus Envelope Assembly

Thomas Broker, Professor (Biochemistry & Molecular Genetics); Human Papillomavirus Gene Expression, Replication, and Pathogenesis

Louise Chow, Professor (Biochemistry & Molecular Genetics); Molecular and Cellular Biology of Human Papillomaviruses

Jeff Engler, Professor (Biochemistry & Molecular Genetics); Studies on 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

Casey Morrow, Professor (Microbiology); Viral Replication, Vaccines

Peter Prevelige, Assistant 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, RNA Replication

Richard Whitley, Professor (Medicine); Virus, Herpesvirus, Herpes Simplex, *Varicella zoster Virus*

Allan Zajac, Assistant Professor (Microbiology); Anti-Viral Immunity; T-Cell Responses

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 biochemistry, prokaryotic genetics and molecular biology, eukaryotic molecular biology and virology, cell and developmental biology, immunology, and neurobiology. 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 beginning of their second 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 three participating departments.

Advanced courses in cellular and molecular biology 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.

Contact

For detailed information, contact Debbie Sirles, Program Manager, 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

Email sirles@uab.edu

Web www.cmb.uab.edu

Course Descriptions

Cellular and Molecular Biology (CMB)

700. Cellular and Molecular Biology I. Biochemistry—Structural and biochemical properties of proteins, enzymes, and co-enzymes are discussed. 4 hours.

701. Cellular and Molecular Biology II. Prokaryotic genetics and molecular biology—Prokaryotic genetic techniques and theory; genetics of bacteria and virus; control of gene expression; DNA recombination, replication, transcription and translation. 4 hours.

702. Cellular and Molecular Biology III. Eukaryotic molecular biology and virology—Theory and techniques of eukaryotic molecular biology; gene regulation in eukaryotic molecular biology; gene regulation in eukaryotes; protein translation and trafficking, virology. 4 hours.

703. Cellular and Molecular Biology IV. Cell and developmental biology—Mechanisms of signal transduction, cell-cell and cell matrix interactions, cytoskeleton and organellar structure. 4 hours.

704. **Cellular and Molecular Biology Va.** Immunology—Theoretical and experimental consideration of the immune system. 4 hours.

705. **Cellular and Molecular Biology Vb.** Neurobiology—An introduction to the principles of molecular and cellular neurobiology, including the properties of membranes, synaptic transmission, the structure and function of ion channels, and second messenger systems. 4 hours.

712. **Methods and Logic.** 1 hour.

721-723. **Laboratory Research.** One quarter in each of three laboratories conducting research; 15-minute oral presentations on accomplishments each quarter. 2 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

Jimmy W. Mays, Professor (Chemistry); Polymer Chemistry, Anionic Polymerization, Branched Polymers, Polymer Characterization

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

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 from the list of 12 core courses. 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 Chemistry Graduate Program Director the composition of the graduate study committee.

12 Core Courses

(CH)
620/720
621/721
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.

Masters 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.

Contact

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
Email krannich@uab.edu
Web www.chem.uab.edu

Course Listings

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)

521. **Physical Chemistry I for Graduate Study.** Thermodynamics and chemical equilibria; electrochemistry. Prerequisites: MA 243, PH 217, CH 113. Fall. (Hamilton, Muccio, Watkins)

522. **Physical Chemistry II for Graduate Study.** Chemical bonding; molecular spectroscopy; chemical kinetics. Prerequisite: CH 521. Winter. (Hamilton, Muccio, Watkins)

523. **Physical Chemistry III for Graduate Study.** Chemical bonding; molecular spectroscopy; chemical kinetics. Prerequisite: CH 522. Spring. (Hamilton, Muccio, Watkins)

531. **Organic Chemistry I for Graduate Study.** Structure, bonding, and physical and stereochemical properties. Fall, Winter, Spring, Summer. (Advincula, Brouillette, Mays)

532. **Organic Chemistry II for Graduate Study.** Organic reactivity--theoretical and practical factors. Prerequisite: CH 531. Fall, Winter, Spring, Summer. (Advincula, Brouillette, Mays)

533. **Organic Chemistry III for Graduate Study.** Synthesis of organic compounds of industrial and biological concern. Prerequisite: CH 532. Fall, Winter, Spring, Summer. (Advincula, Brouillette, Mays)

540. **Inorganic Chemistry I for Graduate Study.** Chemical reactivity and descriptive chemistry in terms of structural and electronic parameters. Fall. (Claude, Gray, Krannich)

541. **Transition Metal Chemistry.** Atomic structure, chemical bonding characterization and reactivity of transition metal complexes. Prerequisite: CH 340, CH 323. Winter. (Claude, Gray, Krannich)

550. **Analytical Chemistry I for Graduate Study.** Analytical measurements, spectrophotometric and gravimetric analyses, chromatography, and chemical equilibrium. Winter. (Beale, Nonidez)

551. **Analytical Chemistry II for Graduate Study.** General operating principles and quantitative applications of commonly used analytical instruments. Prerequisite: CH 550. Spring. (Beale, Nonidez)

561, 562. **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, Winter. (Mucio)

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. Winter, Spring. (Advincula, Mays)

600. **Foundations of Chemistry.** Quantum mechanics applied to electronic structure and chemical bonding. Symmetry and spectroscopic measurements. Fall.

601. **Modern Chemistry for Teachers.** Atomic structure, chemical bonding, and periodicity. (Summerlin)

602. **Laboratory Experiences in Chemistry I.** Application of simple experiments to high school science programs. (Summerlin)

603. **Laboratory Experiences in Chemistry II.** Continuation of CH 602. (Summerlin)

604. **Chemical Instrumentation.** Orientation to FT-NMR, CGC/MS, chromatography, IR, and UV spectrometry, and others for chemistry teachers. (Summerlin)

605. **Introductory Organic Chemistry for Teachers.** Modern topics in organic chemistry. Nomenclature, organic acids and derivatives, aldehydes, ketones, amines, alcohols. (Summerlin)

606. **Introductory Biochemistry for Teachers.** Carbohydrates, lipids, proteins, enzymes, metabolism. Emphasis on nutritional aspects. (Summerlin)

*607. **Techniques for Chemistry Teachers.** Short courses or workshops on various techniques, chemical demonstrations, model building, laboratory techniques, safety, etc. (Summerlin, Krannich)

608. **Chemical Demonstrations.** Laboratory and library research on current topics in chemical education. Prerequisite: Permission of graduate faculty. (Summerlin)

*609. **Special Topics in Chemical Education.** Workshops and short courses on topics such as computers in chemistry, environmental chemistry, industrial chemistry, history of chemistry. (Krannich, Summerlin)

611. **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.

620. **Quantum Chemistry.** Applying the potential energy concept to MO theory to predict and explain molecular structure, properties and reactivity. Huckel and self-consistent field theories, quantum mechanical postulates, variational methods, and perturbation theory will be covered. Prerequisite: CH 322. Fall. (Hamilton)

621. **Molecular Spectroscopy.** Spectroscopic principles of NMR, ESR, microwave, IR, Raman, UV/Vis, fluorescence, and phosphorescence. Emphasis on understanding selection rules, line shapes and intensities, and relaxation times as well as using spectroscopy to determine the structure and properties of small molecules. Prerequisite: CH 323. Winter. (Muccio, Watkins)

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. (Watkins)

630. **Physical Organic Chemistry.** Localized and delocalized chemical bonds, stereochemistry, acidity and basicity, determining organic mechanisms and structure. Fall. (Advincula, Brouillette, Mays)

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. Winter. (Advincula, Brouillette, Mays)

*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. (Claude, Gray)

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). (Claude, Gray)

*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 I.** Statistical treatment of analytical data; equilibria survey of gravimetric, titrimetric, redox, and colorimetric methods of analysis. Fall. (Nonidez)

651. **Advanced Analytical Chemistry II.** Kinetic methods of analysis, fundamental principles of electrochemical, separation, and spectroscopic methods of analysis. Winter. (Nonidez)

655. **Electroanalytical Chemistry.** Potentiometry, voltammetry, polarography, coulometry, pulse techniques,

and trace analysis. Prerequisite: CH 551 or permission of instructor. (Nonidez)

656. **Analytical Separations.** Advanced treatment of distillation, extraction, gas chromatography, HPLC, TLC, and GC-MS. Prerequisite: CH 551 or permission of instructor. (Nonidez)

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. (Nonidez)

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. (Muccio)

*669. **Special Topics in Biochemistry.** Detailed consideration of areas of special interest. Prerequisite: CH 363.

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 in Chemistry.** Quantum mechanics applied to electronic structure and chemical bonding. Symmetry and spectroscopic measurements. Fall.

720. **Quantum Chemistry.** Applying the potential energy concept and MO theory to predict and explain molecular structure, properties, and reactivity. Huckel and self-consistent field theories, quantum mechanical postulates, variational methods, and perturbation theory will be covered. Prerequisite: CH 322. Fall. (Hamilton)

721. **Molecular Spectroscopy.** Spectroscopic principles of NMR, ESR, microwave, IR, Raman, UV/Vis, fluorescence, and phosphorescence. Emphasis on understanding selection rules, line shapes and intensities, and relaxation times as well as using spectroscopy to determine the structure and properties of small molecules. Prerequisite: CH 323. Winter. (Muccio, Watkins)

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. (Watkins)

*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. (Advincula, Brouillette, Mays)

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. Winter. (Advincula, Brouillette, Mays)

732. **Organic Reactions and Synthesis.** Strategy of synthesis, carbon skeletal assembly, selective functional group interconversion, blocking groups, stereochemical control. Prerequisite: CH 731. Spring. (Advincula, Brouillette)

733. **Reactive Intermediates and Conservation of Bonding.** Behavior of organic molecules in static and reactive situations. Prerequisite: CH 731 or permission of instructor. Winter. (Mays)

*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. (Claude, Gray)

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). (Claude, Gray)

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 magneto chemistry techniques. Prerequisite: CH 741. Summer. (Claude, Gray)

*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 I.** Statistical treatment of analytical data; equilibria survey of gravimetric, titrimetric, redox, and colorimetric methods of analysis. Fall. (Nonidez)

751. **Advanced Analytical Chemistry II.** Kinetic methods of analysis, fundamental principles of electrochemical, separation, and spectroscopic methods of analysis. Winter. (Nonidez)

755. **Electroanalytical Chemistry.** Potentiometry, voltammetry, polarography, coulometry, pulse techniques, and trace analysis. Prerequisite: CH 751 or permission of instructor. (Nonidez)

756. **Analytical Separations.** Distillation, extraction, gas chromatography, HPLC, TLC, and GC-MS. Prerequisite: CH 751 or permission of instructor. (Nonidez)

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. (Nonidez)

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. (Muccio)

*769. **Special Topics in Biochemistry.** Detailed consideration of areas of special interest. Prerequisite: CH 463. 1-3 hours.

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: *Randolph*

Faculty

[C. Bruce Alexander](#), Professor (Pathology); Pulmonary Diseases, Forensic Pathology

Jeannette R. Bell, Associate Professor (Clinical Laboratory Sciences); Hematology, Quality Management, Educational Methodologies, Health Care Delivery Systems

[William H. Benjamin](#), Assistant Professor (Pathology); Parasitology, Typhoid Diseases

Richard C. Friedberg, Professor (Pathology); Coagulation, Immunohematology

Margaret G. Fritsma, Associate Professor (Clinical Laboratory Sciences); Immunohematology, Hemostasis, Laboratory Management

Pat E. Greenup, Associate Professor (Clinical Laboratory Sciences); Quality Management, Technology Assessment

Robert Hardy, Associate Professor (Pathology); Glucose Transport, Growth, Ultracellular Calcium, Homeostasis

Shu T. Huang, Associate Professor (Pathology); Blood Banking, Therapeutic Apheresis

Linda H. Jeff, Associate Professor (Clinical Laboratory Sciences); Clinical Microbiology, Educational Methodology

Stephen A. Moser, Associate Professor (Pathology); Clinical Microbiology, Medical Informatics

Jay M. McDonald, Professor (Pathology); Diabetes, Bone Disease

Virginia R. Randolph, Associate Professor (Clinical Laboratory Sciences); Clinical Chemistry, Computer-Assisted Educational Technology

Vishnu V. B. Reddy, Associate Professor (Pathology); Bone Marrow Topography and Immuno-architecture Telepathology

John A. Smith, Professor (Pathology); Peptide Synthesis and Regulation, Immunological and Biochemical Mechanisms

Ken B. Waites, Associate Professor (Pathology); Microbiology and Mycoplasma

M.S.C.L.S. Program Information

The Master of Science in Clinical Laboratory Sciences (M.S.C.L.S.) is a part-time or full-time graduate degree program that enables professionals who hold a baccalaureate degree and certification as a medical technologist or clinical laboratory scientist to prepare for advanced technical and administrative career opportunities. The program is jointly sponsored by the Division of Clinical Laboratory Sciences and the Division of Laboratory Medicine. Through courses, research, and project or thesis preparation, M.S.C.L.S. students enhance their proficiency in a chosen clinical laboratory science discipline: chemistry, hematology, immunohematology, microbiology, informatics, or laboratory administration. Certification as a specialist is available in some disciplines upon completion of specific requirements.

Students who hold a Bachelor of Science in biology, chemistry, or a related major, and who are neither certified medical technologists nor clinical laboratory scientists, but who desire a career in clinical laboratory science, may apply to the M.S.C.L.S. program and, if

accepted, take courses which apply for both the professional certification exam boards and the Master of Science in Clinical Laboratory Sciences.

The M.S.C.L.S. program includes courses in research skills, advanced operations management skills and advanced clinical laboratory science discipline skills. The program is designed to take a full-time student who is a certified medical technologist one and one half years to complete. Depending upon their individual experience, graduates of the program should bring another level of intellectual stimulation to their present position, assume new professional roles, or elect to use their graduate work in preparation for additional advanced formal education.

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 bachelor of science in biology, chemistry, clinical laboratory sciences, or a related major from an accredited college or university,
- possess a minimum undergraduate grade point average (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 on each section of the GRE General Test,
- provide a written statement of career goals,
- participate in interviews with M.S.C.L.S. faculty and admissions committee,
- if applicant is a clinical laboratory scientist, provide evidence of current certification, and
- if accepted, complete a medical history questionnaire and physical, including required immunizations with satisfactory screening by the UAB Medical Center Student Health Service prior to enrollment.

M.S.C.L.S. Program of Study

The Master of Science in Clinical Laboratory Science (M.S.C.L.S.) is designed to meet the professional needs of clinical laboratory scientists (medical technologists). The M.S.C.L.S. program provides both entry to the clinical laboratory science profession and advanced intellectual achievement for clinical laboratory scientists. The M.S.C.L.S. student completes scientific spe-

cialty and research-related courses, participates in scholarly activities, and prepares a project (Plan II) or a thesis (Plan I) that reports original research. Areas of study include chemistry, hematology, immunology and microbiology, immunohematology, informatics, and laboratory administration. Participation in the M.S.C.L.S. program enables clinical laboratory scientists to gain comprehensive knowledge in a selected topic or combination of topics; to independently design, execute, and report scientific, clinical, educational, or management-based research; and to prepare for advanced clinical, technical, and administrative careers.

Certification at the clinical laboratory scientist level or at the advanced specialty level is available to graduates.

Students with a baccalaureate degree in fields other than CLS may concurrently complete medical technology and graduate level requirements. This requires two-and-one-half years for completion.

M.S.C.L.S. Curriculum

The [M.S.C.L.S. program](#) consists of at least 33 semester hours of graduate credit. Students must earn a grade point average of 3.0 (A = 4.0) while completing courses selected from general, research, and specialty sequences. Courses may be scheduled on a part-time or full-time basis.

General Courses

This sequence includes a divisional seminar and courses in quality management, technology assessment, and educational methodology. Students may gain teaching experience in undergraduate clinical laboratory science courses. Electives are available in the general course sequence.

Research Courses

This sequence includes courses in research methodology, scientific inquiry, and quantitative and qualitative methods. Thesis credits are recorded as part of the research sequence. Electives are available in the research course sequence.

Specialty Courses

Selected specialty course sequences enable the student to gain comprehensive knowledge in clinical chemistry, hematology, immunohematology, laboratory administration, informatics, and microbiology. Electives are available in the specialty course sequence.

Contact

For detailed information, contact Virginia Randolph, Director, Clinical Laboratory Sciences Division, UAB School of Health Related Professions, LRC 381, 1530 3rd Avenue South, Birmingham, Alabama 35294-1270 Telephone 205-934-4863

Email 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)

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 which support performance improvement for individuals, groups, and organizational business unit performance; quality management (QM) elements and the 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. (Greenup)

601. Designing Effective Laboratory Medicine Services. Application of organizational theory and behavior principles to the operations of laboratory medicine services; structural, contextual, and system/processes factors that impact on the delivery of services; outcomes to include tactic applications needed for maximizing personal and organizational performance behaviors and results; Students analyze strategies and tactics for achieving exceptional and evolving service relationships with internal and external customers. Prerequisite: Permission of instructor. (Greenup)

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 the clinical laboratory and in vitro diagnostic industries. Prerequisite: Permission of instructor. (Greenup)

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. (Greenup)

605. Transfusion Service Management. Regulatory and compliance issues; inspection and accreditation; Good Manufacturing Practices (GMP); historical perspective; impact of health care reform on organization and delivery of services; legal and employment issues; personnel interview, selection, discipline, competency assessment; ethical issues; quality assessment and improvement; blood bank information systems; budget, financial management, and cost analysis. Prerequisite: Permission of instructor. (Fritsma)

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 the products sold and to establish process quality for the services delivered; application of critical thinking skills to evaluate methodological and substantive validity of correlation and evaluation studies relevant to laboratory medicine practices. Prerequisite: CLS 693 or Permission of instructor. 3 hours. (Greenup)

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.

631. **Advance 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 440 and/or Permission of instructor. 2 hours.

632L. **Advanced Hematology Lab.** Laboratory sessions coordinated with CLS 631 lectures; 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: Current enrollment in CLS 631, permission of instructor. 1 hour. (Bell)

637. **Molecular Techniques.** Molecular techniques in clinical laboratories including methods for molecular microbiology, oncology, hematology, genetics and identity testing; review of economic factors, regulations and licensing issues, accreditation criteria, social, ethical, and legal issues associated with emerging molecular technologies. (Greenup)

642. **Infectious Disease Principles.** Microbial virulence factors, host defense mechanisms, and methods of transmission; major clinical syndromes, infectious diseases and their etiologic agents with the focus on microbial detection and or isolation, identification of isolates and antimicrobial studies; issues of quality and performance management, resources utilization and the role of clinical microbiology laboratories/laboratory practitioners. Prerequisite: MT 436 and/or Permission of instructor. (Greenup)

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: MT 436 and/or permission of instructor. (Greenup)

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. (Fritsma)

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. (Fritsma)

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. (Fritsma)

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 420 and/or permission of instructor. (Randolph)

684. **Advanced Clinical Practicum.** Directed clinical practice; advanced laboratory procedures and methods; quality control systems, preventive maintenance, problem solving, safety. Prerequisite: Permission of instructor. 1-6 hours.

686. **Special Topics in Clinical Laboratory Science.** Selected advanced topics of current scientific, clinical, and professional importance. Specific topics are designed to meet student need and interest. Prerequisite: Permission of instructor. 1-4 hours.

688. **Managing and Marketing Laboratory Sciences.** Marketing management methods and evaluation of marketing tactics; examination of service management

principles and the elements of customer service-driven organizations in the 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. (Greenup)

691. **Seminar in Clinical Laboratory Science.** Current clinical, professional, and research developments in clinical laboratory science. Prerequisite: Permission of instructor. 1 hour.

692. **Immunohematology Seminar.** Current clinical, administrative, professional, and research developments in immunohematology and transfusion medicine. Prerequisite: Permission of instructor. 1 hour. (Fritsma)

693. **Scientific Publications Analysis.** Review and scientific critique of current literature related to laboratory medicine. Prerequisite: Biostatistics and permission of instructor. 2 hours. (Greenup)

698. **Non-Thesis Research.** Prerequisite: Permission of instructor. 1-6 hours.

699. **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.

Contact

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

Email Mhick91213@aol.com

Web www.uab.edu/CommunicationStudies

Course Descriptions (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.

Comparative Medicine

The Department of Comparative Medicine 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.

For detailed information, contact Dr. Philip A. Wood, Department of Comparative Medicine, Volker Hall, Room 402, 1670 University Boulevard, Birmingham, AL 35294-0019.

Telephone 205-934-2117

Email paw@uab.edu

Computer and Information Sciences

Graduate Program Director: *Jones*

Anthony C.L. Barnard, Professor (Computer and Information Sciences); Computer Networking

Barrett R. Bryant, Associate Professor (Computer and Information Sciences); Programming Languages, Compiler Design, Object-Oriented Technology

W. Michael Carson, Assistant Professor (Computer and Information Sciences); Molecular Graphics

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, Medical Informatics

Warren T. Jones, Professor (Computer and Information Sciences); Knowledge Discovery, Machine Learning, Medical Informatics

Kevin D. Reilly, Professor (Computer and Information Sciences); Simulation, Artificial Intelligence, Software Engineering, Medical Bioinformatics

Kenneth R. Sloan, Associate Professor (Computer and Information Sciences); Computer Graphics, Vision, Image Processing, Parallel Search, Medical Informatics

Alan P. Sprague, Associate Professor (Computer and Information Sciences); Algorithm Design, Knowledge Discovery, Medical Informatics

Ernest M. Stokely, Professor (Biomedical Engineering); Medical Imaging

Amy Zwarico, Adjunct Associate Professor (Bell-South.com); Programming Languages, Concurrency, Object-oriented Technologies

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).

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 medical informatics in collaboration with the UAB Academic Health Center.

Contact

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

Email wjones@uab.edu

Web www.cis.uab.edu

Course Listings

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.

533. Computer Networks. Bottom-up study of digital telecommunications, following the ISA/OSI structure and emphasizing local area networks. Transmission media, digital and analog transmission, packet-switching. Medium access control, including IEEE 802 standards. Sliding-window data-link protocols. Connection-oriented and connectionless communication at network layer.

534. Internetworking. Connection of network segments using bridges and routers. Comparison of TCP/IP with IPX/SPX. Internet management and security. Underlying operation of World Wide Web. Required laboratory. Prerequisite: CS 533.

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 533 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. Encryption and authentication to provide secure communication between computers in a hostile environment. Implementations at OSI data-link, network, and application layers, with emphasis on IPsec and SSL. Prerequisite CS 533 or other familiarity with TCP/IP protocol suite.

538. Distributed Objects 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 micro-tasking. 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 BDM, Z, and object-oriented extensions; the relationship among formal requirements, design, and implementation.

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. **Bioinformatics.** 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.** Parallel and sequential algorithms: basic methods, selected algorithms.

653. **Computational Geometry.** Basic methods and data structures, geometric searching, convex hulls, proximity, intersections.

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. **Computational Logic.** Propositional logic, predicate calculus, Herbrand's theorem, resolution, theorem proving.

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 Specifications of Software Systems.**

726-729. **Software Development Seminar.**

730, 731. **Topics in Computer Systems.**

736-739. **Computer Systems Seminar.**

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 Computational Logic.**

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.

Criminal Justice (M.S.C.J.)

Graduate Program Director: *Sloan*

Faculty

Tomislav Kovandzic, Assistant Professor (Justice Sciences). Inequality and Crime; Firearms and Violence; Research Methods; Criminal Justice Policy; Police

Charles A. Lindquist, Associate Professor (Justice Sciences), Corrections; Criminal Justice Policy, Intentional Injury; Comparative Criminal Justice

Ray H. Liu, Professor (Justice Sciences), Drug Chemistry; Instrumental Methods in Forensic Science

Kathryn D. Morgan, Assistant Professor (Justice Sciences); Corrections; Criminological Theory; Minorities

John J. Sloan, III, Associate Professor (Justice Sciences), Correlates of Victimization; Fear of Crime; Criminal Justice Policy; Program Evaluation

Brent L. Smith, Professor (Justice Sciences), Terrorism; Criminological Theory; Victimology

Frederick P. Smith, Professor (Justice Sciences), Trace Evidence; Drug Chemistry; Professional Ethics

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 Analyses

Mark LaGory, Professor (Sociology), Urban Sociology; Demography; Violence

James Philips, 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 G.P.A. of 3.0 for all graduate coursework undertaken. Failing to do so will result in the student being dismissed 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 JS580 and JS600-JS606) 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 G.P.A. 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 G.P.A. of 3.0 in all course-

work 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.

Contact

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

Email jsloan@sbs.sbs.uab.edu

Web main.uab.edu/show.asp?durki=12144

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.** Applications used to generate criminal justice research reports, including statistical analysis packages, 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; early theoretical explanations of criminality including classical, biophysiological, psychological, and sociological theories.

602. **Seminar in Criminological Theory.** Classic and contemporary structural explanations of crime; substan-

tive focus on relationships among cultural and institutional arrangements and crime.

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 innovation.

605. **Seminar in Criminal Justice Research Methods.** Quantitative methods of empirical research; 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 the evaluation of these programs.

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 of 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.** Case studies 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

Kirby Bodden, Associate Professor (Restorative Dentistry); Human Oral Cancer Research, Prosthodontics

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 (Pediatric Dentistry); Dental Epidemiology, Advanced General Dentistry

Page W. Caufield, Professor (Oral Biology); Cariology, Chemotherapeutic Approaches to Caries Prevention

Noel K. Childers, Professor (Pediatric Dentistry); *Streptococcus mutans*, Dental Caries, Oral Immunization, Liposomes

Charles F. Cox, Professor (Restorative Dentistry and Biomaterials); Operative Dentistry, Clinical and Didactic, Material Testing

Ananda Dasanayake, Associate Professor (Oral Biology); Cariology, Oral Epidemiology, Oral Cancer, Low Birth Weight, Streptococcus

Milton Essig, Professor (Restorative Dentistry); CAD-CAM, Ceramic Bonded Restorations

Steven J. Filler, Professor (Oral and Maxillofacial Surgery); 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 (Biomaterials); Composite, Resin, Wear, Fatigue

Timothy Heaven, Associate Professor (Restorative 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 (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 (Biomaterials); Coatings for Implants, Dental Ceramics and Alloys, Porcelain

Jack E. Lemons, Professor (Biomaterials); Biocompatibility of Synthetic Materials, Alloys and Casting Technology, Biomechanics

Yihong Li, Assistant Professor (Oral Biology); Molecular Epidemiology, Early Childhood Caries, Transmission of Mutants Streptococci

Perng-Ru Liu, Associate Professor (Restorative 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 (Diagnostic Sciences); Odontogenic Tumors, Oral Cancer, Fibro-Osseous Lesions of the Jaws

Raquel Mazer-Gurmendi, Assistant Professor (Biomaterials); Dental Materials, Composite Resins, Adhesives, Clinical Investigation, Physical and Mechanical Testing

Michael McCracken, Assistant Professor (Biomaterials); dental implants, biomimetic materials, growth factors

John C. Mills, Associate Professor (Endodontics); Endodontic Implants (Stabilizers); Development of an Acid-Etch Technique for Bonding Segments of Fractured Endodontically Treated Teeth for Replantation, Trauma to Teeth

Leonard A. Mueninghoff, Professor (Restorative Dentistry); Implants, Biomaterials, Microleakage, Adhesives, Veneering, Composites

S. Jean O'Neal, Professor (Restorative Dentistry); Fixed Prosthodontics, Color and Clinical Evaluation of Dental Materials

Kent G. Palcanis, Professor (Periodontics); Clinical Periodontology, Control of Periodontal Disease

Fengxia (Felicia) Qi, Assistant Professor (Oral Biology); Bacterial Genetics, Antibiotics, *Streptococcus mutans*

J. R. Patel, Associate Professor (Diagnostic Sciences); Advanced Panoramic Radiographic Techniques, Subtraction Radiography

Firoz Rahemtulla, Professor (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 (Biomaterials); 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 (Biomaterials); Restorative Materials, Composites, Wear, Bonding System, Clinical Evaluations

Reginald W. Taylor, Associate Professor (Orthodontics); Collagen Molecular Biology, DNA, cDNA Sequencing, Gene Cloning

Joe P. Thomas, Adjunct Professor (Pediatric Dentistry); Clinical Caries Investigation, Sickle Cell Anemia

John B. Thornton, Jr., Professor (Pediatric Dentistry); Incidence of Periodontal Disease in 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 pre-dental 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 two and preferably three quarters prior to 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 not less than three weeks before the close of the appropriate quarter. 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.

Course Listings

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 quarter. 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 impacting on 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, noble 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. **Advance 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 quarter. 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 Endodontic First-Year Clinic.**

*686. **Advanced Endodontic 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 Prosthodontic Seminar.** Correct and historical prosthodontic 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 students 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

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.)

Arts Education (M.A.Ed.)

M.A.Ed. concentrations: Art, Music, English as a Second Language (ESL)

Graduate Program Director: *Burns*

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

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

Charlotte B. Holley, Assistant Professor (High School Education); English Education, Reading, Multicultural Education, Integrated Curriculum, Literacy and Adult Education

Virginia D. Horns-Marsh, Professor Emerita (Early Childhood and Elementary Education); Early Childhood, Reading, Language Arts

Thomas W. Jambor, Associate Professor (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

James Kirylo, Assistant Professor (Elementary Education); Curriculum Theory and Development, Literacy Development

Janice Kluge, Associate Professor (Art); Art Education, Drawing, Sculpture

Barbara Lewis, Associate Professor (Elementary Education); Reading, Language Arts

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

Lee Meadows, Assistant 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

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

Kevin P. Walsh, Associate Professor (Early Childhood and Elementary Education); Discipline and Social Education, Social Philosophies of Education

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.

Contact

For detailed information, contact Dr. Joe Burns, Program Director, UAB Department of Curriculum and Instruction, EB 119, 1530 3rd Avenue South, Birmingham, Alabama 35294-1250.

Telephone 205-934-5371

Web www.uab.edu/educ

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 Fifth-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 Fifth-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 Fifth-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 Fifth-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 Fifth-Year Program students. Observation and student teaching in elementary and secondary schools (10 weeks or 300 clock hours). Prerequisites: Unconditional acceptance into the Fifth-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 Fifth-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 Fifth-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 Fifth-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 Fifth-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 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 plan-

ning, 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.

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. **Masters Project.** Course is designed for the nontraditional fifth-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.

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.

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.

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.

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.

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 Fifth-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 Fifth-Year Program.

567. **Secondary School Curriculum: Science.** Teaching methods and curricula in secondary science programs. Includes field experiences. Prerequisite: Admission to Fifth-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 Fifth-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 Fifth-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 Fifth-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 Fifth-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 Fifth-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 Fifth-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 Fifth-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 Fifth-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.

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.

521. **Foundations of Graduate Study in Music Education.** Course examines the history and contemporary philosophy of music education in the public schools. Curriculum development, conceptual teaching, basic bibliographic and research techniques, and evaluation of the music program, with an emphasis on psychology of music as applied to contemporary music instruction in public schools will be examined in detail. Prerequisites: Permission of instructor. 3 hours.

529. **Choral Techniques and Materials.** An advanced study of the techniques of choral conducting including appropriate gestures, score study, performance practice, choral diction (using the International Phonetic Alphabet or IPA), voice building for choirs, literature selection appropriate for use in secondary education, rehearsal techniques and working with various types of instrumental accompaniment. Prerequisites: Admission to the Masters Program in music, undergraduate conducting or permission of the instructor. 3 hours.

530. **Methods of Instrumental Music.** A study of the instrumental music environment. This course will explore administrative topics, teaching techniques, evaluations, discipline, budgeting, and public school policies. A substantial amount of time will be devoted to materials and literature, and current trends in music education. Prerequisites: Permission of instructor. 3 hours.

English as a Second Language (EESL)

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.

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

Education, Counseling (Ed.S., M.A.C.N.)

Education, Health (Ed.S., M.A.Ed.)

Education, Health Education/Health Promotion (Ph.D.)

Education, Physical (Ed.S., M.A.Ed.)

Education, School Psychometry (M.A.Ed.)

Education, School Psychology (Ed.S.)

Graduate Program Director: *Macrina*

Faculty

Gypsy Abbott, Professor; Educational Psychology, Psychological Testing, Evaluation

Marcas Bamman, Assistant Professor; Exercise Physiology, Muscle Physiology, Musculoskeletal Aging

Dianne Binkley, Assistant Professor; School Health Education, Program Planning and Evaluation

Clint E. Bruess, Professor; Program Administration, Sexuality Education

Terry Conkle, Assistant Professor; Physical Education Pedagogy

William A. Crunk, Jr., Associate Professor; Rehabilitation Counseling, Family Guidance, Counseling Theories

Brian F. Geiger, Associate Professor; Health Promotion Models, Comprehensive School Health, Technology, Community Education

Peggy C. Harrison, Associate; Physical Education, Curriculum, Teaching Methods, Supervision of Physical 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, Associate Professor; Health Promotion, Community Health, Planning and Administration

Charles McLafferty, Assistant Professor; Qualitative Research, Education Psychology, Counseling Theory

James McLean, University Research Professor; Foundations of Education, Research, Statistics

Paul B. Pedersen, Professor; Multicultural Counseling and Interviewing, International Educational Exchange, Multicultural Mediation, Culture Centered Training

Cynthia J. Petri, Associate Professor; Health Behavior, HIV Education and Prevention, Technology, Theory

Gary L. Sapp, Professor; Cognitive Assessment, School Psychometry, School Psychology

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

Lesla 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 Masters degree option for students interested in either clinical exercise physiology or physiology research. The curriculum is multidisciplinary and is comprised of 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 while 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		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
	Elective in major	3
	Thesis	6
	Related Field	6-9
	Statistics Course	3
EPR 609	Statistical Methods and Research in Education	

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
	Elective in major	3
	Thesis Substitution	12
	Related Field	6-9
	Statistics Course	3
EPR 609	Statistical Methods and Research in Education	

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

Course Listing

See physical education course listing for 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 (3 hours)

HE 502, HE 508, HE 521, HE 523, HE 557, HE 592, HE 593, HE 598, HE 602, HE 606, HE 612

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
EDL 611 School Organization and Law Foundations and Professional Studies (see approved list)	3
Technology Competency	0-3
Elective (as approved by advisor)	3

Alternative A (Non-traditional Fifth-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

Survey of Special Education Coursework: Required if not previously completed. (0-3 hours)

ECY 600 Introduction to Exceptional Learners

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

Additional Courses:

EPR 692 Introduction to Educational Research	3
EPR 609 Statistical Methods and Research: Intermediate	3
Technology Competency	0-3
Electives with Permission of advisor	
600- or 700-level Professional Studies or Teaching Field courses	3-6

Course Listing

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 environmen-

tal); 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
- 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 pre-requisites 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 examines 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.

652. **Workshop in Elementary Physical Education.** Arranged infrequently on various timely topics.

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 Fifth-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.

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:

<u>Term</u>	<u>Deadline</u>
Fall	August 1st
Winter	November 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 on-going process. The faculty reserves the right to determine candidate's appropriateness as a professional. A written 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 rewrite the exam. Students who fail to pass the rewrite may 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 signature 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. There are no evening placements and no summer placements for school counseling students. 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 N-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.

Non-School Counseling

The two specializations outlined below are intended to prepare graduates to function in nonschool settings and lead to recommendation by the department for licensure as a Licensed Professional Counselor (LPC). Applicants to nonschool 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 rehabilitation 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

risk 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. **Qualitative Research: Inquiry and Analysis.** Development of skills necessary to conduct qualitative research: data collection, data analysis and interpretation, and presentation of findings and conclusions. Prerequisite: EPR 596 or equivalent.

* 698. **Individual Nonthesis Research in Educational Psychology.** Prerequisite: Permission of instructor.

* 699. **Individual Thesis Research in Educational Psychology.** Prerequisites: Admission to candidacy and permission of instructor.

710. **Computer Applications and Advanced Statistical Methods.** Multiple regression and multivariate techniques using microcomputers. Structuring appropriate research questions and hypotheses; analyzing and interpreting results. Prerequisites: EPR 608 and 609.

714. **Seminar in Human Development.** Current theory and research in human development. Prerequisite: Admission to school psychology program, and master's degree or permission of instructor.

719. **Internship and Seminar in School Psychology II.** Daily, one-semester participatory experience in school and clinic setting supervised by qualified psychologist. Prerequisite: Permission of program coordinator. 6 hours.

720. **Consultation in Counseling and School Psychology.** Seminar on major current issues of interest to school psychologists.

728. **Seminar on Research in Education.** Assisting school personnel in interpreting research findings. Prerequisite: Master's degree.

729. **Research Seminar in Counseling and School Psychology.** Development and completion of acceptable research project. Prerequisites: EPR 692 and permission of instructor.

793. **Doctoral Seminar in Research Evaluation and Design.** Presentation and analysis of research in students' areas of interest. Prerequisites: Advanced gradu-

ate standing and graduate courses in statistics and research design.

796. Qualitative Research: Doctoral Seminar. Focus on development of dissertation research proposal, utilizing qualitative methodology of suitable quality, for submission to doctoral research committee. Prerequisite: Advanced graduate standing and permission of instructor.

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 counseling theory and skills courses are profession-

al 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.

*(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.

Prerequisites: 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 Program 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:

1. Alabama Department of Rehabilitation Services
2. International Rehabilitation Associates (Private Rehabilitation)
3. Sheltered Workshop Facilities
4. Higher Education--Disability Support Services
5. Independent Living Centers
6. Drug and Alcohol Treatment Centers
7. Correctional Facilities
8. Employee Assistance Programs
9. Mental Health Facilities
10. Disability Determination
11. Private Practice--Sole Practitioners
12. 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)

ECG 697 Counseling Internship* (Prerequisite: ECG 695 and approval of Internship Coordinator). (Case management skills are a part of the internship experience)

Area IV: Electives (6 semester hours)

*Current societal standards require 600 clock hours of supervised internship.

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.

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 re-

garding 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. To 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)

Note: School Counseling Internship sites are very limited during Summer terms.

Note: Special Education requirement must be met.

*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.)

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.

1. Human Growth and Development
2. Social and Cultural Foundations
3. Helping Relationships
4. Group Work
5. Career and Lifestyle Development
6. Appraisal
7. Research and Program Evaluation
8. Professional Orientation and Ethics

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, winter, spring, and summer terms. The comprehensive examination should be sche-

duled at the time a student has met all the requirements of Precandidacy for Area I.

Education, Leadership and Special Education

Educational Leadership (Ph.D., Ed.D., Ed.S., M.A.E.)

Education, Special (Ed.S., M.A.E.)

Graduate Program Director at UAB: *Rogan*

UAB Faculty

Carol Allison, Instructor (Special Education); Visual Impairments

Jade Carter, Associate Professor (Special Education); Learning Disabilities, UAB Horizons Program

David L. Dagley, Associate Professor (Leadership); Law, Employee Relations, Educational Administration

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

Carol A. Dowdy, Professor (Special Education); Programming for the Mildly Handicapped at Secondary Level

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 L. Grigsby, Associate Professor (Foundations of Education); Science and Mathematics Instruction, Foundations of Research, Democratic Processes

Ira W. Harvey, Associate Professor (Leadership); Administration, Political Science

Donald H. Henderson, Professor Emeritus (Leadership); School Law, Principalship, Attendance Supervision

Betty Higdon, Assistant Professor (Special Education); Low Incidence and High Incidence Disabilities, Administration Leadership, Collaboration in Schools

Shirley Salloway Kahn, Assistant Professor (Leadership); Higher Education, Planning

Jennifer Kilgo, Associate Professor (Special Education); Early Childhood

JoAnn Lan, Assistant Professor (Instructional Technology); Educational Media

James M. Lee, Professor (Foundations of Education); Foundations of Education, Teaching Process, Religion and Education

Mary Nix, Associate Professor (Foundations of Education)

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)

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 **January 15** for the program of study beginning the following March (Spring term).

Contact

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

Email brogan@uab.edu

Web www.uab.edu/educ

Course Listings

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.

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 ef-

fectiveness 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 EDL 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 EDL 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 EDL 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 EDL 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 leadership; 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: Prerequisite: 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 con-

cerns 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 ex-

pected 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 fifth-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 fifth-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 instructor.

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 judgement; 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. **Individuals 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.E.)

Graduate Program Director: *Lucas*

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 Doblal, 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

Gamlin, Paul, 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 Raheemtulla, 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.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 recommendations 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 (nonthesis 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.

Contact

For detailed information, contact Chair, UAB Department of Biomedical Engineering, Hoehn Bldg. Rm. 370, 1075, 13th Street South., Birmingham, Alabama 35294-4440.

Telephone 205-934-8420

Email llucas@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 anger 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 correction 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 propa-

gation 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.)

Engineering, Environmental Health (Ph.D.)

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

James S. Davidson, Assistant Professor (Civil and Environmental Engineering); Structural Engineering, Structural Mechanics, Numerical Methods, Structural Dynamics, Bridge Design

Norbert J. Delatte, Assistant 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, Computer Applications

Melinda M. Lalor, Associate Professor (Civil and Environmental Engineering); Environmental Engineering, Water Resources Engineering, Solid Waste Management

David Olowokere, Associate Professor (Civil and Environmental Engineering); Structural Engineering, Bridge Design

Robert E. Pitt, Professor (Civil and Environmental Engineering); Environmental Engineering, Water Resources

Edmund P. Segner, Jr., Professor Emeritus, (Civil and Environmental Engineering); Structural Engineering, Structural Mechanics

Michael E. Vermace, Assistant Professor (Civil and Environmental Engineering); Environmental Engineering, Water Resources Engineering

Secondary Faculty

John Baker, Associate Professor (Materials and Mechanical Engineering); Fluid Mechanics, Computational Fluids

Kenneth Dillon, Associate Professor (Environmental Health Sciences); Water Chemistry, Air Pollution

Alan Eberhardt, Associate Professor (Materials and Mechanical Engineering); Solid Mechanics, Analytical and Numerical Methods

Robert Jacobs, Associate Professor (Environmental Health Sciences); Environmental Health

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 accident research)

Admission Requirements

In addition to the general Graduate School admission requirements, requirements for admission to the program leading to the Master of Science in Civil Engineering degree include the following four 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 (on a 4.0 scale) 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 Test of English as a Foreign Language (TOEFL) and a 3.5 on the Test of Written English (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.

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.

Plan I (Thesis Option)

The student must successfully complete at least 24 semester hours of coursework, including (in addition to the general Graduate School requirements):

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, or urban affairs.
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. 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);
- C. a minimum of at least 6 semester hours in disciplines outside civil engineering, such as other engineering disciplines, mathematics, earth science, physics, or urban affairs.

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 and structural engineering/structural mechanics. Supporting courses are offered in transportation engineering, optimization, and other areas.

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 333 Water Supply and Drainage Design
- CE 334 Environmental Engineering Laboratory
- CE 335 Introduction to Water and Wastewater Treatment
- CE 435 Environmental Engineering
- CE 444 Civil Engineering Analysis
- CE 484 Engineering Hydrology
- CE 485 Hydraulic Engineering Systems

Classes will be taken in one of the following disciplines: general environmental engineering, stormwater management, wastewater treatment, air quality, or solid and hazardous waste management. Continuous enrollment in the environmental engineering seminar series (CE 641) will be expected of all environmental engineering graduate students.

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 360 Structural Analysis
- CE 444 Civil Engineering Analysis
- CE 450 Structural Steel Design
- CE 455 Reinforced Concrete Design

Ph.D. Programs

A Ph.D. program in Environmental Health Engineering is offered by the Department of Civil and Environmental Engineering. An environmental health engineer requires multidisciplinary training in both environmental engineering and environmental health, plus advanced specialized training combining numerous attributes of these two fields. A typical student entering this program would already have an M.S.C.E. in Civil and Environmental Engineering. Nonengineering students in a health or science field would typically require an additional year of course work for the basic engineering prerequisites. However, because of the program's multidisciplinary nature, special efforts will be made to attract nonengineers to this program, as it is necessary to have students with diverse backgrounds in this field.

The program contains at least 66 credit hours of classroom work, plus 24 credits of dissertation research, a total of 90 credit hours beyond the baccalaureate level. All students will be required to complete a basic undergraduate class sequence that is normally included in a civil and environmental engineering undergraduate program before any graduate classes can be taken. The program also contains a sequence of prerequisites to the Ph.D. program that contains additional fundamental coursework that would normally be satisfied while pursuing an M.S.C.E. degree. This Ph.D. program would normally require about four years of total graduate work.

All students take a 36-unit core program, comprising class sequences in statistical analyses, biological sciences, environmental chemistry, and environmental health. An additional 30 units are also taken specializing in a specific health, water, air, or solid waste field, such as stormwater management, epidemiology, toxicology, wastewater treatment, air quality, or solid and hazardous wastes management. These specialized sequences will provide more advanced background in important environmental health topics and will well prepare the students for their dissertation research that will focus on environmental health engineering. The program also includes other closely related tracks such as by-product utilization, structural health of the infrastructure, industrial ecology, and other health- or safety-related studies. Passing qualifying, comprehensive, and defense examinations are required for successful completion of the degree. For more detailed information, contact Dr. Robert E. Pitt, Program Coordinator for the Ph.D. in Environmental Health Engineering, UAB Department of Civil and Environmental Engineering.

Telephone 205-934-8434

Email rpitt@uab.edu

UAB also cooperates in programs leading to the Ph.D. in civil 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 civil 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 at the cooperating institution.

Contact

For detailed information, contact Dr. Fouad H. Fouad, Chair or Gayla Schultz, Administrative Associate, UAB Department of Civil and Environmental Engineering, 140 Hoehn Building, 1075 13th Street South, Birmingham, AL 35294-4440.

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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

631. **Environmental Law.** Law as it applies to the practicing environmental engineer. New and emerging regulations.

632. **Industrial Water and Wastewater Treatment.** Solid wastes and waste waters from various industries. Assessment of treatability, system design, and equipment selection. Prerequisite: CE 335.

633. **Solid and Hazardous Wastes.** Engineering principles and management issues of generation, storage, collection, transfer, transport, processing, recovery, and disposal of wastes. 3 hours.

634. **Air Quality Modeling and Monitoring.** Atmospheric pollutants; effects, reactions, and sources. Air pollution meteorology and dispersion modeling. Ambient monitoring. Prerequisite: ME 311

635. **Environmental Engineering.** Air and water pollution, solid waste. Quality of environment. Environmental health. Regulation, legal considerations. Prerequisite: CE 335.

636. **Urban Stormwater Water Pollution Management.** Quality and quantity of urban stormwater. Receiving water problems and sources of pollutants. Runoff quality and quantity characterizations. Selection and design of controls; regulations. Prerequisite: CE 333.

637. **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.

638. **Chemical Processes and Pollutant Impacts in Water.** Aquatic chemistry. Chemical behavior of pollutants in receiving waters. Fate of common pollutants. Chemical kinetics in natural waters. Photochemical reactions. Computer modeling of wastewater discharges. Prerequisite: Graduate standing.

639. **Sediment Sources and Controls.** Erosion and sediment transport in urban areas; design of common erosion control practices. Prerequisite: CE 333.

640. **Biological Processes and Pollutant Impacts in Water.** Biological monitoring, pollutant effects on aquatic ecosystems, biological effects on pollutant behavior. Computer modeling of effects on streams. Field assignments. Saturday labs to supplement classes. Prerequisite: Graduate standing. 4 hours.

641. **Environmental Engineering and Water Resources Seminar.** Seminar focusing on student research and guest presentations of various topics of interest to environmental engineering students. Mandatory continuous enrollment for all environmental engineering students. 1 hour.

681. **Environmental Chemistry.** Chemical equilibrium, acid/base, chemical concepts in pollutant behavior. Chemical kinetics, redox system, hydrolysis; pesticides, chemical wastes. Prerequisite: CE 638.

682. **Unit Processes in Water and Wastewater Treatment.** Water and wastewater characteristics and how they affect treatment processes. Grit removal; filtration; clarification, dissolved air flotation, gas transfer, disinfection, water softening, ion exchange, activate sludge, sludge dewatering, and sludge disposal. Growth kinetics of microorganisms and photosynthetic processes. Prerequisite: CE 335.

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 682.

684. **Hydraulic Engineering Systems.** Fundamentals of hydraulics including properties of water, hydrostatic forces, flow in piping systems, flow in open channels, hydraulic structures, elements of hydrology. Prerequisite: CE 333.

685. **Engineering Hydrology.** Hydrologic principles: hydrologic cycle, precipitation data, stream flow measurements. Applications to engineering problems: streamflow analysis, watershed management. Prerequisite: CE 333.

686. **Engineering Hydrogeology.** Groundwater movement, natural quality, contamination, and restoration. Well hydraulics and flow net analysis. Prevention of groundwater contamination. Prerequisite: CE 333.

687. **Stormwater Detention Pond Design.** Storm water problems and control methods. Urban hydrology prediction procedures for drainage and water quality studies. Detention pond design basics limitations and multiple benefits. Prerequisite: CE 333.

731. **Environmental Law.** Law as it applies to the practicing environmental engineer. New and emerging regulations.

732. **Industrial Water and Wastewater Treatment.** Solid wastes and waste waters from various industries; 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. **Urban Stormwater Pollution Management.** Quality and quantity of urban stormwater. Receiving water problems and sources of pollutants. Runoff quality and quantity characterizations. Selection and design of controls; regulations. Prerequisite: CE 333.

737. **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 334.

738. **Chemical Process and Pollutant Impacts in Water.** Aquatic chemistry. Chemical behavior of pollutants in receiving waters. Fate of common pollutants. Chemical kinetics in natural waters. Photochemical reactions. Computer modeling of wastewater discharges. Prerequisite: CE graduate standing.

739. **Sediment Sources and Controls.** Theory of erosion and sediment transport in urban areas; design of common erosion control. Fundamental practices. Prerequisite: CE 333.

740. **Biological Processes and Pollutant Impacts in Water.** Biological monitoring, pollutant effects on aquatic ecosystems, biological effects on pollutant behavior. Computer modeling of effects of streams. Field assignments. Saturday laboratories to supplement lectures. Prerequisite: Graduate standing. 4 hours.

741. **Engineering and Water Resources Seminar.** Current topics and research in environmental engineering.

782. **Unit Processes in Water and Wastewater Treatment.** Water and wastewater characteristics and how they affect treatment processes. Grit removal, filtration, clarification, dissolved air flotation, gas transfer, disinfection, water softening, ion exchange, activated sludge, dewatering, and sludge disposal. Growth kinetics of microorganisms and photosynthetic processes. Prerequisite: CE 335.

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, and sludge treatment processes. Prerequisite: CE 682.

786. **Engineering Hydrogeology.** Ground water movement, natural quality, contamination and restoration. Well hydraulics and flow net analysis. Well hydraulics and flow net analysis. Physical and chemical properties of ground water. Prevention of ground water contamination. Prerequisite: CE 333.

787. **Stormwater Detention Pond Design.** Design of detention ponds for stormwater management. Water quality and hydrology concepts. Prerequisite: CE 333.

Structural Engineering and Structural Mechanics

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 420.

620. **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 and CE 221.

626. **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.

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.

656. **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.

660. **Structural Mechanics.** Elastic beam deflections, beam columns, lateral torsional buckling, column stability, plastic design, plate bending, yield line theory. Prerequisite: CE 360.

661. **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.

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 461 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.

667. **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.

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 620.

720. **Advanced Mechanics.** Variation of stress at point determination of principal and maximum shear stresses. Basic problems involving symmetrical deformation thickwall cylinders, spheres, and rotating disk. Torsions of noncircular sections. Curved beams. Theories of failure. Unsymmetrical bending and shear center. Prerequisite: CE 220.

726. **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; elimination of stresses in soil masses; lateral resistance of piles and pile group; retaining walls, sheetpiles and coffer-dams. Prerequisite: CE 332.

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.

756. **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.

760. **Structural Mechanics.** Elastic beam deflections, beam columns, lateral torsional buckling, column stability, plastic design, plate bending, yield line theory. Prerequisite: CE 360.

761. **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

763. **Finite Element Methods.** Theory and applications in structural mechanics. Plane stress, plane strain, axisymmetric problems, solids, plates, shells, nonlinear systems. Prerequisite: CE 461 or CE 661.

764. **Structural Dynamics.** Dynamic analysis of single and multiple degree-of-freedom systems. Approximate design methods. Matrix methods of solution emphasizing

ing earthquake design. Prerequisites: CE 215 and CE 360.

767. **Wind and Seismic Loads.** Methods for calculating loads on structures due to extreme winds and earthquakes. Calculation of wind loads on various types of structures according to theory and codes. Determination of earthquake loads on structural using structural dynamics and codes. Prerequisite: CE 360.

768. **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.

Transportation, Materials, and Supporting Courses

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.

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.

649. **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; ways to liability.

657. **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.

658. **Engineering Management.** Management techniques for the practicing engineer.

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.

793. **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.

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, 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: *Vaughn*

Faculty

David A. Conner, P.E., Professor (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, P.E., Professor Emeritus (Electrical and Computer Engineering); Electric Power Systems

Thomas C. Jannett, Professor (Electrical and Computer Engineering); Modern Control Systems, Biomedical Instrumentation, Industrial Controls

James R. Jones, P.E., Associate Professor (Electrical and Computer Engineering); Commercial/Industrial and Utility Power Systems

Warren T. Jones, P.E., Professor (Computer and Information Sciences); Neural Networks, Knowledge-Based Systems, and Information Filtering

Stan A. McClellan, Associate Professor (Electrical and Computer Engineering); Communications, Digital Signal Processing

Dennis G. Smith, Associate Professor (Electrical and Computer Engineering); Computer Systems, Computer Graphics, Neural Networks, Digital Controls

Murat M. Tanik, Professor (Electrical and Computer Engineering); Software Systems Engineering, Integrated Systems Design, Process Engineering

Gregg L. Vaughn, P.E., 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 (on a 4.0 scale) or better grade point average 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 work¹; and
4. An acceptable score on the GRE General Test and the TOEFL, if applicable.⁹

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 design thesis developed through registration for at least nine semester hours of EE 699.

⁹ Verification of registration by examination as a Professional Engineer (P.E.) will satisfy Admission Criteria 3 and 4.

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 an independent design project developed through registration for at least 3 semester hours of EE 691; and
5. Successful completion of an examination on the design 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 (on a 4.0 scale) or better grade point average 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, distributed as follows:

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.

Contact

For detailed information, contact UAB Department of Electrical and Computer Engineering.

Telephone 205-934-8440

Email ecewebc@eng.uab.edu

Web www.eng.uab.edu

Course Descriptions

Unless otherwise noted, all courses are for 3 semester hours of credit.

Electrical and Computer Engineering (EE)

511. **Facilities Engineering.** General engineering project planning, applying codes and standards, prelim-

inary design, economic forecasting, environmental planning and reports, site selection, population displacement, cash flow, specifications and plans. Prerequisite: Permission of instructor.

527. **Industrial Control.** Power control devices and applications. Relay logic and translation to other forms. Analog and digital computers. Programmable logic controllers. Proportional-integral-derivative (PID) control techniques. Modern laboratory instrumentation and man-machine interface software. 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. Applications include signal conditioning for instrumentation, instrumentation amplifiers, nonlinear and computational circuits, Butterworth and Chebyshev filter design, power amplifier design, voltage regulator design, and oscillators. A-to-D and D-to-A conversion methods. Laboratory exercises emphasizing design techniques. Prerequisite: EE 316 and 351.

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 331.

538. **Intermediate Microcomputers.** Intermediate topics in data acquisition, control, real-time I/O and signal processing. Introduction to digital signal processors. Lecture and laboratory. Prerequisite: EE 337.

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, distributed control systems, factory automation, man-machine interface software and hardware, intelligent control, real-time systems, database applications and distributed computing. 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 333 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.** Basics of semiconductor physics and switching behavior of bipolar and MOS transistors. Properties of CMOS, TTL, and ECL logic families. Semiconductor memory. IC fabrication. State machine and large-scale project techniques. Manual layout of small ICs using LSI Edit. Laboratory involves measuring device characteristics and designing and implementing several types of sequential circuits. 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. SPICE simulation of digital integrated circuits. Projects involve designing complex integrated circuits using modern DA tools. Prerequisites: EE 210.

558. **Medical Instrumentation.** Fundamental operating principles, applications and design of electronic instrumentation used in measurement of physiological parameters. Class design project. Prerequisite: EE 351.

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 system 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 generators, transformers, and transmission lines for system studies. Introduction to symmetrical components. Calculation of short-circuit currents due to balanced and unbalanced faults. Determination of interrupting ratings of circuit breakers. Transient stability of power systems. Derivation of swing equation and solution by numerical method. Equal area criterion. Power system design project required. 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.

586. **Technical Entrepreneurship I.** The first course of a two-course sequence. It includes lectures on entrepreneurship, intrapreneurship, strategic planning, finance, marketing, sales, operations, research and development, manufacturing, and management of technology-based companies. Management teams are formed, and ventures are selected. These ventures are simulated over an extended period of time. Extensive student presentations and reports are required. Prerequisite: Permission of instructor.

587. **Technical Entrepreneurship II.** The second course of a two-course sequence (continuation of EE 586). It includes lectures on entrepreneurship, intrapreneurship, strategic planning, finance, marketing, sales, operations, research and development, manufacturing, and management of technology-based companies. Management teams are formed, and ventures are selected. These ventures are simulated over an extended period of time. Extensive student presentations and reports are required. Prerequisite: EE 586.

590. **Special Topics in (Area).** Prerequisite: Permission of instructor. 1-6 hours.

591. **Special Problems in (Area).** Prerequisite: Permission of instructor. 1-6 hours.

595. **Integrated System Design.** Successful completion and oral defense of a team design project developed through registration of at least 6 semester hours. Prerequisite: Permission of instructor.

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 MSEE degree. 1-3 hours.

610. **Technical Communication for Engineers.** A workshop-oriented course providing students with the opportunity to produce technical memoranda, a proposal, and a conference and/or refereed-journal paper and to make oral presentations related to these work prod-

ucts utilizing appropriate software presentation aids. Lecture and laboratory. Prerequisite: Graduate standing in Engineering and successful performance on a written pretest.

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.

623. **Digital Signal Processing.** Digital filter analysis and design, Fourier transform, digital filter structures, IIR filter design, FIR filter design, fast Fourier transform, and FFT algorithms. Prerequisite: EE 421.

624. **Digital Communications.** Design of digital communications systems. Prerequisites: EE 621 and 622.

625. **Coding for Digital Communications.** Channel models and block codes, block code ensemble performance analysis, convolutional codes and ensemble performance, sequential decoding of convolutional codes. Prerequisite: EE 624.

626. **Digital Image Processing.** Digital image processing fundamentals, image transformations, image enhancement, image restoration, image compression, image segmentation, and image presentation. Prerequisite: EE 623.

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 fundamentals. Layered network model and correspondence to real systems. Discussion of Ethernet, token ring, TCP/IP, LAN, and other protocols. Exploration of the Internet and similar systems. Network application models. Simulation of networks. Prerequisites: EE 337.

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 632 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 and 426 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 Theory.** State variable models for discrete-time systems. Sampled-data systems. State feedback and pole placement. State estimation. Prerequisite: EE 426 or permission of instructor.
642. **Optimal Control.** Optimal control and optimal state estimation. Predictive control. Multivariable control. Prerequisite: EE 641.
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. Provides state-of-the-art practical experience in proposal development and software design. Develops integrated skills drawing experience from computer engineering, computer science, communication, systems engineering, and problem solving. Lecture and laboratory.
651. **Software Engineering Large Systems, I.** Introduces advanced integrated software systems development paradigms. Notions of process and integrated systems are extensively covered. Modeling-in-the-large and modeling-in-the-small are discussed and related to levels in Object Oriented Design and Programming. Lecture and laboratory. Prerequisite: EE 650/750 or consent of instructor.
652. **Software Engineering Large Systems, II.** Builds on the advanced integrated software systems development paradigms covered in EE 651/751. Components are introduced as elements of large system implementations. In the context of a design taxonomy, advanced object-oriented design and development techniques are reviewed. Lecture and laboratory. Prerequisites: EE 650/750 and EE 651/751 or consent of instructor.
653. **Electronic Power Switching Circuits.** Power semiconductor devices. Switching circuit analysis, AC voltage controllers, controlled rectifiers, DC-to-DC converters, inverters, and cyclo-converters. Prerequisites: EE 351 and permission of instructor.
654. **Advanced Electronics With Industrial Applications.** Phase-lock loops, servos ICs, programmable filters, linear power devices, and implications of various construction practices. Laboratory experiments. Prerequisite: EE 351.
656. **Introduction to Automation and Robotics.** Automation mechanisms examined from geometrical, component, control, and application viewpoints. Individual term project with oral report required. Prerequisite: EE 472 or 572.
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.
681. **Formulating Large System Designs.** Defining requirements, design concepts, and preliminary designs for very large systems. Prerequisite: Permission of instructor.
682. **Multivariable Systems.** Analysis and design of multiple-output, multiple-input control systems. Prerequisite: Permission of instructor.
683. **Complex Frequency Techniques in Process Control.** S-plane techniques; characterization of processes; design of controllers. Prerequisite: Permission of instructor.
690. **Special Topics in (Area).** Prerequisite: Permission of instructor. 1-6 hours.
691. **Special Problems in (Area).** Prerequisite: Permission of instructor. 1-6 hours.
698. **Nonthesis Research.** 1-6 hours.
699. **Thesis Research.** Prerequisite: Admission to candidacy. 1-6 hours.
701. **Electrical Engineering Seminar.** 1 hour.
724. **Digital Communications.** Design of digital communication systems. Prerequisites: EE 621 and 622.
725. **Coding for Digital Communications.** Channel models and block codes; block code ensemble performance analysis; convolutional codes and ensemble performance; sequential decoding of convolutional codes. Prerequisite: EE 624 or 724.
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.
732. **Introduction to Computer Networking.** Computer network fundamentals. Seven-layer OSI model and correspondence to real systems. Discussion of Ethernet, token ring, TCP/IP, LAN and other protocols. Exploration of the Internet and similar systems. Network application models. Simulation of networks. Prerequisites: EE 337.
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 632 or 732 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 and 426 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. **Optimal Control.** Optimal control and optimal state estimation. Predictive control. Multivariable control. Prerequisite: EE 641 or 741.
743. **System Identification and Adaptive Control.** Modeling of systems using structure identification, pa-

parameter estimation, and model validation. Controller design based on input-output models. Parameter adaptive control. Prerequisite: Permission of instructor.

746. **Batch Control.** Theory, analysis, and synthesis of batch processing control systems. Prerequisite: Permission of instructor.

747. **Distributed Control Systems.** Application of distributed control to process, integration, and operator interfaces. Prerequisite: Permission of instructor.

748. **Process Analyzers.** Automated analytical techniques for identifying chemical process streams. Prerequisite: Permission of instructor.

750. **Software Engineering.** Introduces classical software lifecycles and software development paradigms. Provides state-of-the-art practical experience in proposal development and software design. Develops integrated skills drawing experience from computer engineering, computer science, communication, systems engineering, and problem solving. Lecture and laboratory.

751. **Software Engineering Large Systems, I.** Introduces advanced integrated software systems development paradigms. Notions of process and integrated system views are extensively covered. Modeling-in-the-large and modeling-in-the-small are discussed and related to levels in object-oriented design and programming. Lecture and laboratory. Prerequisite: EE 650 or 750, or permission of instructor.

752. **Software Engineering Large Systems, II.** Builds on the advanced integrated software systems development paradigms covered in EE 651/751. Components are introduced as elements of large system implementations. In the context of a design taxonomy, advanced object-oriented design and development techniques are reviewed. Lecture and laboratory. Prerequisite: 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.

781. **Formulating Large System Designs.** Defining requirements, design concepts, and preliminary designs for very large systems. Prerequisite: Permission of instructor.

782. **Multivariable Systems.** Analysis and design of multiple-output, multiple-input control systems. Prerequisite: Permission of instructor.

783. **Complex Frequency Techniques in Process Control.** S-plane techniques; characterization of processes; design of controllers. Prerequisite: Permission of instructor.

790. **Special Topics in (Area).** 1-6 hours.

791. **Individual Study in (Area).** 1-6 hours.

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

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

Engineering, Materials (Ph.D., M.S.Mt.E.)

Graduate Program Director: *Janowski*

Faculty

Rigoberto Advincula, Assistant Professor (Chemistry); Synthesis, Fabrication and Characterization of Ultrathin Films

J. Barry Andrews, Professor (Materials and Mechanical Engineering); Solidification, Microgravity Processing, Physical Metallurgy, Intermetallic Materials, Electronic Properties

Charles E. Bates, Research Professor (Materials and Mechanical Engineering); Casting and Solidification

Processes of Iron and Steel, Machinability, Environment

Krishan K. Chawla, Professor (Materials and Mechanical Engineering); Metal, Ceramic, and Polymer Matrix Composite Materials; Fibers, Interfacial Phenomena

Zoe E.B. Dwyer, Lecturer (Materials and Mechanical Engineering); Metal Casting and Defects, Physical Metallurgy, Thermodynamics

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

Robin D. Griffin, Research Assistant Professor (Materials and Mechanical Engineering); Electron Microscopy, Physical Metallurgy

Gregg M. Janowski, Associate Professor (Materials and Mechanical Engineering); Electron Microscopy, Metal Matrix Composites, Physical Metallurgy, Structure-Processing-Property Relationships

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

Babak Minaie, Associate Professor (Materials and Mechanical Engineering); Casting, Integrated Process and Product Development, Computational Fluid Dynamics

Jimmy W. Mays, Professor (Chemistry); Polymer Synthesis, Dilute Solution Properties, Compatibility

Burton R. Patterson, Professor (Materials and Mechanical Engineering); Powder Processing, Physical Metallurgy, Quantitative Microscopy

E. Douglas Rigney, Academic Associate Professor (Biomedical Engineering); Corrosion, Biomaterials, Metal, Ceramic Interfaces, Surface Modification, Wear

Rosalia N. Scripa, Professor (Materials and Mechanical Engineering); Ceramics and Glass, Extractive Metallurgy, Semiconductor Crystal Growth, Electronic-Magnetic Materials

David L. Shealy, Professor (Physics); X-ray Telescopes, Microscopes and Lithography; Optics, Free Electron Lasers, Microelectronic Packaging Materials

Raymond G. Thompson, Research Professor (Materials and Mechanical 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 Acoff, Associate Professor (Metallurgical and Materials Engineering); Physical Metallurgy, High Temperature Materials, Electron Microscopy, Welding

John A. Barnard, MINT Professor (Metallurgical and Materials Engineering); Surface Science, Interfacial Phenomena, Auger Spectroscopy, Phase Transformation

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

Program Information

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 (on a 4.0 scale) 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 Test of English as a Foreign Language (TOEFL) and 3.5 on the Test of Written English (TWE).

Verification of registration by examination as a Professional Engineer (P.E.) will satisfy the GPA and GRE requirements. Consideration will be given by the program director for waiving the GPA and GRE requirements for candidates with exceptional levels of professional experience and accomplishments.

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 masters students must take MSE 601-Materials Science and Engineering Seminar every quarter.

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 engineering 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 engineering 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. The comprehensive examination option should be selected by the student (in consultation with the advisor and graduate committee) as early as possible.

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 658-Engineering Management, EE 685-Engineering Operations, EGR 686-Technical Entrepreneurship I, EGR
- 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. The comprehensive examination option should be selected by the student (in consultation with the advisor and graduate committee) as early as possible.

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 a 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 quarter.

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 comprehensive examination on 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 exempt. 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 253 Materials Engineering I
MSE 254 Materials Engineering II
MSE 263 Instrumentation and Testing
MSE 363 Characterization of Materials
MSE 380 Thermodynamics of Materials
MSE 381 Physical Metallurgy
MSE 382 Mechanical Behavior of Materials.

Contact

*For detailed information, contact Dr. Gregg M. Janowski, Graduate Program Director, UAB Department of Materials and Mechanical Engineering, BEC 254, 1530 3rd Avenue South, Birmingham, AL 35294-4461. Telephone 205-8450
Email mmeuab@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)

513. **Composite Materials.** Processing, structure, and properties of metal-, ceramic-, and polymer-matrix composite materials. Emphasis on roles of interfacial-bond strength, reinforcement type and orientation, and matrix selection in physical and mechanical properties of composite materials. Prerequisite: MSE 254.

523. **Corrosion.** Principles and theories of metallic corrosion and methods of prevention. Lecture and laboratory. Prerequisite: MSE 254.

530. **Polymeric Materials.** (Also CH 480.) Processing methods, structure/ engineering property relationships, and applications of polymeric materials. Lecture and laboratory. Prerequisite: MSE 254.

543. **Metals Casting and Welding.** Basic theory, practice, and applications of metal casting and welding, lecture and laboratory. Prerequisite: MSE 254 or permission of instructor.

557. **Powder Processing of Materials.** Principles and practice of powder processing; powder production and characterization, blending, compaction, sintering, testing, and part design. Lecture and laboratory. Prerequisite: MSE 254 or permission of instructor.

561. **Non-Ferrous Metallurgy.** Microstructure, properties, selection, heat treatment, and processing of non-ferrous materials. Special emphasis on novel alloys and production technologies, such as rapid solidification. Lecture and laboratory. Prerequisite: MSE 254 or permission of instructor.

562. **Ferrous Metallurgy.** Microstructure, properties, selection, heat treatment, and processing of iron-based materials. Lecture and laboratory. Prerequisite: MSE 254 or permission of instructor. 3 hours, .

563. **Surface Engineering.** Basic surface engineering technologies and applications. Specific topics include laser processing, physical and chemical vapor deposition, and surface microstructure-processing-property relationships. Lecture and laboratory. Prerequisite: MSE 254.

572. **Processing and Properties of Glasses and Ceramics.** Mechanical, optical, and thermal properties of ceramics and glasses and the effect of structure and processing on these properties. State-of-art processing techniques for ceramics, glasses, and composite materials. Chemical, micromorphological, and transformation-based processing. Lecture and laboratory. Prerequisite: MSE 383.

583. **Electronic and Magnetic Properties of Materials.** Mechanisms behind rectifying junctions, transistors, paramagnetism, diamagnetism, and ferromagnetism. Prerequisite: MSE 253 or permission of instructor.

601. **Materials Science and Engineering Seminar.** Required of all full-time graduate 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: MSE 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 703, 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 715 or permission of instructor.

617. **Kinetics.** Transformation rate theory associated with diffusional transformations will be addressed. The physical phenomena involved and appropriate numerical and analytical techniques to describe the phenomena will be studied. Prerequisite: MSE 616 or 716, 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 715, 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.

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 743, or permission of instructor.

647. **Advanced Corrosion.** Electrochemical techniques for corrosion evaluation. Mechanisms of uniform and localized corrosion. Oxidation theory and preventive methods. Prerequisites: MSE 380 and 423 or 523, 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.

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. 1-6 hours.

699. **Thesis Research.** Prerequisite: Admission to candidacy and permission of mentor. 1-6 hours.

701. **Materials Science and Engineering.** Required of all full-time graduate 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 will be addressed. The physical phenomena involved and appropriate numerical and analytical techniques to describe the phenomena will be studied. 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.

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: MSE363 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: MSE643 or 743, or permission of instructor.

747. **Advanced Corrosion.** Electrochemical techniques for corrosion evaluation. Mechanisms of uniform and localized corrosion. Oxidation theory and preventive methods. Prerequisites: MSE380 and 423 or 523, 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.

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. 1-6 hours.

799. **Dissertation Research.** Prerequisite: Admission to candidacy and permission of mentor. 1-6 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: *Baker*

Faculty

John Baker, Assistant Professor (Materials and Mechanical Engineering); Combustion, Transport Phenomena

Heng Ban, Associate Professor (Materials and Mechanical Engineering); Pollution Control, Combustion, Thermal-fluid Science

Charles Bates, Research Professor (Materials and Mechanical Engineering); Casting and Solidification Processes

Martin Crawford, Professor Emeritus (Materials and Mechanical Engineering); Heat Transfer, Fluid Mechanics, Thermodynamics, Air Pollution Control

Evangelos Eleftheriou, Research Assistant Professor (Materials and 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

Babak Minaie, Associate Professor (Materials and Mechanical Engineering); Heat Transfer, Computational Fluids and Heat Transfer

B. J. Stephens, Associate Professor (Materials and Mechanical Engineering); Mechanical Systems, Machine Design, Vibration Control, Advanced Stress Analysis

Thomas F. Talbot, Professor Emeritus (Materials and Mechanical Engineering); Mechanical Systems, Metallurgical Failure Analysis, Manufacturing Processes

Program Information

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:

1. Not less than B-level scholarship overall or over the last 60 semester hours of earned credit; and
2. 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 on the TOEFL is required. Other standardized examination scores will also be considered.

Verification of registration by examination as a Professional Engineer (P.E.) will satisfy the GPA and GRE requirements.

A student not meeting these requirements may also be admitted, perhaps on probationary status, if the student presents other information indicating likely success in the program.

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)
 - Nine semester hours in the following required courses: ME 565, Computer Methods in Mechanical Engineering; ME 650, Transport Phenomena; ME 670, Advanced Mechanical Design;
 - Three semester hours in approved mathematics courses;
 - A minimum of 9 semester hours in mechanical engineering or approved related courses at the 500 or 600 level; and
 - Three semester hours in an approved mathematics or engineering course.
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 benefit.

1. The student must successfully complete at least 33 semester hours of coursework, including
 - Nine semester hours in the following required courses: ME 565, Computer Methods in Mechanical Engineering; ME 650, Transport Phenomena; ME 670, Advanced Mechanical Design;
 - A minimum of 18 semester hours of mechanical engineering or approved related courses at the 500 or 600 level (the 18 hours must include at least 3 semester hours of ME 698, Nonthesis Research, involving design or research); Three semester hours in approved mathematics or the physical sciences.
 - Three semester hours in an approved mathematics or engineering course.
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

- Nine semester hours in the following required courses: ME 565, Computer Methods in Mechanical Engineering; ME 650, Transport Phenomena; 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 631, Administrative Theory and Practice;
- Three semester hours in a nonthesis design project.
- Nine semester hours of engineering-oriented management coursework. Approved courses include CE 658, Engineering Management; EE 685, Engineering Operations; EGR 686, Technical Entrepreneurship I; EGR 687, Technical Entrepreneurship II; and ME 601, Design Measurement and Enhancement of Work Systems.
- Three semester hours in an approved mathematics or engineering 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.

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 311 Introductory Fluid Mechanics
- ME 351 Introductory Heat Transfer
- ME 370 Kinematics & Dynamics of Machinery
- ME 460 Instrumentation and Controls

ME 471 Mechanical Design I
CE 220 Mechanics of Solids

Contact

For detailed information, contact Dr. B. J. Stephens, Department of Materials and Mechanical Engineering, BEC 254, 1530 3rd Avenue South, Birmingham, Alabama 35294-4461.

Telephone 205-934-8450

Email bstephen@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 & Fixtures 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 for machining, die design, inspection, and gauging presented through lectures and projects. Prerequisite: Permission of instructor.

508. Metrology and Quality Control. Aspects of precision measurement, inspection and gaging, and design of experiments. Short lectures and experiments with modern-day quality control instrumentation.

514. Introduction to Computational Fluid Dynamics. Basic numerical analysis techniques; quasi-linearization, consistency, convergence, accuracy, and Von Neumann error analysis.

515. Compressible Fluid Flow. Application of thermodynamics and fluid mechanics to perfect gas flow. Prerequisites: ME 241 and 311.

520. Fluid Measurements. Theory and techniques for measurement of static and dynamic fluid and flow properties. Prerequisite: ME 312.

521. Fluid Machinery. Fluid mechanics of fluid machinery such as turbines, pumps, compressors, fans, blowers, and gas turbine engines. Prerequisite: ME 311.

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 451 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: 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 311 and 351.

564. Introduction to Finite Element Method. Concepts and applications of the finite element method. Development and applications of basic finite elements. Software use.

565. Computer Methods in Mechanical Engineering. Applications of digital computers to solution of problems in mechanical engineering. Prerequisite: Permission of instructor.

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.

576. Failure Analysis. Failure mechanism; service failures and methods employed to prevent failures. Prerequisites: MSE 254, 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 perfor-

mance. 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.

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. **Dynamics of Rotor Bearing Dynamics.** Rigid and nonrigid models; coupled motion between rotating and stationary structures. Prerequisite: ME 370 and 571, 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 solutions. 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.** 1-6 hours.

699. **Master's Thesis Research.** Prerequisite: Admission to candidacy. 1-6 hours.

English (M.A.)

Graduate Program Director: *Grimes*

Faculty

Rebecca A. Bach, Assistant 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

Robert J. Collins, Associate Professor (English); American Literature, Creative Writing

Dennis R. Covington, 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, Assistant 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

Virgina Whatley Smith, Associate Professor (English); African American Literature, 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

Program Information

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 a course in a foreign language at a fourth-semester level or higher. 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.

I. 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 hrs in Bibliography & Methods, 3 hrs of linguistics, 6 hrs of thesis work, 12 hrs of British/American literature, and 6 hrs of electives. They must take at least 6 hrs in Group I and 6 hrs in Group II.

2. 15 hours of course work must be at the 600 seminar level in English. In most cases, 6 of these required 15 hours will 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 hrs 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 hrs in Bibliography & Methods, 3 hrs of linguistics, 12 hrs of British/American literature, and 12 hrs 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 three 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 sixth week of each quarter. Unless a single area test remains to be taken, students should arrange to take at least two area tests during the same quarter.

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.

II. CONCENTRATION IN COMPOSITION/RHETORIC

Plan I.

1. Students who write a thesis must take 3 hrs in Bibliography & Methods of Research, 3 hrs of linguistics, 9 hrs of literature electives, 6 hrs of thesis research, 3 hrs of rhetorical theory, and 6 additional hrs of courses in

the areas of Rhetorical Theory, Composition Pedagogy, or Professional Writing (total of 30 hrs).

2. 15 hours of course work must be at the 600 seminar level in English. In most cases, 6 of these required 15 hours will 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 hrs 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 hrs in Bibliography & Methods of Research, 3 hrs of linguistics, 9 hrs of literature electives, 3 hrs of rhetorical theory, and 12 additional hrs of courses in the areas of Rhetorical Theory, Composition Pedagogy, or Professional Writing (total of 30 hrs).

2. Guidelines 2-12 under Concentration in Literature, Plan II, apply to these students.

III. 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. In most cases, 6 of these required 15 hours will 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 hrs of course work, including at least 3 hrs 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.

Class A Teaching Certificate

Under the Alabama State Department of Education's "Strengthened Subject Option," students who complete requirements for the M.A. program in English 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.

Contact

For detailed information, contact Dr. Kyle Grimes, UAB English Graduate Program Director, HB 207-F, 1530 3rd Avenue South, Birmingham, AL 35294-1260.

Telephone 205-934-8580

Email kgrimes@uab.edu

Web www.uab.edu/english

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)

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, Hebrew, 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 quarterly 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 quarterly 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 quarter preceding the quarter 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.**

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, listserv, 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 quarterly 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 quarterly 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 indu-

trialism, 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: *Forman*

Faculty

H. Kenneth Dillon, Associate Professor (Environmental Health Sciences); Industrial Hygiene, Environmental Chemistry

Henry Jay Forman, (Environmental Health Sciences); Exposure to Environmental Pollutants, Oxidants Produced by Drug Metabolism, Reactive Oxygen Species, and Signal Transduction

Brian G. Forrester, Assistant Professor (Family Medicine); Occupational Medicine

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

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

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 prepares scientists for careers in research, environmental program management, and policy analysis. Education and research in the identification, evaluation, and control of hazards to human health are emphasized in this program. Students may concentrate on a wide variety of areas including exposure assessment, environmental chemistry, non-point-source water pollution, risk assessment and management, environmental toxicology, and industrial hygiene. 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 on DNA, risk assessment, biological methods for treating hazardous wastes, biological monitoring tools for assessing chemical exposures, dermal absorption of chemicals, non-point-source water pollution modeling and control, application of geographic information systems, analysis and evaluation of airborne microbes and associated respiratory diseases, aerosol behavior, biological effects of radiation, innovative methods for monitoring airborne chemicals, novel approaches to assessing exposures of general or occupational populations to chemical hazards, bioconcentration of chemicals in humans, and controlling exposures to environmental stressors.

Admission

Applicants should meet or exceed the requirements for admission to a doctoral degree program set by the Graduate School. In addition, applicants should have completed a minimum of a one-year sequence in biology; organic, inorganic, and physical chemistry; and physics requiring calculus. Students with previous environmental experience are particularly encouraged to apply.

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 an advanced, computer-based statistics course, ENH 711(Risk Assessment of Environmental Hazards), and either EPI 616 (Environmental Epidemiology) or EPI 617 (Occupational Epidemiology). Other courses prepa-

ratory to dissertation research will be determined by the student in consultation with his or her academic advisors. In addition, those students who do not have a master's degree in an appropriate area of environmental health must meet the department's course requirements for the M.S.P.H. in environmental health and toxicology or industrial hygiene, depending upon the focus of the Ph.D. dissertation research.

Contact

For detailed information, contact Ms. Cherie Hunt, 1665 University Boulevard, University of Alabama at Birmingham, School of Public Health, Birmingham, Alabama 35294-0022 .

Telephone 205-934-8488

Email ehs@crl.soph.uab.edu

Web main.uab.edu/show.asp?durki=5163

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. Following 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.

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. Genetic Toxicology of Environmental Agents. In-depth study of activation-detoxication reactions (cytochromes P-450, carcinogen DNA/RNA/protein adducts, molecular dosimetry); mechanisms of promotion, progression, gene expression, tumorigenesis and malignancy, and chemoprevention. Instruction and practice in grant writing. Prerequisites: Biochemistry and ENH 750 or permission of instructor. (Rahn)

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. 3 hours (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 anatomic, 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)

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 Lab Rotation. (Roy)

798. Doctoral-Level Directed Research. Prerequisite: Permission of Graduate Director. 1-6 hours.

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

Epidemiology (Ph.D.)

Graduate Program Director: *Roseman*

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

David Brown, Assistant Professor (Epidemiology); Occupational Epidemiology, Cancer Epidemiology, Epidemiologic Methods, Molecular Epidemiology; Biomarkers

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

Maurizio Macaluso, Professor (Epidemiology) Infectious Disease Epidemiology, Cancer Epidemiology, Reproductive Epidemiology

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 (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); Infectious Disease Epidemiology, Cancer 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 will be required.

Contact

For detailed information, contact Dr. Jeffrey Roseman, Department of Epidemiology and International Health UAB School of Public Health, Ryals Building, Room 230M, 1665 University Boulevard, Birmingham, AL 35294-0022.

Telephone 205-934-7132

Fax 205-934-8665

Email bush@uab.edu

Web www.epi.soph.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 Diseases. Epidemiologic issues and controversies involved in chronic diseases other than cancer and cardi-

ovascular disease (i.e., rheumatic, psychiatric, and neurologic disease). Framework to approach epidemiology of these diseases and their control; application of basic epidemiologic methods to different chronic diseases.

709. Theoretical Basis of Epidemiology. Review of statistical concepts, epidemiologic studies; simple analytic applications, confounding, stratified analyses, statistical power, standardized mortality ratios, proportional mortality ratios, principles of matched study designs; introduction to logistic regression. Prerequisite: EPI 625.

710. Analysis of Case Control Studies. Provides doctoral students with an advanced understanding of the principles that govern the analysis and interpretation of epidemiologic data and with competence in the use of state-of-the-art analytical techniques.

711. Nosocomial Disease Control Practicum. Exposure to and involvement in hospital infection control. Students assigned to infection control practitioner in University Hospital. Project required. Prerequisite: Permission of instructor.

712. Infectious Disease Epidemiology Practicum. Onsite exposure to epidemiology as applied in health department setting. Classes held at Jefferson County Health Department. Emphasis on infectious disease control; includes direct participation in ongoing control activities. Prerequisite: Permission of instructor. 2 hours.

713. Risk Assessment of Environmental Hazards. An advanced course that uses all of the concepts of epidemiology, toxicology, and environmental health sciences to accomplish a risk assessment. 3 hours

720. Analysis of Follow-up Studies. Designed to provide doctoral students in epidemiology with practical experience in the analysis and interpretation of data from follow-up studies. Specific aims are: To outline a strategy for data analysis and review relevant methodological issues and to apply stratified analysis methods and regression models in the study of diseases of multifactorial etiology. Prerequisites: EPI 710. 3 hours.

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.

740. Cancer Epidemiology.

750. **Issues in Control of Chronic Diseases.** Disease control by prevention, early detection, and improved 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. Efficient and practical means to control chronic disease in today's society. Prerequisite: Permission of instructor. 2 hours.

781. **Special Topics in Epidemiology.** Topics include advanced infectious diseases, epidemiologic methods, and clinical trials practice. Prerequisite: Permission of the instructor.

788. **Principles and Methods in Molecular Epidemiology.** Provides students with both an understanding of molecular biology and its relevance to the epidemiology of human diseases, and the ability to apply this new molecular knowledge to epidemiologic research. Prerequisite: IH 605–Molecular Biology; for public health, or permission of instructor. 4 hours.

790. **Doctoral Seminar in Epidemiology.** In-depth study of several areas of epidemiologic methodology not covered in other courses. Students responsible for selecting and presenting topics. Considerable reading and outside preparation required. Prerequisite: Permission of instructor. 2 hours.

797. **Analysis and Presentation of Epidemiologic Data.** As preparation for the qualifying examination, the students are given data set with questions to answer. The students analyze the data and present the findings in a publishable quality manuscript. Each student meets individually with the instructor on a weekly basis. 2 hours. Prerequisites: EPI 625, and BST 655, EPI 710 recommended.

798. **Doctoral-Level Directed Research.** Individual study with guidance of appropriate public health faculty. 1-6 hours.

799. **Dissertation Research.** Research for dissertation under direction of dissertation committee. Prerequisite: Admission to candidacy. 1-6 hours.

Foreign Languages

Faculty

Serge Bokobza, Associate Professor (Foreign Languages); Nineteenth- and Twentieth-Century French Literature, Literature and Ideology, Civilization

William C. Carter, Professor (Foreign Languages); Nineteenth- and Twentieth-Century French Literature, French Novel, Proust

Mario Andre' Channler, Assistant Professor (Foreign Languages); Medieval and Golden Age Spanish Peninsular Literature; Hispano-Arabic Origins, Spanish Peninsular Literature in the African Diaspora

Catherine F. Danielou, Associate Professor (Foreign Languages); Sixteenth- and Seventeenth-Century French Literature, Gender Studies

Sheri Spaine Long, Associate Professor (Foreign Languages); Contemporary Spanish Peninsular Literature, Novel, Second Language Acquisition, and Teaching Methodology

Dellita L. Martin-Ogunsola, Professor (Foreign Languages); Contemporary Latin American Literature, Caribbean, Central American, and Afro-Latin American poetry and prose

Carlos L. Orihuela, Assistant Professor (Foreign Languages); Nineteenth- and Early Twentieth-Century Latin American Literature, Andean

Program Information

UAB does not currently offer a graduate degree in foreign languages. 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 under "Education (General Information)." Courses in foreign languages are listed below.

Contact

For detailed information, contact Dr. Dellita L. Martin-Ogunsola, Chair, UAB Department of Foreign Languages, HB407-A, 1530 3rd Avenue South, Birmingham, AL 35294-1260.

Telephone 205-934-4651

Email dellita@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.

French (FR)

506. **Advanced Grammar and Composition.** (continuation of FR 505).

512. **Civilization: Pre-Revolutionary.** French civilization from beginnings to French Revolution. First in two-course series on entire scope of French civilization.

513. **Civilization: Post-Revolutionary.** (continuation of FR 512). French civilization from Revolution to present.

521. **Phonetics.** Phonetic transcription and oral practice; phonetic difficulties; corrective exercises; practical use of basic phonetic principles.

522. **Advanced Conversation.** Vocabulary building and oral communication skills; oral presentations and extemporaneous discussions of assigned readings from the French press.

530. **Development of Modern French Theater.** Modern French theater from eighteenth-century drama bourgeois to contemporary theater absurd; analysis of representative plays; evolution of theater as genre.

540. **Modern French Poetry.** French poetry since Baudelaire's *Les Fleurs du Mal* (Verlaine, Rimbaud, Mallarme, Apollinaire, Prevert, and others).

550. **Topics in the French Novel.** Major aspects of French novel; representative authors.

699. **Directed Readings.** Supervised readings in selected areas.

German (GN)

699. **Directed Readings.** Supervised readings in selected areas.

Spanish (SPA)

504. **Phonetics.** Phonetics and phonemics. Spanish phonology, oral drills and phonetic transcription.

506. **Medieval Spanish Literature and the Picaresque.** Selected texts, including *Cantar de Mio Cid*, *La Celestina*, *Lazarillo de Tormes*, *Guzman de Alfarache*, and *Vida de Buscon*.

508. **Golden Age Poetry and Prose.** Representative poets, including Garcilaso de la Vega, Gongora, and Quevedo. Major prose writers, including Cervantes.

510. **Golden Age Drama.** Major dramatists of the period, including Lope de Vega, Tirso de Molina, and Calderon de la Barca.

515. **Spanish Romanticism.** Representative authors, including Espronceda, Larra, Duque de Rivas, Zorrilla, and Becquer.

520. **Spanish Realism and Naturalism.** Representative authors, including Galdos, Fernan Caballero, and Valera.

525. **Generation of 1898.** Themes, forms, and techniques of all genres. Writers include Unamuno, Baroja, Valle-Inclan, Azorin, and A. Machado.

530. **Generation of 1927.** Themes, forms, and techniques of all genres. Writers include Alexandre, Cernuda, Garcia Lorca, Salinas, and J. Guillen.

540. **Post-Civil War Spanish Novel.** Representative authors, including Cela, Delibes, Laforet, Martin-Santos, and Matute.

550. **Post-Civil War Spanish Theatre and Poetry.** Representative dramatists and poets, including Buero Vallejo, Sastre, Fuertes, and Brines.

560. **Traditional Latin American Novel.** Origins in late nineteenth century (Marmol, Isaacs, Matto de Turner) and early twentieth century (Giraldes, Rivera, Gallegos, and Azuela).

562. **Contemporary Latin American Novel.** Emphasizes novels of Latin American "Boom" (Fuentes, Cortazar, Garcia Marquez, Vargas Llosa, Carpentier, and Sabato).

564. **Latin American Short Story.** Emphasizes short fiction of Latin America in the nineteenth and twentieth centuries (romanticismo, realismo, naturalismo, criolismo, modern, and contemporary trends).

565. **Latin American Poetry.** Colonial period to the present, including baroco, neoclasicismo, romanticismo, modernismo, posmodernismo, vanguardismo, and posvanguardismo.

570. **Latin American Theatre.** Theatrical currents for the late nineteenth-century sainete to contemporary drama. Dramatists include Sanchez, Payro, Dragun, Marques, and Wolf.

571. **New Latin American Prose Fiction: 1970-Present.** Latest trends, including recent works by writers established before the 1970s (Vargas Llosa, Garcia Marquez, Fuentes) and younger "Post-Boom" writers (Allende, Skarmeta, Valenzuela, Soriano, Poniatowska).

572. **Afro-Hispanic Literature.** Representative authors of the Caribbean and northern Latin America, including Brindis de Salas, Duncan, N. Guillen, Blas Jimenez, Morejon, Ortiz, and Zapata Olivella.

573. **Literature of Revolution and Social Change.** Literature produced as a result of revolutions and social upheaval in twentieth-century Latin America, mainly in Argentina, Chile, Colombia, Cuba, and Mexico.

574. **Latin American Women Writers.** Representative women writers of Latin America from the colonial period to the present, with special emphasis on women's roles and the perception of gender in society. Authors include Sor Juana, Storni, Mistral, Burgos, Castellanos, Morejon, Cartagene Portolatin, Ferre, Valenzuela, and Vega.

575. **Literature and Cinema.** Books and films reflecting the depiction of the written work as visual concept. Works include Puig's *Beso de La Mujer Arana*, Borges's *El Muerto*, Valle-Inclan's *Divinas Palabras*, and Cela's *Pascual Duarte*.

*580. **Special Topics in Spanish Peninsular Literature.** Readings in particular authors, genres, and topics. May be repeated for credit with instructor's permission.

*581. **Special Topics in Latin American Literature.** Readings in particular authors, genres, and topics. May be repeated for credit with instructor's permission.

599. **Individual Studies.** Prerequisite: Permission of department chair.

699. **Directed Readings.**

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, Assistant 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.

Contact

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

Email rayliu@uab.edu

Course Listings

Unless otherwise noted, all courses are for 3 semester hours of credit. Course numbers preceded with an asterisk

risk indicate courses that can be repeated for credit, with stated stipulations.

Justice Science (JS)

JS 551. **Research Methods in Forensic Science.**

JS 571. **Molecular Genetics.**

JS 572. **Biology for Forensic Scientists.**

JS 573. **Advanced Recombinant DNA Technology.**

JS 650. **Advanced Questioned-Death Investigation.**

JS 652. **Advanced Questioned Document.**

JS 653. **Advanced Investigation of Fires and Explosives.**

JS 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. Fall.

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.** Continuation of 671.

673. **Forensic Drug Analysis.** Isolation, identification, and quantification of commonly abuse 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.**

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, John W. Hicks, Susan Jackson, Daniel D. Jones, Larry K. Krannich, Coral Lamartiniere, and Ray H. Liu.

Faculty: Ronald T. Acton, Microbiology; Robert A. Angus, Biology; 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, South Carolina, Psychiatry; Frederick P. Smith, Justice Sciences; Charles L. Turnbough, Jr., Microbiology; Jeffrey D. Wells, Justice Sciences; Bruce P. Wheatley, Anthropology.

Visiting and Adjunct Faculty: Jay M. Glass, Chief Deputy Coroner, Jefferson County; M.P.A., UAB, Death investigation. John W. Hicks, M.P.A., Southern California, Administration; evidence and procedure. 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, 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 Graduate Training Program in Forensic Science Doctoral Training Program. A decision is made based on the majority vote of members in the committee.

Curriculum and Funding

All students are required to take a total of 9 hours of forensic science (FS) courses during the first four 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 form their advisors by the end of the second and the third terms, respectively. Students who have not selected advisors by the end of the fourth 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 fifth term and continue funding until the completion of doctoral course work and dissertation research, generally for four years.

Contact

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

Email 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 I** (1). Winter.

774. **Biological Methods in Forensic Science** (1). [FS 704 Laboratory Rotation II (3)].^b Winter.

772. **Conventional Criminalistics II** (1). Spring.

775. **Law, Evidence, and Procedure** (1). Spring.

773. **Forensic Drug Analysis** (1). Summer. or [FS 703 Laboratory Rotation III (3)].^b Summer.

Other Courses

CH 750. **Advanced Analytical Chemistry I** (3). Fall.

CMB 700. **Cellular and Molecular Biology I:** Biochemistry (5). Fall.

CMB 701. **Cellular and Molecular Biology II:** Prokaryotic Genetics and Molecular Biology (5).^c Fall.

CMB 702. **Cellular and Molecular Biology III:** Eukaryotic Molecular Biology and Virology (5). Winter.

TOX 711. **Principles of Toxicology** (3). Winter.

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 Winter Term.

^b In addition to taking FS 700 Laboratory Rotation (1) during the first term, students are also required to take one (and one only) laboratory rotation course in each of the second, third, and fourth terms in the program. One of the latter laboratory rotation courses must be FS 703 or FS 704 offered in the second and fourth term, respectively.

^c This course starts following the completion of CMB 700 and ends in the Winter Term prior to the beginning of CMB 702.

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:** Cell and Developmental Biology (5)

CMB 704. **Cellular and Molecular Biology V:** 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 321. **Physical Chemistry I** (prerequisite)

CH 322. **Physical Chemistry II** (prerequisite)

CH 323. **Physical Chemistry III** (prerequisite)

CH 450. **Instrumental Analysis** (prerequisite)

CH 751. **Advanced Analytical Chemistry II** (3)

CH 756. **Analytical Separations** (3)

CH 757. **Analytical Spectroscopy** (3)

Department of Pharmacology and Toxicology

CH 321. **Physical Chemistry I** (prerequisite)

CH 322. **Physical Chemistry II** (prerequisite)

CH 323. **Physical Chemistry III** (prerequisite)

CH 450. **Instrumental Analysis** (prerequisite)

CMB 703. **Cellular and Molecular Biology IV:** Cell and Developmental Biology (5)

TOX 712. **Actions and Assessment of Toxicants** (3)

TOX 713. **Advanced Topics in Toxicology** (3)

TOX 795. **Advanced Toxicology Seminar** (1)

Gerontology

Director, Gerontology Education Program: *Baker*

Faculty

Patricia S. Baker; Assistant Professor (Sociology); Gerontology, Medical Sociology, Minority Aging

Karlene Ball, Professor (Psychology); Clinical Science/Patient-Oriented Research; Health Services Research; Mobility Impairment and Its Complications

Marcus Bamman; Assistant Professor (Education); Basic Biomedical Science Research; Musculoskeletal Disease; Atherosclerosis and Aging

R. Steven Daniels; Associate Professor (Government and Public Service); Elder Abuse

Linda W. Duke; Associate Professor (Psychology); Cognitive Psychology, Human Psychophysiology, Aging

Melissa Galvin; Assistant Professor (Health Behavior); Community-Based Interventions, Health Promotion

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

Penelope Paul; Associate Professor (School of Nursing); Nursing Care, Quality of Life of Older Adults

Richard M. Shewchuk; Associate Professor (Health Services Administration); Health and Long-Term Care Issues in Aging

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 sup-

plement 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 when courses are likely to be offered.

Contact

For detailed information, contact Dr. Patricia Baker, Director, UAB Gerontology Education Program, Center for Aging, Room 201-E1, 933 19th Street South, Birmingham, AL 35294-2041.

Telephone 205-934-4399

Email pbaker@uab.edu

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.

Course Listings

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.

593. **Educational Gerontology.** Assessment of educational methodologies and learning styles specific to the

geriatric consumer and/or patient. Also focuses on program planning for the elderly.

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.

603. **The Politics of Aging.** Analysis of the role of aging in the political process. Focuses on the political demands made by the elderly, the role of aging in political decision making, and policy outputs relevant to the older population.

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.

690, 790. **Independent Study in Gerontological Nursing.** Individually designed research agendas for students wishing to conduct semi-independent research or guided reading in gerontological nursing. Permission of instructor. 1 to 3 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.

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 poli-

cy; 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

Graduate Program Director: *Austin*

Faculty

Abney, Nancy G., English as a Second Language

Austin, Julia S., English as a Second Language, Faculty-Teacher Development, Technical Writing

Griner, J. Lee, Technical Writing

Lorden, Joan F., Faculty-Teacher 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.

Contact

For detailed information, contact Dr. Julia S. Austin, HUC 511, 1530 3rd Avenue South, Birmingham, Alabama 35294-1150.

Telephone 205-975-6539

Email jaustin@uab.edu

Web www.uab.edu/profdev

Course Listings

Graduate School (GRD)

Courses

700. **Oral Communication.** Improves listening and speaking skills of non-native English speakers in informal and academic settings. Fall. Pass/Fail.

701. **Professional Speaking.** Develops professional communication skills, including public speaking skills,

conversation management, register shifting, and overall comprehensibility. Videotaped presentations critiqued individually by instructor. Winter. 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. Spring, Pass/Fail. (Spring, international students; Summer, domestic students)

703. **Style and Grammar in Writing.** 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 quarter. 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 technology to enhance learning. Winter. Summer. 2 credit hours. Pass/Fail.

Workshops

706. **How to Obtain Funding.** 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. **Giving Professional Presentations.** 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. Winter. One-day workshop. 1 credit hour. Pass/Fail.

708. **Writing Professionally.** 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.

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. Fall. Winter. Summer. Two-day workshop. 1 credit hour. Pass/Fail.

710. **Career Development for Life Science Graduate Students.** Teaches the skills required for a successful job hunt inside or outside academe. Winter or Spring. One-day workshop. 1 credit hour. Pass/Fail.

717. **Principles of Scientific Integrity.** Surveys ethical issues and principles in the practice of science. Fall mini-term. 2 credit hours. Pass/Fail.

721-724. **ESL Language Course.** A language course for UAB second language graduate students, employees, postdoctoral fellows, and other interested persons. Offered each quarter. 3 credit hours.

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

Cynthia Carter Haddock, Professor (Health Services Administration); Organization Theory, Health Policy

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

L. Russell Jordan, Professor (Health Services Administration); Governing Boards, Medical Staff Relations

Stephen J. O'Connor, Associate Professor (Health Services Administration); Health Services Administration

Jose B. Quintana, Assistant Professor (Health Services Administration); Outcomes in Production of Health

Anthony W. Patterson, Instructor and Assistant Program Director (Health Services Administration); Health Services Administration

John E. Sheridan, L. R. Jordan Professor of Health Services Administration; Organizational Behavior

Richard M. Shewchuk, Associate 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, Ginter, Gainer, Grabowski, Ho, McGee, Moon, Morrissey, 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. A 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 15 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 ma-

triculation, students must have completed 6 semester credit hours of undergraduate accounting and 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 417, 1530 3rd Avenue South, Birmingham, Alabama 35294-3361. Telephone 205-934-1583

Email msha@uab.edu

Web www.hsa.uab.edu

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 27 graduate courses, including 3 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.

Contact

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

Email msha@uab.edu

Web www.hsa.uab.edu or

Graduate School of Management, BEC 203

1530 3rd Avenue South

Birmingham, Alabama 35294-4460

Telephone 205-934-8817

Email 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.

Contact

For detailed information, contact Stephen J. O'Connor, Director, Executive M.S.H.A. Program, UAB School of

Health Related Professions, Webb 524, 1530 3rd Avenue South, Birmingham, Alabama 35294-3361.
Telephone 205-934-1829
Email mshaexec@uab.edu
Web www.hsa.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.

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.

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.

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 research 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.

*690. **Administrative Residency.**

Health Informatics (M.S.H.I.)

Graduate Program Director: *Orthner*

Core Faculty

Eta S. Berner, Professor (Health Services Administration)

Jerome H. Carter, Assistant Professor (General and Internal Medicine)

J. Michael Hardin, Professor (Health Services Administration)

Helmuth F. Orthner, Professor (Health Services Administration)

Other Participating Faculty

Jim A. Chesney, Instructor (Health Informatics)

Darlene R. Green, Assistant Professor (Health Informatics)

Gary J. Grimes, Professor (Electrical and Computer Engineering)

Glenn G. Hammack, Associate Professor (Optometry)

S. Robert Hernandez (Health Services Administration)

Terrell W. Herzig, Instructor (Health Informatics)

Joan C. Hicks, Instructor (Health Informatics)

Tee H. Hiatt, Professor Emeritus (Health Services Administration)

Howard W. Houser, Professor (Health Services Administration)

Warren D. Jones, Professor (Computer and Information Sciences)

Stanley A. McClellan, Assistant Professor (Electrical and Computer Engineering)

Stephen A. Moser, Associate Professor (Pathology/Microbiology)

T. Scott Plutchak, Associate Professor (Health Informatics)

John E. Sheridan, L.R. Jordan Professor (Health Services Administration)

Richard M. Shewchuk, Associate Professor (Health Services Administration)

Thomas E. Terndrup, Professor (Emergency Medicine)

Michael R. Waldrum, Assistant Professor (Internal Medicine)

Norman W. Weissman, Professor (Health Services Administration)

Valeria M. Wilson, 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)

Charles M. Jones, Adjunct Instructor (Health Informatics)

Judy G. Ozbolt, Adjunct Professor (Health Informatics)

Susan Z. Pretnar, Adjunct Instructor (Health Informatics)

Harold H. Scott, Adjunct Professor (Health Informatics)

Program Information

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 beginning in September through June 30, preceding the expected date of enrollment for the next fall term. Applications received after June 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 grade point average (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 on file a final degree-granting transcript for each previous 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 Graduate Record Examination (GRE), the Graduate Management Admission Test (GMAT), or the Miller Analogies Test (MAT) are accepted for the HI Program. 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 *or* a score of 50 on the MAT 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.

Contact

For detailed information, contact Master of Science in Health Informatics Program, UAB School of Health Related Professions, Webb 532, 1530 3rd Avenue South, Birmingham, AL 35294-3361.

Telephone 205-934-3509

Fax 205-975-6608

Email: mshi@uab.edu

Course Descriptions

Note: The curriculum consists of fifteen (15) Core Courses, an Administrative Internship (or a Thesis Project or a Nonthesis Project) and four elective courses for 62 semester credit hours. Elective courses are identified by (E) at the end of the course title in the following course list.

Health Informatics (HI)

600. **Information Engineering I.** Requirements, concepts, methods, and tools in analyzing, modeling, and designing health information systems with emphasis on clinical systems. 3 hours. Prerequisites: Two undergraduate computer courses including visual programming.

601. **Health Information Engineering II.** Concepts of data modeling, data architectures, and data administration. Study of various models with application to current health information projects. 3 hours. Prerequisites: HI 600.

602. **Information Systems in Support of Patient Care.** Study of foundations of clinical decision-making and incorporation of information systems into clinician's work to support an enterprise wide health care delivery model. The computer-based medical record and the patient data repository are emphasized. 3 hours. Prerequisites: HI 640.

605. **Health Care Enterprise Data Communications.** Study of architecture of health care enterprise information systems. Case study and assessment of functionality of several prominent models. Includes distributed systems, telephony networks, and standards for information interchange. 3 hours.

606. **Managing Web-based Systems for Health Care (E).** Hands-on computer systems course designed to provide the skills to install, configure, and manage information systems and its components. The primary focus is on Web-based systems. 3 hours. Prerequisite: HI 600, 601, 605, or consent of instructor.

610. **Health Care Information Resources Management.** Study of concepts and techniques for information resources management in health care enterprises through case study. Includes resource allocation, techniques for prioritization and control, project management, system installation, and operational fundamentals for information services. 3 hours. Prerequisites: HI 640 or consent of instructor.

612. **Organizational Behavior.** Systematic examination of human behavior in organizational settings with

special application to health care organizations. Emphasis is on study of individuals and small groups; personality, perception, attitudes, motivation, communication, and leadership. The course is taught using case discussions and textbook readings. 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. Includes case studies of the design and use of computer-based decision support and modeling systems. 3 hours. Prerequisites: HI 640, or consent of instructor.

616/CS 691. **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. Study of 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 health care organization. 3 hours. Prerequisites: HI 600, 601, 615, and advanced statistics or computer science coursework, or permission of instructor.

620. **Security, Audit, and Control of Health Information Systems.** Study of issues and techniques related to information security management. The topics include network security, privacy issues, legislation, regulations, and accreditation standards unique to the health care domain. 3 hours. Prerequisites: HI 602, 605, and 640, or consent of instructor.

625. **Negotiating Contracts for Health Information Systems.** Simulation of the steps leading to system selection and Request For Proposal process, maintaining control over negotiating process and preparing, and negotiating vendor contracts. 3 hours. Prerequisites: HI 600, 601, 602, 605, 606, 630, and 640, or consent of instructor.

630. **Strategic Planning and Evaluation for Health Information Systems.** Theory and application of methods for strategic planning and benefits realization strategies for health care information systems. Topics include integration of information systems and organizational strategic planning through project and case study. 3 hours. Prerequisites: HI 600, 601, 602, 605, 606 and 640, or consent of instructor.

640. **Survey of Information Systems in Health Care.** The course provides a survey of the history and status of information systems in health care. Information architectures, administrative and clinical applications,

strategic planning, information security, and benefits realization. 3 hours.

655. Synthesis of Health Informatics. Case methods and/or problem-solving applications in a seminar context related to emerging health informatics issues. Integration of materials presented during academic program. 2 hours. *This course is taken in the calendar year the student expects to graduate.* Prerequisites: HI 600, 601, 602, 605, 620, and 640, or consent of instructor.

691. Information Systems in Support of Health Care Delivery. The course focuses on an overview of the history, current environment, and projected future of the health care delivery system from the perspective of information systems support. 3 hours.

692. History of Medical & Health Informatics (E). A 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. 3 hours. Prerequisite: HI 640.

693. Leadership and Personal Presence for Information Technology (E). The course provides a systematic review of leadership models with particular focus on the leader as "change agent." Leadership issues related to the integration of information technology within health care organization are emphasized. 3 hours.

694. Special Topics in Health Informatics (E). This course permits the in-depth study of a selected topic in health informatics. May be repeated for credit. 3 hours. Prerequisite: Consent of instructor.

695. Independent Study in Health Informatics (E). The purpose of the independent study is to allow the student the 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. Such topics include medical informatics, nursing informatics, computer and communication sciences, library science, etc. May be repeated for credit. 3 hours. Prerequisite: Consent of instructor.

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.

690. Administrative Internship. The purpose of the administrative internship is to provide structured field

experiences in health care that include a mentoring relationship with a preceptor and an opportunity for application of information resource management theory and strategies. The internship gives the student a foundation for professional development and assists in refining skills and behaviors necessary for successful practice in a complex professional, social, political, and technological environment.

The administrative internship is one academic quarter in length. Usually, a chief information officer in a health care facility mentors the students. However, students may opt to do internships with information system vendors, consulting groups, health insurance carriers, or other enterprises associated with the health care industry. Students usually receive a stipend and other prerequisites. 6 hours. Prerequisite: Consent of Internship Coordinator.

698. Master's Level Nonthesis Research. Students who have substantial work experience in health informatics may elect to do a project for fulfillment of their degree requirements. The project gives the student the opportunity for focused investigation of an informatics problem in the real-world setting and for application of problem solving methodologies for development and execution of solutions. The deliverable item is a rigorous project that investigates and applies theory through a practical implementation project. The project should be substantial and equivalent to a major project conducted during an administrative internship. May be repeated for credit. 6 hours. Prerequisite: Consent of instructor.

699. Master's Level Thesis Research. Students planning to pursue a doctoral degree are encouraged to complete a thesis to fulfill their degree requirements in Health Informatics. The thesis provides the student with the opportunity to conduct original research and interpretation of those results in health informatics. The thesis demonstrates the student's acquaintance with the literature of the field and competency in proper selection and execution of research methodology. Current Ph.D. programs are available in the Department of Health Services Administration or the Department of Computer and Information Sciences. May be repeated for credit. 6 hours. Prerequisite: Consent of instructor.

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. 3 hours.

HCOW 615. Financial Management. The purpose of this course is to equip students with the knowledge and

skills for the basic financial analysis needed to make decision for budgeting, investments, leasing, inventory management, and risk return analysis. 3 hours.

Research Methods and Statistics

Courses in quantitative and qualitative methods and scientific inquiry may be taken for courses offered in Health Services Administration, Biostatistics, or Public Health. For students selecting the thesis option, one course in research methods is required. The research methods course will substitute for one of the program-required electives.

HA 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. 3 hours.

HA 722. **Regression Analysis (E).** Various approaches to regression analysis including ordinary least squares, logit, and probit methods. 3 hours.

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.

EPI 600. **Introduction to Epidemiology.** Principles of epidemiological thinking. Measure of disease frequency and association. Determinants of disease and distribution of factors influencing health and disease in populations. 3 hours.

Elective Courses

The curriculum consists of 15 required courses, an administrative internship (or Thesis or Nonthesis project) and four 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 606 **Managing Web-based Systems for Health Care.** 3 hours. (Orthner)

HI 616 **Data Mining.** 3 hours. (Hardin)

HI 692 **History of Medical and Health Informatics.** 3 hours. (Orthner, Berner)

HI 693 **Leadership and personal Presence for Information Technology.** 3 hours. (Hardin, Sheridan)

HI 694 **Special Topics in Health Informatics.** 3 hours. (Berner, Carter, Hardin, Orthner)

HI 695 **Independent Study in Health Informatics.** 3 hours. (Berner, Carter, Hardin, Orthner)

HI 621 **Health Care Financial Management II.** 3 hours.

HA 722 **Regression Analysis.** 3 hours. (Hardin)

HCOW 614/MBA 610 **Cost Control for Health Professionals.**

BST 619 **Data Collection and Management.** (satisfies research design requirement). 3 hours.

EPI 600 **Introduction to Epidemiology** (satisfies research design requirement). 3 hours.

Examples for Concentration Areas

Strategic Management: HI 606, HI 692, HI 693, HI 695

Technical Infrastructure: HI 606, HI 693, HI 695 (twice)

Data Utilization: HI 616, HA 722, BST 619, EPI 600.

History (M.A.)

Graduate Program Director: *Conley*

Faculty

Carolyn A. Conley, Professor (History); British and Irish Political and Social History

Colin J. Davis, Associate Professor (History); U.S. Labor, Women's Labor History, Social History.

Jack E. Davis, Assistant 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

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

James L. Penick, Professor Emeritus (History); Late Nineteenth- and Twentieth-Century U.S.

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 both 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).

Contact

For detailed information, contact Dr. Carolyn A. Conley, History Graduate Program Director, Department of History, U401, 1530 3rd Avenue South, Birmingham, Alabama 35294-3350.

Telephone 205-934-5634

Email cconley@uab.edu

Course Descriptions

All 600-level courses may be taken twice, except 601 & 602. Students may take no more than two Directed Readings courses (681).

History (HY)

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. **Seminar in Southern History 40 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.
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. 3 hours

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: *Lincoln*

Faculty

[C. Bruce Alexander, M.D.](#)
[Peter G. Anderson, D.V.M., Ph.D.](#)
[Michael T. Anderson, Ph.D.](#)
[Marcus Bamman, Ph.D.](#)
[Stephen Barnes, Ph.D.](#)
[Jimmy D. Bartlett, O.D.](#)
[Joseph S. Beckman, Ph.D.](#)
[P. Darwin Bell, Ph.D.](#)
[Susan L. Bellis, Ph.D.](#)
[Etty N. Benveniste, Ph.D.](#)
[Dale J. Benos, Ph.D.](#)
[Kathleen H. Berecek, Ph.D.](#)
[Richard E. Blackwell, M.D.](#)
[Harry C. Blair, M.D.](#)

[Edwin J. Blalock, Ph.D.](#)
[Larry Boots, Ph.D.](#)
[James K. Bubien, Ph.D.](#)
[Daniel C. Bullard, Ph.D.](#)
[Donald Buchsbaum, Ph.D.](#)
[Xu Cao, Ph.D.](#)
[Samuel Christian, Ph.D.](#)
[Trudy L. Cornwell, Ph.D.](#)
[David T. Curiel, M.D.](#)
[Victor M. Darley-Ussmar, Ph.D.](#)
[Louis J. Dell'Italia, M.D.](#)
[Lawrence J. Delucas, Ph.D.](#)
[Robert B. Diasio, M.D.](#)
[Kevin F. Dybvig, Ph.D.](#)
[Mahmoud el Kouni, Ph.D.](#)
[Ada Elgavish, Ph.D.](#)
[Craig A. Elmets, M.D.](#)
[William T. Evanochko, Ph.D.](#)
[Charles N. Falany, Ph.D.](#)
[Stuart J. Frank, M.D.](#)
[Bruce Freeman, Ph.D.](#)
[Michael J. Friedlander, Ph.D.](#)
[Catherine M. Fuller, Ph.D.](#)
[Ken-ichiro Fukuchi, Ph.D.](#)
[F. Shawn Galin, Ph.D.](#)
[Candace L. Gladson, M.D.](#)
[William E. Grizzle, M.D., Ph.D.](#)
[Clinton J. Grubbs, Ph.D.](#)
[Lisa M Guay-Woodford, M.D.](#)
[John A. Hablitz, Ph.D.](#)
[Gilbert R. Hageman, Ph.D.](#)
[Robert W. Hardy, Ph.D.](#)
[Basil I. Hirschowitz, M.D.](#)
[Raymond E. Ideker, M.D., Ph.D.](#)
[Robert M. Jackson, M.D.](#)
[Hanjoong Jo, Ph.D.](#)
[Gail V. Johnson, Ph.D.](#)
[Richard S. Jope, Ph.D.](#)
[Sham S. Kakar, Ph.D.](#)
[Kent T. Keyser, Ph.D.](#)
[Helen Kim, Ph.D.](#)
[Peter H. King, M.D.](#)
[Kevin L. Kirk, Ph.D.](#)
[Timothy W. Kraft, Ph.D.](#)
[Dennis F. Kucik, M.D., Ph.D.](#)
[Jeffrey E. Kudlow, M.D.](#)
[Coral A. Lamartiniere, Ph.D.](#)
[Robin A. J. Lester, Ph.D.](#)
[Anning Lin, Ph.D.](#)
[Thomas M. Lincoln, Ph.D.](#)
[Ray H. Liu, Ph.D.](#)
[Pamela A. Lucchesi, Ph.D.](#)
[Jay M. McDonald, M.D.](#)
[Lori L. McMahan, Ph.D.](#)
[Stuart C. Mangel, Ph.D.](#)
[Sadis Matalon, Ph.D.](#)

[Elias Meezan, Ph.D.](#)
[Lin Mei, Ph.D.](#)
[Joseph L. Messina, Ph.D.](#)
[Steven A. Moser, Ph.D.](#)
[Joanne E. Murphy-Ullrich, Ph.D.](#)
[Jimmy D. Neill, Ph.D.](#)
[Mitchell Olman, M.D.](#)
[Suzanne Oparil, M.D.](#)
[Dale A. Parks, Ph.D.](#)
[Rakesh Patel, Ph.D.](#)
[Joseph B. Phillips, III, M.D.](#)
[Dennis J. Pillion, Ph.D.](#)
[Carl A. Pinkert, Ph.D.](#)
[Selvarangan Ponnazhagan, Ph.D.](#)
[Michael W. Quick, Ph.D.](#)
[Deodutta Roy, Ph.D.](#)
[Mansoor N. Saleh, M.D.](#)
[Paul W. Sanders, M.D.](#)
[James A. Schafer, Ph.D.](#)
[Lisa Schwiebert, Ph.D.](#)
[Denish Shaw, Ph.D.](#)
[Gene P. Siegal, M.D., Ph.D.](#)
[Raj K. Singh, Ph.D.](#)
[Frederick Smith, Ph.D.](#)
[Jeffrey B. Smith, Ph.D.](#)
[Phillip D. Smith, M.D.](#)
[Jean Pierre Sommadossi, Ph.D.](#)
[Harald Sontheimer, Ph.D.](#)
[Eric J. Sorscher, M.D.](#)
[Margaret M. Tarpey, M.D.](#)
[Anne B. Theibert, Ph.D.](#)
[Diane Tucker, Ph.D.](#)
[Ferdinand Urthaler, M.D.](#)
[William P. Vaughan, Ph.D.](#)
[Ken Waites, M.D.](#)
[David G. Warnock, M.D.](#)
[Casey T. Weaver, M.D.](#)
[David Weiss, Ph.D.](#)
[John N. Whitaker, M.D.](#)
[C. Roger White, Ph.D.](#)
[Philip A. Wood, D.V.M., Ph.D.](#)
[Wen-Cheng Xiong, Ph.D.](#)
[Hui Xu, Ph.D.](#)

Program Information

The Integrative Biomedical Sciences Program, offered through the Departments of Comparative Medicine, Pathology, Physiology, and Pharmacology/Toxicology, 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 cell 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 pro-

vided 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 in an integrated approach toward understanding the principals of 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 400MHz), 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 grade point average, 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, 2001.

To be accepted into the program, the student should have completed a B.S. degree that includes the following undergraduate 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.

Contact

For more information, contact Barbara Hartman, Program Coordinator, VH G001, 1530 3rd Avenue South, Birmingham, AL 35294-0019.

Telephone 205-934-2817

Fax 205-934-0043

Email: Hartman@uab.edu

Web: ibs.path.uab.edu

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

Email arhu055@uabdpo.dpo.uab.edu

Materials Science (Ph.D.)

Graduate Program Director at UAB: *Janowski*

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.

UAB Faculty

Rigoberto Advincula, Assistant Professor (Chemistry); Synthesis, Fabrication, and Characterization of Ultrathin Films

J. Barry Andrews, Professor (Materials and Mechanical Engineering); Solidification, Microgravity Processing, Physical Metallurgy, Intermetallic Materials, Electronic Properties

Krishan K. Chawla, Professor (Materials and Mechanical 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 and Mechanical 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 and Mechanical Engineering); Electron Microscopy, Metal-Matrix Composites, 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 and Mechanical 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 and Mechanical 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

John A. Barnard, MINT Professor (Metallurgical and Materials Engineering); Electronic, Geometric, and Magnetic Structure of Surfaces and Interfaces

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

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

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

R. Michael Banish, Associate Research Professor (Chemistry); Self-Diffusion and Thermal Diffusivity of Metals and Semi Conductors

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 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, Professor (Chemistry); Reactions and Application of Polymers, Microgravity Science and Processing

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

Edward J. Meehan, Jr., Associate Professor (Chemistry); Crystal Growth of Proteins, X-ray Crystallography of Protein Single Crystals

Robert J. Nauman, Professor (Materials Science); Crystal Growth in Low Gravity, Space Processing

Joseph Ngy, Assistant Professor (Biology), X-ray Crystallography

Aleksander G. Ostrogorsky, Professor (Physics), Gravity Effects on Materials Processing

Clyde Riley, Professor (Chemistry); Laser Photochemistry, Electroplating in Low Gravity

Carmen Scholz, Assistant Professor (Chemistry), Green Chemistry, Biodegradable Biomaterials

William N. Setzer, Associate 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

Jeffrey Weimer, Associate Professor (Chemistry); Surface Banding Studies

Francis C. Wessling, Professor (Mechanical and Aerospace Engineering); Space Processing of Materials

Program Information

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 Committee. 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.

Contact

*For detailed information, contact Dr. Gregg M. Janowski, Graduate Program Director, UAB Department of Materials and Mechanical Engineering, BEC 254, 1530 3rd Avenue South, Birmingham, AL 35294-4461. Telephone 205-934-8450
Email mmeuab@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

Courses that prepare students for Program Examination I (See Program Director for reading list):

Structure and Analysis

BME 726. Analytical Techniques for Biomaterials Research. 1-3 hours.

CD 631. Polymeric Materials. 3 hours.

CH 580. *Introduction to Polymer Chemistry I*. 3 hours.

CH 730. Physical Organic Chemistry I. 3 hours.

CH 740. Bonding and Structure in Inorganic Compounds. 3 hours.

MSE 363. Characterization in Materials Science. 3 hours.

MSE 743. Materials Characterization I. 3 hours.

MSE 744. Materials Characterization II. 3 hours.

PH 745. Molecular Spectroscopy. 3 hours.

Condensed Matter Science

CD 661. Physical Properties of Biomaterials. 3 hours.

CH 721. Fundamentals of Molecular Spectroscopy. 3 hours.

PH 753, 754. Advanced Solid-state. 3 hours each.

PH 771, 772. Quantum Mechanics I, II. 3 hours each.

Thermodynamics and Kinetics

CH 729. Special Topics in Physical Chemistry. 1-3 hours.

MSE 703. Thermodynamics of Materials. 3 hours.

PH 635. Statistical Mechanics. 3 hours.

Structure, Processing, and Properties

CH 580. *Introduction to Polymer Chemistry*. 3 hours.

MSE 253, 254. Materials I, II. 3 hours each.

MSE 381. Physical Metallurgy. 3 hours.

MSE 383. Ceramic Materials. 3 hours.

Courses appropriate for Specialization 1: Structure and Properties of Materials. Must include 3 hours in instrumentation, 3 hours in methods of chemical analysis, and 3 hours in spectroscopy.

BME 726. Analytical Techniques for Biomaterials Research. 1-3 hours.

CH 729. Special Topics in Physical Chemistry: NMR of Solids. 3 hours.

CH 749. Special Topics in Inorganic Chemistry: Inorganic Polymers. 3 hours.

CH 751. Advanced Analytical Chemistry II. 3 hours.

CH 755. Electroanalytical Chemistry. 3 hours.

CH 757. Analytical Spectroscopy. 3 hours.

MSE 703. Advanced Thermodynamics of Materials. 3 hours.

MSE 718. Surfaces, Interfaces, and Thin Films. 3 hours.

MSE 737. Quantitative Microscopy. 3 hours.

MSE 743:744. Materials Characterization I, II. 3 hours each.

MSE 753. Phase Diagrams. 3 hours.

Courses appropriate for 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 722. General Biocompatibility. 1-3 hours.

BME 724. Biocompatibility Evaluations of Materials and Devices. 1-3 hours.

BME 750. Tissue Assessment. 1-3 hours.

CH 729. Special Topics in Physical Chemistry: NMR of Solids. 1-3 hours.

CH 739. Special Topics in Organic Chemistry: Structures by Computers. 3 hours.

Courses appropriate for 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: NMR of Solids. 1-3 hours.

CH 743. Chemical Applications of Group Theory. 3 hours.

CH 744. Spectroscopy of Inorganic Chemistry. 3 hours.

MSE 583. Electronic and Magnetic Properties of Materials. 3 hours.

MSE 718. Surfaces, Interfaces, and Thin Films. 3 hours.

MSE 743. Materials Characterization I. 3 hours.

PH 623. Modern Optics I. 3 hours.

PH 655. Advanced Solid-state Laboratory. 3 hours.

PH 715. Advanced Statistical Mechanics. 3 hours.
 PH 741. Mössbauer Spectroscopy. 3 hours.
 PH 742. Electron Spin Resonance. 3 hours.
 PH 750, 751. Classical Electrodynamics I, II. 3 hours each.
 PH 753, 754. Advanced Solid-state Physics. 3 hours each.
 PH 760. Methods of Mathematical Physics. 3 hours.
 PH 762. Computational Physics. 3 hours.

Courses appropriate for Specialization 4: Materials Processing. Must include 6 hours in solidification or crystal growth and 3 hours in processing technology.

BME 720. Biomaterials. 1-3 hours.
 CD 633. Alloy Systems in Dentistry.
 MSE 713. Mechanical Behavior of Materials. 3 hours.
 MSE 715. Nucleation and Growth. 3 hours.
 MSE 716. Microstructural Processes. 3 hours.
 MSE 718. Surfaces, Interfaces, and Thin Films. 3 hours.
 MSE 723. Solidification. 3 hours.
 MSE 747. Advanced Corrosion. 3 hours.
 MSE 753. Phase Diagrams. 3 hours.

Courses appropriate for Specialization 5: Biomaterials Must include 6 hours in the structure and properties of biomaterials and 3 hours in biomaterials applications.

BME 720. Biomaterials. 1-3 hours.
 BME 722. General Biocompatibility. 1-3 hours.
 BME 724. Biocompatibility Evaluations of Materials and Devices. 1-3 hours.
 BME 726. Analytical Techniques for Biomaterials Research. 1-3 hours.
 BME 790. Special Topics in Biomaterials. 1-6 hours.
 BME 791. Individual Study in Biomaterials. 1-6 hours.
 BME 793. Internship in Biomaterials. 1-6 hours.
 CD 626. Surgical Implants in Dentistry. 3 hours.
 CD 629. Ceramic Materials in Dentistry. 3 hours.
 CD 633. Alloy Systems in Dentistry.
 CD 661. Laboratory Methods for Biomaterials Research. 3 hours.

Courses appropriate for 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 750. Tissue Assessment. 1-3 hours.
 BME 756. Joint Assessment. 1-3 hours.
 MSE 713. Mechanical Behavior of Materials. 3 hours.
 MSE 715. Nucleation and Growth. 3 hours
 MSE 737. Quantitative Microscopy. 3 hours

MSE 743, 744. Materials Characterization I, II. 3 hours each.
 PH 611, 612. Classical Mechanics I, II. 3 hours each.
 PH 710, 711. Advanced Classical Mechanics I, II. 3 hours each.

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: *Weikard*

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, Assistant 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, Assistant Professor (Mathematics); Partial Differential Equations, General Relativity, Differential Geometry

Yanni Zeng, Assistant 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 been a human endeavor for millennia. It has always been driven by two sources: the intrinsic beauty of numbers, shapes, structures, and their interrelationships as well as the necessity to solve practical problems in fields as diverse as finance, atomic physics, and computer tomography. Mathematics has therefore 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.

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 exam 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 of 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).

Contact

For detailed information, contact Dr. Rudi Weikard, Mathematics Graduate Program Director, UAB Department of Mathematics, CH 452, 1530 3rd Avenue South, Birmingham, Alabama 35294-1170.

Telephone 205-934-2154

Email graduate@math.uab.edu

Web www.math.uab.edu

Course Listings

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. 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.

Mathematics (MA)

745. **Functional Analysis.** 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. Prerequisite: MA 643.

746, 747. **Linear Operators in Hilbert Space I-II.** 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.

750. **Fourier Transforms.** Fourier transform and inverse transform of tempered distributions; applications to partial differential equations. Prerequisite: MA 643.

751, 752. **Advanced Ordinary Differential Equations I-II.** Selected topics varying with instructor. Prerequisite: Permission of instructor.

753. **Nonlinear Analysis.** Selected topics including degree theory, bifurcation theory, and topological methods. Prerequisite: Permission of instructor.

756, 757. **Advanced Partial Differential Equations I-II.** Selected topics varying with instructor. Prerequisite: Permission of instructor.

772. **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: MA 675.

773. **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, Poincaré-Bendixson theorem. Prerequisites: MA 640 and 675.

774. **Dynamical Systems II.** Discrete dynamical systems. Hyperbolicity, symbolic dynamics, chaos, homoclinic orbits, bifurcations, and attractors (theory and examples). Prerequisite: MA 773.

775. **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: MA 645.

777. **Algebraic Topology I.** Covering spaces; introduction to homotopy theory. Prerequisites: MA 635 and 675.

778. **Algebraic Topology II.** Singular homology, cohomology. Prerequisite: MA 777.

781. **Differential Topology I.** Manifolds, tangents, vector fields, existence of integral curves, infinitesimal transformations, introduction to Lie groups, Lie algebras. Prerequisite: MA 643.

782. **Differential Topology II.** Manifolds with boundary, transversality and intersections, integration on manifolds. Prerequisite: MA 781.

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 vary with topics. 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 listings for additional graduate courses in applied mathematics.

Mathematics (M.S.)

Graduate Program Director: *Weikard*

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, Assistant 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, Assistant Professor (Mathematics); Partial Differential Equations, General Relativity, Differential Geometry

Yanni Zeng, Assistant 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 been a human endeavor for millennia. It has always been driven by two sources: the intrinsic beauty of numbers, shapes, structures, and their interre-

lationships as well as the necessity to solve practical problems in fields as diverse as finance, atomic physics, and computer tomography. Mathematics has therefore 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 primary and secondary specializations 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. All students are required to participate in the Graduate Seminar (MA 690) or a research seminar. Normally, under Plan I, Graduate Seminar hours may not be counted as part of the 30-hour requirement. See Course Listings 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,
- completion of a thesis, and
- an examination 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 grad in each course has to be a B or better. A minimum of 24 hours must be on the 600 level or above. All students are required to participate in the Graduate Seminar (MA 690) or a research seminar. Normally, under Plan II, Graduate Seminar hours may not be counted as part of the 30-hour requirement. See Course Listings 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 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.)

Contact

For detailed information, contact Dr. Rudi Weikard, Mathematics Graduate Program Director, UAB Department of Mathematics, CH 452, 1530 3rd Avenue South, Birmingham, Alabama 35294-1170.

Telephone 205-934-2154

Email graduate@math.uab.edu

Web www.math.uab.edu

Course Listings

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, 535. **Introduction to Modern Algebra I, 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 142.

540-542. **Advanced Calculus I-III.** Introduction to real numbers, sequences and series of real numbers, continuity, differentiation, the mean value theorem, the Riemann integral, the fundamental theorem of calculus, sequences and series of functions, uniform vs. pointwise convergence, some elementary and special functions. Prerequisite: MA 244.

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, queuing 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.

631, 632. **Applied Linear Algebra I, II.** Vector spaces, linear transformations, Jordan form, eigenvalues and eigenvectors, normed and inner product spaces, adjoints and quadratic forms. Direct and iterative computational methods, Shur decomposition, sensitivity and stability for linear systems, least squares, eigenvalue computation, singular value decomposition. Prerequisite: MA 531 or 635.

634, 635. **Algebra I, II.** Basics of logic and set theory. Groups, rings, fields, and vector spaces. Prerequisite: MA 535.

640. **Advanced Calculus IV.** Functions of several variables, the implicit function theorem, integration of different forms. Prerequisite: MA 542.

641-643. **Real Analysis I-III.** Measure and integration theory, convergence theorems, Lebesgue measure, LP spaces, complex measures, product measures, Fubini's theorem. Prerequisite: MA 542.

644, 645. **Complex Analysis I, II.** The algebraic and topological structure of the complex numbers, analytic functions, Cauchy's integral theorem and integral formula, power series, elementary functions and their Riemann surfaces, isolated singularities, residues, Laurent expansion, argument principle, Rouché's theorem, maximum modulus theorem and related topics, Riemann mapping theorem, entire functions, Hadamard's factorization theorem. Prerequisite: MA 542.

650, 651. **Ordinary Differential Equations I, II.** Existence and uniqueness of solutions, linear equations, stability theory, asymptotic behavior of nonlinear systems. Prerequisites: MA 542 and 635.

656, 657. **Partial Differential Equations I, II.** Cauchy problem for heat and wave equations, maximum principle, eigenfunction expansion methods, elementary Hilbert space methods. Prerequisite: MA 643.

660. **Numerical Linear Algebra.** Norms for vectors and matrices; Gaussian elimination; pivoting; LU decomposition; large sparse banded systems; singular value decomposition; condition number and rounding error; eigenvalues and QR algorithm. Prerequisites: MA 531, 540, and 568.

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 equ-

ations, 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.

674, 675. **Topology I, II.** Separable metric spaces, basis and subbasis, continuity, compactness, completeness, Baire category theorem, countable products, general topological spaces, separation axioms, metrization theorems, manifolds, function spaces, Tychonov theorem, Euclidean spaces, continua, fundamental groups, covering spaces. Prerequisites: MA 541 and 635.

687-689. **Differential Geometry I-III.** Manifolds, tangents, vector fields, Lie derivatives, linear connections, geodesics, Riemannian and semi-Riemannian structures, Riemannian connections, Hopf-Rinow theorem, curvature, immersions and second fundamental form, calculus of variations, and comparison theory. Prerequisites: MA 640 and 635.

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.)

Graduate Program Director: *Thompson*

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

Jerry N. Thompson, Professor (Human Genetics); Biochemical Genetics, Enzyme Deficiency Diseases, Enzyme Substrates

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 & Molecular Biology

Eric J. Sorscher, Professor (Physiology and 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 biochemical 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. J. N. Thompson, 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 metho-

dology, computer understanding, and appropriate elective courses.

Contact

For detailed information, contact Dr. Jerry N. Thompson, UAB Medical Genetics Graduate Program Director, or Mr. Richard Dyer, Community Care Building, Room 323, 908 20th Street South, Birmingham, AL 35294.

Telephone 205-934-4983

Email rdyer@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.

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. Medelian 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 abbreviations, karyotyping, and consequences of aneuploidy and structural changes. Techniques of cell culture and chromosome banding. Winter.

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. Winter. 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, Winter, Spring. 1 hour each term.

785. **Journal Club in Medical Genetics.** Recent papers in medical genetics. Fall, Winter, Spring. 1 hour each term.

790. **Special Topics in Medical Genetics.** Fall, Winter, Spring. 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); Signal Transduction in Lymphocytes

L. Andrew Ball, Professor (Microbiology); Negative-Strand RNA Viruses

Scott R. Barnum, Assistant Professor (Microbiology); Complement

David M. Bedwell, Associate Professor (Microbiology); Translation Termination, Calcium Signaling

William H. Benjamin, Assistant Professor (Pathology); Genetics of host-Bacterial Relationship

S. Louis Bridges, Assistant Professor (Medicine); Immunoglobulin Gene Expression, Rheumatoid Arthritis

David E. Briles, Professor (Microbiology); Bacterial Pathogenesis, Pneumococcus, Tuberculosis, Virulence, Immunity

William J. Britt, Professor (Pediatrics); Herpesvirus Envelope Assembly

R. Pat Bucy, Associate Professor (Pathology); T Cell Development, Immune Regulation

Peter D. Burrows, Professor (Microbiology); B Cells, Developmentally Regulated Genes, Isotype Switching

Robert Carter, Assistant Professor (Medicine); Molecular Mechanisms of Control of B Lymphocyte Responses

Page W. Caufield, Professor (Oral Biology); Dental Caries, Transmission, Acquisition, Pathogenesis, Genetics

Debashish Chattopadhyay, Assistant Professor (Medicine); Protein Structure-Function, Structure-Based Drug Design, Vesicular Trafficking, Malaria

Chen-lo H. Chen, Research Professor (Microbiology); Avian T- and B-Cell Development, Evolution of Immune System, Graft Versus Host Reactions

Noel Childers, Professor (Pediatric Dentistry); Oral Immunization, Dental Caries

Max D. Cooper, Professor (Pediatric Medicine); Immune System Ontogeny and Phylogeny

Marilyn J. Crain, Assistant Professor (Medicine); Pediatric and Perinatal HIV, Molecular Epidemiology of *Streptococcus pneumoniae*

Kevin Dybvig, Professor (Comparative Medicine); Mycoplasmas, Genetics, Phenotypic Switching, DNA Rearrangements

Jeffrey C. Edberg, Assistant 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

David O. Freeman, Assistant Professor (Medicine); Immunoparasitology, Molecular Parasitology, Tropical Medicine

Patricia N. Fultz, Professor (Microbiology); Retroviral Pathogenesis, HIV Vaccines

G. Yancey Gillespie, Professor (Surgery); Malignant Brain Tumors, Cell Biology, Immunobiology, Viral Vector Therapies, Murine Brain Tumor Models

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

Beatrice H. Hahn, Professor (Medicine); Human Retroviruses and Associated Diseases

Louis W. Heck, Professor (Medicine); New Treatments of Inflammatory Diseases

Raymond Hiramoto, Professor (Microbiology); Cancer Immunotherapy, CNS-Immune System Communication

Susan K. Hollingshead, Research Associate Professor (Microbiology); Mechanisms of Variation in Microbial Pathogenesis

Eric Hunter, Professor (Microbiology); Retrovirus Molecular Biology, Virus Assembly

Susan Jackson, Associate Professor (Microbiology); Mucosal Immunology, AIDS, IgA

Mark J. Jedrzejewski, Assistant Professor (Microbiology); Microbial Pathogenesis, X-ray Crystallography, Structure-Based Drug Design

Victoria A. Johnson, Associate Professor (Medicine); HIB Pathogenesis and Drug Development and Resistance, Hepatitis B and C Pathogenesis

Louis B. Justement, Associate 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, Idiotypes, Hybridomas, Transgenic Mice, Immunoregulation

Earl R. Kern, Research Professor (Medicine); Pathogenesis of Herpesvirus Infections

Robert P. Kimberly, Professor (Medicine); Immunologic Diseases and Autoimmunity

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

William J. Koopman, Professor (Medicine); Pathogenesis of Immune Disease

Hironi Kubagawa, Associate Professor (Pathology); Immunoglobulin-like Molecules and Fc Receptors

Jacob Lebowitz, Professor (Microbiology); Structure and Function of Relationships of Supercoiled DNA, Specific Protein-DNA Interactions

Elliot J. Lefkowitz, Research Assistant Professor (Microbiology); RNA Virus Gene Expression and Evolution

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

J. 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 (Microbiology); Viral Replication, Vaccines

John D. Mountz, Professor (Medicine); Autoimmunity; Soluble Fas, Transgenic Mice

Mark J. Mulligan, Associate Professor (Medicine); HIV, Glycoprotein Vaccine, Viral Assembly, Retroviruses

Peter E. Prevelige, Associate Professor (Microbiology); Viral Capsid Self-Assembly

Firoz Rahemtulla, Professor (Oral biology); Salivary Peroxidase System, Salivary Glands

Chander Raman, Assistant Professor (Medicine); Autoimmunity and Tolerance, Lymphocyte Activation, Signal Transduction, Lymphocyte Development

Michael Russell, Research Professor (Microbiology); Mucosal Immunology, A Mucosal Vaccines, Streptococcal Antigens

Harry W. Schroeder, Associate Professor (Medicine); Developmental Genetics, Clinical Immunology

George M. Shaw, Professor (Medicine); Human Retroviruses, Molecular Virology and Pathology

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

Bracey 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 (Medicine); Herpesviruses

Craig M. Wilson, Assistant Professor (Medicine); Molecular Biology of Drug Resistance in Malaria

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, and graduate study in the department leads to a degree in cell biology. The CMB graduate program is designed to provide a first-year 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, or molecular cell biology (microbiology).

The Microbiology graduate program, which is administered through the Department of Microbiology, 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 and cell biology; molecular virology; viral, microbial, and mammalian cell genetics; immunogenetics; cellular, developmental, and tumor immunology; immunochimistry; chemistry, biosynthesis, and structure of biological macromolecules and membranes; and host-parasite relationships, phagocytosis, 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 molecular cell biology.

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, including calculus; physics; 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 for up to five years, provided the student's performance is satisfactory. During the 1999-2000 academic year, entering students were provided with stipends of \$17,000 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

1. Completion of the following courses or their equivalent: CMB 700, 701, 702, 703, 704, 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 Review and Research Workshop during each quarter 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.

Contact

For detailed information, contact Ms. Debbie Sirles, Program Manager, UAB Department of Microbiology, Bevill Biomedical Research Building, Suite 260, 845 19th Street South, Birmingham, AL 35294-2170.

Telephone 800-262-7764

Email sirles@uab.edu

Web www.microbio.uab.edu

Course Descriptions

Cellular and Molecular Biology (CMB)

700. Cellular and Molecular Biology I. Biochemistry. Structural and biochemical properties of proteins, enzymes, and co-enzymes are discussed. 5 hours.

701. Cellular and Molecular Biology II. Prokaryotic genetics and molecular biology. Prokaryotic genetic techniques and theory; genetics of bacteria and virus; control of gene expression; DNA recombination, replication, transcription, and translation. 5 hours.

702. Cellular and Molecular Biology III. Eukaryotic molecular biology. Theory and techniques of eukaryotic molecular biology; gene regulation in eukaryotic molecular biology; gene regulation in eukaryotes; protein translation and trafficking, virology. 5 hours.

703. Cellular and Molecular Biology IV. Cell and developmental biology. Mechanisms of signal transduction, cell-cell and cell matrix interactions, cytoskeleton and organelle structure. 5 hours.

704. Cellular and Molecular Biology V. Immunology. Theoretical and experimental consideration of the immune system. 5 hours.

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

Microbiology (MIC)

The following courses may be taken more than once.

710. **Development of Communication Skills for Biological Research.** 2 hours.

723. **RNA Virus Journal Club.** 1 hour. Fall, Winter, Spring.

737. **Mucosal Immunology Journal Club.** 1 hour.

780. **Selected Readings in Molecular Cell Biology.** Fall, Winter, Spring.

785. **Biology of Parasitism Discussion Group.** Fall, Winter, Spring. 1 hour.

786. **Retrovirus Journal Club.** 1 hour. Fall, Winter, Spring.

789. **Journal Club in Biological Crystallography.** 1 hour. Fall, Winter, Spring.

796. **Inflammation Journal Club.** Fall, Winter, Spring. 1 hour.

797. **Cellular and Molecular Immunology Journal Club.** Fall, Winter, spring. 1 hour.

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

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

Music

The Department of Music offers the Master of Arts Education with a Specialization in Music Education. Two distinct tracks are available: the Traditional Fifth-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.

Contact

*For detailed 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*

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.

Music Education (EMU)

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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. 3 hours.

503. **Methods of Teaching Music N-6 Lab.** Public school observation experiences for music education students enrolled in EMU 502. 1 hour.

615. **Technology in Music Instruction.** Application of computer-based technology to contemporary music instruction in public schools. 3 hours.

690. **Internship in Music Education.** For Fifth-Year Program students. Observation and student teaching in elementary and secondary schools (10 weeks or 300 clock hours). Prerequisites: Unconditional acceptance into the Fifth-Year Program, completion of 9 hours in professional studies, EMU 502 and 503, either MU 529 or MU 530, and completion of 3 hours in academic courses. 9 hours.

Applied Music (MUP)

520. **Concert Choir.** Advanced study of the techniques of choral performance, including performance practice, choral diction, voice building for choirs, and working with various types of instrumental accompaniment. 1 hour.

535. **Wind Ensemble.** Advanced study of the techniques of wind band performance, including performance practice and literature. 1 hour.

536. **Jazz Ensemble.** Advanced study of the techniques of jazz band performance, including performance practice, historical period study, and literature for various combinations of instrument. 1 hour.

540. **Private Lessons: Voice.** 2 hours.

550. **Private Lessons: Piano.** 2 hours.

560. **Private Lessons: Woodwinds.** 2 hours.

570. **Private Lessons: Brass.** 2 hours.

580. **Private Lessons: Percussion.** 2 hours.

590. **Private Lessons: Strings.** 2 hours.

Music (MU)

521. **Foundations of Graduate Study in Music Education.** History and philosophy of music education in

public schools. Curriculum development, conceptual teaching, basic bibliographic and research techniques, and evaluation of the music program, with an emphasis on psychology of music as applied to contemporary music instruction in public schools. 3 hours.

529. **Choral Techniques and Materials.** Advanced study of the techniques of choral conducting, including appropriate gestures, score study, performance practice, choral diction, voice building for choirs, literature selection, rehearsal techniques, and working with various types of instrumental accompaniment. 1 hour.

530. **Methods of Instrumental Music.** The instrumental music environment. Administrative topics, teaching techniques, evaluations, discipline, budgeting, and public school policies, materials and literature, and current trends in music education. 3 hours.

545. **Modal Counterpoint.** Characteristics of vocal polyphonic writing based on modal scales, with emphasis on the style of Palestrina and other Renaissance composers. 3 hours.

548. **Orchestration.** Instrument construction and acoustics, range, notation, and terminology. Basic principles and techniques of writing for orchestral and wind instruments. Guidelines are provided regarding writing for instruments for special effects. 3. hours.

555. **Analysis of Musical Structure.** Principles and techniques of organization in tonal music and advanced study of analytical methods. 3 hours.

558. **Contemporary Techniques in Composition.** Functional and nontertian harmony, polyharmony, atonal and serial music, microtones, sound mass compositions, and contemporary notation. 3 hours.

561. **Seminar in Music Literature.** Advanced study of specific topics in music history and literature. 3 hours.

564. **American Music.** Cultivated and vernacular traditions in America. 3 hours.

566. **Music in World Cultures.** Cultivated and vernacular styles in non-Western music. 3 hours.

629. **Research in Music Education.** A study of music research, including both qualitative and quantitative techniques. An introduction to research journals, traditional and electronic sources of information, and study development. 3 hours.

Graduate Program Director: *Garner*

Primary Faculty

Michael Brenner, Associate Professor (Neurobiology); Molecular Control of Transcription of Cytoskeletal Proteins in Glia

Lynn E. Dobrunz, Assistant Professor (Neurobiology); Dynamic Aspects of Neurotransmitter Release Probability at Individual Synapses

Michael J. Friedlander, Professor and Chair (Neurobiology); Development and Plasticity of Synaptic Function in the Cerebral Cortex

Craig C. Garner, Associate Professor (Neurobiology); Molecular Biology of Neuronal Cytoskeleton and Novel Presynaptic Proteins

John Hablitz, Professor (Neurobiology); Development of Ion Channel Gating and Synaptic Transmission by Excitatory Amino Acids in the Mammalian Forebrain

Robin A. J. Lester, Assistant Professor (Neurobiology); Molecular Pharmacology of Ligand- and Voltage-gated Ion Channels in the Central Nervous System

Stuart Mangel, Associate Professor (Neurobiology); Pharmacological Modulation of Intraretinal 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); Role of Neurotrophins and Microcompartmentalization of Calcium in Synaptic Function and Plasticity

Michael W. Quick, Assistant Professor (Neurobiology); Molecular Biology of Neurotransmitter Transporters

Harald W. Sontheimer, Associate Professor (Neurobiology); Regulation and Function of Ion Channels in Normal Glia and in Gliomas

Anne B. Theibert, Assistant Professor (Neurobiology); Molecular Mechanisms of Signal Transduction in the CNS; Role of Intracellular Calcium in Neurite Outgrowth

David S. Weiss, Associate Professor (Neurobiology); Molecular Biophysics of Receptors; Structure and Function of GABA Receptors

Secondary Faculty

Franklin R. Amthor, Associate Professor, Psychology

Vytas Bankaitis, Professor, Cell Biology

Lewis R. Baxter, Professor, Psychiatry and Behavioral Neurobiology

Joseph S. Beckman, Professor, Anesthesiology

Dale Benos, Professor and Chairman, Physiology and Biophysics

Etty Benveniste, Professor, Cell Biology

J. Edwin Blalock, Professor, Physiology and Biophysics

Steven L. Carroll, Assistant Professor, Pathology

Michael A. Casey, Associate Professor, Cell Biology

Charles S. Cobbs, Assistant Professor, Neurosurgery

Ramon F. Dacheux, Professor, Ophthalmology

Peter J. Detloff, Assistant Professor, Biochemistry and Molecular Genetics

Leon S. Dure, Assistant Professor, Pediatrics and Neurology

Robert O. Friedel, Professor and Chair, Psychiatry and Behavioral Neurobiology

Paul Gamlin, Professor, Physiological Optics

Gail V. W. Johnson, Professor, Psychiatry and Behavioral Neurobiology

Ronald L. Johnson, Assistant Professor, Cell Biology

Kent Keyser, Associate Professor, Physiological Optics

Kevin L. Kirk, Professor, Physiology and Biophysics

Michael S. Loop, Associate Professor, Physiological Optics

Richard B. Marchase, Professor and Chair, Cell Biology

Lawrence E. Mays, Professor and Chair, Physiological Optics

Lori L. McMahon, Assistant Professor, Physiology and Biophysics

Anthony Nicholas, Assistant Professor, Neurology

Youngsuk Oh, Assistant Professor, Medicine

Alan K. Percy, Professor, Pediatrics and Neurology

Steven Rosenfeld, Associate 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 who have the breadth of training in the fundamentals of modern neurobiological research ranging from molecular to systems approaches and the depth of training in several particular areas that will enable them to become leading contributors to the health-related brain research enterprise. The focus of the program is on the molecular and cellular basis of normal structure and function of the nervous system, although much of the work addresses major issues in neurological health and disease. Students have the opportunity to receive training in neurobiology of disease, with a focus on clinical topics from neurology, neurosurgery, psychiatry, pediatrics, and rehabilitation medicine, providing a unique perspective for fundamental neuroscience research and teaching careers at academic health science centers.

Admission Requirements

Applications to the program will be judged by the graduate committee of the Department of Neurobiology, in consultation with other appropriate faculty. Recommendations for acceptance will be based on Graduate School admissions criteria and, when possible, a personal interview.

Students may enter the Neurobiology Graduate Program through one of three feeder programs – the Cellular and Molecular Biology (CMB) program, the Neuroscience program, or the M.D.-Ph.D. program. Students take a set of first-year “core” courses as defined by the program through which they enter. In addition, students participate in journal clubs and seminars with visiting speakers. The students also choose from a va-

riety of advanced courses including Mechanisms of Signal Transduction, Mind and Brain, Principles of Synaptic Transmission and Plasticity, Ion Channel Biophysics, and Neurodegenerative Diseases. In addition, each student obtains research experience and identifies potential mentors through quarterly laboratory rotations.

Coursework

Neurobiology students take a series of courses to be selected from the following: Biochemistry (CMB 700), Cellular and Molecular Neurobiology (NBL 751), Statistics for Biomedical Sciences (NBL 735), Integrative Neuroscience (NEUR 710) and Developmental Neuroscience (NBL 752). Medical Neuroscience (NBL 711) can be substituted for Integrative Neuroscience and Developmental Neuroscience, Cell & Developmental Biology (CMB 703), Eukaryotic Molecular Biology (CMB 702), Immunology (CMB 704), Prokaryotic Genetics & Molecular Biology (CMB 701), Biophysics of Membrane Excitability (NBL 720), Developmental Neuroscience (NBL 752), Integrative Neuroscience (NEUR 710), Medical Neuroscience (NBL 711), and Neurobiology of Disease (NBL 730).

In addition, neurobiology students participate in the neurobiology seminar series and a selected topics colloquium throughout their graduate studies. It is also required that students take a course covering "The Principles of Scientific Integrity" (GRD 717). At some point in the student's graduate career, she or he must also present data in the neurobiology seminar series and participate in a teaching practicum. Students will be asked to do this after successfully passing their qualifying examination.

The Neurobiology Department requires all of its students to achieve grades of B or better in all the NBL core courses (for those admitted through other feeder programs or directly into Neurobiology) or in all the Neuroscience core courses (for those admitted through the Neuroscience program).

Admission to Candidacy

After successfully completing their core courses students are required to take a qualifying examination (usually in the fall of their second year). The examination will consist of both a written examination and an oral defense presented to a qualifying examination committee composed of primary and secondary neurobiology faculty.

The written examination will consist of questions in four areas of neurobiology, expansive in scope, and will test the ability of the student to read and summarize scientific material, to integrate and synthesize this ma-

terial, and to coherently present these issues in written form. There will be one question from each of the four core areas: (i) molecular neurobiology, (ii) signal transduction and cell biology, (iii) systems neurophysiology, and (iv) neural development and diseases of the nervous system. The student will be permitted 48 hours for each question and will answer two questions per week. The student may use text material, but may not receive help from faculty, students, or others.

The oral defense of the written portion will take place one week after completion of the written portion. Student will, during the oral portion of the examination, be examined on their answers to the written questions, and on fundamental aspects in the four broad areas of Neurobiology: (i) molecular neurobiology, (ii) signal transduction and cell biology, (iii) systems neurophysiology, and (iv) neural development and diseases of the nervous system.

The student must show competency in each of the four areas. If the student fails one area, she or he may retake that portion at a later date that quarter. If the student is found to be deficient in two or more areas, she or he will be dismissed from the program.

Completion of the Ph.D. Program

After passing the qualifying examination, the student must meet at least once a year with a dissertation committee. This dissertation committee can be the same as that for the qualifying examination, or can be changed through consultation with the mentor. It is expected that most students will complete the entire program in four or five years. However, a time limit of seven years is allowed for completion of the degree of Doctor of Philosophy in the Department of Neurobiology in extenuating circumstances.

Financial Assistance

Doctoral students will receive financial aid in the form of a fellowship. Current stipends are \$17,000 per year plus tuition for 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.

Contact

For detailed information, contact Dr. Craig C. Garner, Program Director, UAB Department of Neurobiology, CIRC 593, 1719 Sixth Avenue South, Birmingham, Alabama 35294-0021.

Telephone 205-975-5573

Fax 205-934-6571

Email garner@nrc.uab.edu

Web www.nrc.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.

Neurobiology (NBL)

711. **Medical Neuroscience.** Introduction to the structure and function of the normal mature and developing nervous system from the molecular level to the behavioral level; provides a basic science introduction to clinical neuroscience. 5 hours.

715-718. **Lab 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.

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.** An introduction to the principles of molecular and cellular neurobiology, including the properties of membranes, synaptic transmission, the structure and function of ion channels, and second messenger systems. 6 hours.

752. **Developmental Neuroscience.** Birth, migration, growth, and differentiation of neurons; establishment of synaptic connections; regulation and plasticity. 4 hours.

753. **Laboratory Methods in Cell and Molecular Neurobiology.** An intensive integrative course that combines hands-on laboratory experiments with in-depth discussion of theoretical and methodological issues. 4 hours.

755. **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.

780-782. **Selected Topics in Neurobiology I-III.** Students and faculty critically evaluate recently published work from all areas of neurobiology. 1 hour.

798. **Nondissertation Research.** 1-12 hours.

799. **Dissertation Research.** Prerequisite: Admission to candidacy. 1-12 hours.

Neuroscience

Chair, Committee on Graduate Study in Neuroscience:
Hablitz

Committee

Paul Gamlin, Physiological Optics; John Hablitz, Neurobiology; Raymond Hiramoto, Microbiology; Richard Jope, Pharmacology; Lori L. McMahon, Physiology; J. Michael Wyss, Cell Biology.

Program Information

The graduate training program in neuroscience at UAB is an interdepartmental effort that bridges basic and clinical science departments throughout the UAB community. The program was established in 1983. The resulting approach to neuroscience training within this program reflects the influence of the contemporary interdisciplinary research of the more than 60 funded principal investigators who form the faculty for the program. The program emphasizes an open structure that allows students to garner the greatest amount of expertise in diverse areas of the neurosciences. The current programs of research by the faculty members include molecular, genetic, cellular, immunological, developmental, systems, behavioral, neurological, and psychiatric approaches to the nervous system.

Applicants to this program must have a solid background in general biology, chemistry and mathematics. Most students apply as "undifferentiated students" with the intent of using their classroom and laboratory experiences during the first year to help them define their dissertation research interests. These students should apply for admission to the Graduate School, specifying graduate study in neuroscience. For undifferentiated

students, 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. During the first year in graduate school, undifferentiated students select an advisor and request an affiliation with the graduate program of the advisor's department.

Students with well-defined research interests have the option of entering the neuroscience core curriculum after having been admitted to a graduate degree program in one of the participating UAB departments. Such students must follow the normal application procedures for the appropriate participating program.

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 also shared use elsewhere. 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 student's investigation of neurobiological questions of interest to them. The program is designed to recruit and train the individuals who will become the future, international leaders in neuroscience research.

Advanced courses in the neurosciences are offered by individual departments and a weekly seminar series brings outstanding neuroscientists to the UAB campus. Since large numbers of neuroscientists are actively involved in research on the campus, a variety of journal review sessions and special-interest discussion groups meet weekly. Students who successfully complete the neuroscience core curriculum receive recognition of this at the time they complete a departmental program and receive the Ph.D. degree.

Contact

For detailed information, contact Dr. John Hablitz, Chair, Committee on Graduate Study in Neuroscience, Civitan International Research Center, Room 510A, 1719 Sixth Avenue South, Birmingham, AL 35294-0021. Telephone 205-934-0742

Course Descriptions

Cellular and Molecular Biology (CMB)

(See CMB for complete course description)

700. **Cellular and Molecular Biology I.** Biochemistry. 5 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.

710. **Integrative Neuroscience.** Control of the cardiovascular system; fluid and energy balance; neural mechanisms underlying biological rhythms, learning and memory, sensory and motor processes. 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, Assistant Professor (Nurse Anesthesia); Electrocardiography and Cardiovascular

Joe R. Williams, Associate Professor (Nurse Anesthesia); Pharmacology

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 six 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 verbal and 500 quantitative on the GRE exam 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 (September miniterm) of each year. It comprises 64 semester hours of didactic instruction and 48 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.

Contact

For detailed information, contact Mr. Joe R. Williams, Program Director, Master of Nurse Anesthesia Program, UAB School of Health Related Professions, Webb 636, 1530 3rd Avenue South, Birmingham, AL 35294-3361.

Telephone 205-934-3209

Email mna@uab.edu

Web main.uab.edu/show.asp?durki=1275

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)

601. **Anatomy.** Structure and functions of human body examined through laboratory dissection, lecture, models, and preceptorials. 4 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. **Principles of Anesthesia I.** Principles and theories of anesthesia practice with emphasis on fundamental concepts of anesthesia care. 3 hours.

641. **Principles of Anesthesia II.** Principles of physics and monitoring related to anesthesia practice. 3 hours.

645. **Professional Aspects of Anesthesia.** Psychosocial and ethical issues related to anesthesia. 1 hour.

646. **Legal Consideration and Quality Assurance Issues.** Malpractice and quality assurance concerns in anesthesia practice. 2 hours.

650. **Regional Anesthesia.** Techniques used to provide regional anesthesia for surgical procedures. 2 hours.

660. **Anesthesia for Special Conditions I.** Concepts concerning anesthesia management of pregnant patients. 2 hours.

661. **Anesthesia for Special Conditions II.** 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, 673. **Clinical Practicum I, II.** Operating room experience; application of theoretical principles of anesthesia management. 4 hours each.

674, 677. **Clinical Practicum III-VI.** (Continuation of NA 672 and 673). 5 hours each.

678. **Advanced 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.

681-684. **Project.** Students develop selected topics into state-of-the-art review articles. 1 hour each.

695-698. **Special Topics.** Review of specialty concepts as presented in NA 670, 671, and 680. 2 hours each.

Nursing (NUC)

600. **Research Design and Inferential Statistics I.**

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.

610, 611. **Pathophysiology I, II.** Normal physiology of all major organ systems; emphasis on pathological conditions. 3 hours each.

Nursing (Ph.D., M.S.N.)

Graduate 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

Joan Carlisle, Assistant Professor (Nursing); Child Health Promotion

* **Ann Clark**, Associate Professor (Nursing); Women's Health, Alternative Therapies

Ruth Cox, Assistant Professor (Nursing); Delinquency, Family Health

Priscilla Daffin, Assistant Professor (Nursing); Oncology Prevention and Screening; Pain and Suffering

* **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

Juanzetta Flowers, Associate Professor (Nursing); Women's Health, Health Policy, International Nursing

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, Nursing Interventions

* **Joan Grant**, Associate Professor (Nursing); Nursing Diagnosis, Family Caregiving

***Joyce Newman Giger**, Professor (Nursing); Risk Reduction in African American Women

* **Lynda Harrison**, Professor (Nursing); Effects of Human Touch on Preterm Infants, Maternal-Child Health, Parenting

Gail Hill, Assistant Professor (Nursing); Health Systems, Acute Care

* **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, Assistant Professor (Nursing); Self-Care Activities and Health Promotion in Adolescents

Linda Miers, Assistant Professor (Nursing); Nurse Caring Behaviors, Roy Adaptation Model

Kathleen Mikan, Professor (Nursing); Instructional Development, Health Education Media, Telehealth, Informatics

Penelope Paul, Associate Professor (Nursing); Gerontology, Elders with Dementia and their Caregivers

Victoria Poole, Assistant Professor (Nursing); Pregnancy Intendedness, Women's Health, Family Planning

Erica Pryor, Assistant Professor (Nursing); Epidemiology; Statistics; Infectious Disease

Mary Lynn Reilly, Assistant Professor (Nursing); Nursing Education, Maternal-Infant Nursing

* **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

* **Michael Weaver**, Associate Professor (Nursing); Health Promotion, Community Health, Biostatistics

Anne Williams, Assistant Professor (Nursing); Stroke Victims, Caregiving

* **Roma Williams**, Assistant Professor (Nursing); Women's Health, Health Promotion, Disease Prevention

Penelope Wright, Associate Professor (Nursing); Pediatric Oncology, Quality of Life

* *Ph.D. core faculty*

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 which (1) improve the health status and function of individuals and communities and (2) facilitate the health status and functioning of families engaging in caregiving.

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 upon scientifically sound conceptual and methodological decisions about research designs, measures, and statis-

tics; 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:

1. Master's degree in nursing from an accredited program, or baccalaureate degree in nursing from an accredited program for those applying to the Post-Baccalaureate PhD option;
2. At least an overall B average on all graduate level coursework;
3. Scores of at least 550 on the verbal and quantitative sections of the GRE, or a total of 1650 on the verbal, quantitative and analysis section of the GRE;
4. Satisfactory TOEFL scores for students from non-English-speaking countries (minimum of 550);
5. Evidence of graduate coursework in research and inferential statistics;
6. Eligibility for licensure as a registered nurse in Alabama;
7. A written goal statement which describes congruence between the applicant's research interests and one of the program focal areas;
8. A current curriculum vita;
9. Submission of an independent work which demonstrates the applicant's scholarship potential.
10. Letters of reference.
11. A personal interview is 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:

1. coursework and experiences based on the student's background and focal area, with an overall grade point average of B or better, and grades of B or better in all required courses in the School of Nursing;
2. a qualifying paper in the form of a grant application prior to completion of the fourth quarter of full-time study;
3. a statistical analysis sequence;
4. a comprehensive examination administered upon completion of an individualized program of studies; and
5. a written dissertation demonstrating competence in research, individual inquiry, critical analysis, and in-depth treatment of a health care problem within the focal area. The investigation must make a genuine contribution to knowledge, concepts, and theories in the field of nursing. A final defense of the dissertation is required.

M.S.N. and Post-Master'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 upon a student's learning needs in specific areas of interest. 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.

Financial Aid

Financial aid available includes a limited number of Alabama Graduate Nurse Scholarships; graduate teaching or research assistantships; National Research Service Awards for predoctoral and postdoctoral study; School of Nursing Graduate Fellowships; federal professional nurse traineeships; the Florence A. Hixson Scholarship; and part-time employment for registered nurses licensed in Alabama. For information concerning these, the Chair for Graduate Studies in Nursing (see below) or consult the School of Nursing catalog.

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.

Contact

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

Email dashiffc@admin.son.uab.edu

web www.uab.edu/son/sonintr2.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.

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. Summer. (Dashiff, Cox)

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 practice and apply this to research experiences within the area of family health and caregiving. 3 hours. Winter. (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, R. Williams)

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. Summer. (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. Winter. (Gauthier, Giger)

NRM 770. **Designs for Nursing Studies I.** The beginning phases of the research process, including exploration of a domain of problems, formulation of research questions, and critique of non-experimental designs for their utility in building nursing knowledge. 3 hours. Winter. (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. Summer. (Davis; Broome)

NRM 772. **Designs for Nursing Studies II.** Sampling, design, analysis plans, presentation of results, findings, and conclusions in experimental designs and the integration of these into the body of knowledge in an identified focal area of research. Ethical and cultural issues related to the implementation of experimental research within the context of clinical trials, effectiveness of nursing intervention, and health care delivery will be addressed. 3 hours. Spring. (Kang, Rice, Smith)

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. Winter. (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. Spring. (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 780. **Special Topics.** A special topic seminar with variable focus. 1-3 hours. Summer. (TBA)

* NUR 790. **Independent Study in Nursing.** Pass/Fail. 1-6 hours.

* NUR 791. **Independent Study in Nursing Practice.** Pass/Fail. 1-6 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 quarter, from a minimum of one hour credit to a maximum of three hours credit. Offered every term. (Graduate Faculty Research Mentors)

* NUR 799. **Dissertation Research.** Prerequisites: Comprehensive Exam and admission to candidacy. Pass/Fail. 1-6 hours.

Nutrition Sciences (Ph.D.), Clinical Nutrition (M.S.)

Ph.D. Program Director (Nutrition Sciences): *Nagy*
M.S. Program Director (Clinical Nutrition): *Canfield*

Faculty

Jose O. Alvarez, Professor (International Health); Protein Metabolism, Dietary Factors in Dental Health

Joseph E. Baggott, Assistant Professor (Nutrition Sciences); Folate and Antifolate Metabolism, One-Carbon Metabolism, Purine Biosynthesis

Rebecca L. Bradley, Associate Professor (Nutrition Sciences); Nutritional Assessment, Dietetic Education, Clinical Nutrition

C. Michael Brooks, Professor (School of Health Related Professions); Nutrition Education; Cancer Education, Prevention and Control; Asthma/COPD Self-Management

W. Ruth Buchanan, Instructor (Nutrition Sciences); Dietetics Education, Systems Management

Gayl J. Canfield, Assistant Professor (Nutrition Sciences); Dietetics Education, Nutrition in Cancer Prevention

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

Phillip E. Cornwell, Associate Professor (Nutrition Sciences); Homocysteine Metabolism, Laboratory Methodology, Cellular Regulation

Carol Craig, Professor Emerita (Nutrition Sciences); Dietetic Education, Clinical Nutrition

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

Reinaldo Figueroa, Associate Professor (Pediatrics); Gastroenterology, Nutrition

Frank A. Franklin, Professor (Pediatrics); Gastroenterology, Lipids, Nutrition

Michael I. Goran, Professor (Nutrition Sciences); Obesity, Body Composition, Physical Activity, Prevention, Diabetes, Heart Disease, Children

Barbara Gower, Assistant 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

Carol Hickey, Associate Professor (Maternal and Child Health); Preconception and Prenatal Nutrition, Cross-Cultural Aspects of Health Care

Gary Hunter, Professor (Human Studies); Exercise Physiology

Janet Isaacs, Assistant Professor (Nutrition Sciences); Children with Special Health Care Needs

Gary L. Johannig, 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

Calvin Long, Adjunct Professor (Nutrition Sciences); Energy Metabolism

Sarah L. Morgan, Associate Professor (Nutrition Sciences and Medicine); Nutrition and Rheumatic Diseases, Folate and Antifolates, Osteoporosis

Tim R. Nagy, Assistant 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

Howerde E. Sauberlich, Professor (Nutrition Sciences); Nutritional Requirements and Assessment, Trace Elements, Vitamins, Toxicology

Susan Sell, Assistant Professor (Nutrition Sciences); Molecular Genetics, Diabetes and Obesity

Bonnie A. Spear, Assistant Professor (Pediatrics); Pediatric and Adolescent Nutrition

Charles B. Stephensen, Associate Professor (International Health); Nutrition and Community Health, Vitamin A Nutrition, Immunology, Infectious Diseases

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

MS 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 MS 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. Courses from the following emphasis option areas: exercise science, health education, health services administration, public health, and laboratory sciences are required as well.

Contact

For detailed information, contact Dr. Gayl J. Canfield, 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

Email cnntr@uab.edu

Web main.uab.edu/show.asp?durki=1275

Dietetic Internship

The Dietetic Internship Program is accredited by 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 four cities in Alabama: Dothan, Huntsville, Mobile, and Montgomery. 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 15 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.

Contact

For detailed information, contact Dr. Gayl J. Canfield, 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

Email dintr@uab.edu

Web main.uab.edu/show.asp?durki=1275

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.

Contact

For detailed information, contact Dr. Charles W. Prince, 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 324, 1675 University Boulevard, Birmingham, AL 35294-3360.

Telephone 205-934-7757

Email phdntr@uab.edu

Web main.uab.edu/show.asp?durki=1275

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.

For additional courses in epidemiology and other public health areas, see the catalog of the School of Public Health.

Nutrition Sciences (NTR)

589. **Internship Practicum.** Clinical experience in food service management and clinical nutrition. Fall, Winter, Spring. 3 or 6 hours.

601, 602. **Advanced Medical Nutrition I, II.** 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, Winter. 3 hours each.

604. **Principles and Practice of Nutrition Support.** Nutrition support for critically ill patients; theory integrated with clinical practice. Winter.

605. **Maternal and Child Nutrition.** Pathophysiology of common disorders; public health and world health problems related to field. Prerequisite: Permission of instructor. Summer.

611, 612. **Advanced Food Service Systems Management I, II.** Management systems, application to hospital food service. Prerequisite: Permission of instructor. Fall, Winter.

618, 619. **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. Winter, Spring. 3 hours each.

622. **Nutrition, Obesity, and Prevention of Cardiovascular Disease and Cancer.** Critical evaluation of the effects of genetics and environmental factors, espe-

cially nutrients, on the development and prevention of obesity, atherosclerosis, and cancer. Spring. 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.

650. **Body Composition and Energy Metabolism.** Methods of measurement and relationship to human health and disease. Prerequisite: Permission of instructor. Fall.

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.

688. **Issues in Dietetics.** Current issues and research developments in dietetics. Spring. 1-3 hours.

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. 3-6 hours.

693. **Clinical Practicum: Pediatric Nutrition.** Clinical experiences in normal growth patterns in children; nutritional needs in health and disease. Prerequisite: Permission of instructor. 3-6 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. Each term. 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.

704. **Principles and Practice of Nutrition Support.** Critical review of current methods of providing nutrition support for critically ill patients; theory integrated with clinical practice. Winter.

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, 719. **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. Winter, Spring. 4 hours each.

720, 721. **Trace Elements in Human Nutrition I, II.** Trace elements in nutrition and disease. Prerequisite: NTR 718 and 719 or equivalent. 2 hours each.

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. Spring. Prerequisite: Permission of instructor.

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. 1-3 hours.

734. **Laboratory Methods in Vitaminology.** Vitamin determinations in clinical and other specimens. Prerequisite: Permission of instructor.

737. **Research Concept Development.** Development and writing of research projects, grants, dissertations, manuscripts, and reports. Fall. 1 hour.

742. **Nutritional and Toxicological Aspects of Food Safety.** Food toxicants, mutagens, and antinutrients; metabolic, genetic, toxicological, microbial, and chemical aspects of food ingredients. 2 hours.

743. **Macronutrients.** Dietary requirements, metabolism, food sources, and clinical implications of major nutrients. Prerequisite: NTR 718 and 719 or equivalent.

744. **Vitamins: Nutritional, Clinical, and Biochemical Aspects.** Vitamins and related growth factors; sources, interactions, bioavailability, toxicities, and clinical implications. Prerequisite: NTR 718 and 719 or equivalent. 2 hours.

746. **Nutritional Aspects of Aging.** Nutrients and metabolism relating to the aging process and various degenerative disorders; nutritional support of elderly. Prerequisite: NTR 718 and 719, or equivalent. 2 hours.

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.

750. **Body Composition and Energy Metabolism.** Methods of measurement and relationship to human health and disease. Prerequisite: Permission of instructor. Fall.

760. **Foundations of Nutrition Research.** Development of nutrition as a science and critical analysis of classic literature in nutrition research. 1 hour.

778. **Special Topics in Nutrition Sciences.** 1-5 hours.

788. **Advanced Nutrition Seminar.** Fall, Winter, Spring. 1 hour.

789. **Seminar in Energy Metabolism and Obesity.** Fall, Winter, Spring. 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

Carroline 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

Louise R. Thibodaux, Associate Professor (Occupational Therapy); Client-centered practice; Social determinants of health; Theory of Occupation; Gerontology, Research Methodology

Laura K. Vogtle, Associate Professor (Occupational Therapy); Pediatrics, Research Methods, Program Evaluation, Outcomes Research

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

M.S. Track II (Entry-Level Professional Program)

Track II is designed for individuals who have earned a baccalaureate degree in another field. It is an entry-level program which qualifies the graduate to become a practicing therapist and collaborative researcher. This full-time program can be completed in 8 quarters (2 years). Graduates are eligible to sit for the national certification examination administered by the National Board for Certification in Occupational Therapy (NBCOT) after successful completion of all coursework.

The program is accredited by the Accreditation Council for Occupational Therapy Education (ACOTE) of the American Occupational Therapy Association (AOTA), located at 4270 Montgomery Lane, PO Box 31220, Bethesda, MD 20824-1220; telephone: (301) 652-AOTA.

Credentials Conferred

Graduates of the program receive a diploma for a Master of Science in Occupational Therapy.

Professional Certification

Graduates of the program will be 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.

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:

- a baccalaureate degree from an accredited college or university;
- a minimum of 3.0 (on a 4.0 scale) in the last 60 hours of coursework;
- a minimum of 3.0 (on a 4.0 scale) in the natural sciences prerequisites;
- a minimum of 3.0 (on a 4.0 scale) in the social and behavioral sciences prerequisites;
- a minimum GRE score of 1000 (500 in each (verbal and quantitative) or a MAT score of 50 (note: 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;
- a personal interview with members of the faculty of the Division of Occupational Therapy;
- completed applications to the UAB Graduate School and the occupational therapy program; and
- if accepted, completion of the UAB Medical History Questionnaire and Physical, including required immunizations 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 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., theater, art, music, dance, photography)	3
English Composition	3
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 (Chemistry, Mathematics, Physics, Biology, Computer Science)	3-4
Medical Terminology	1-2

*Must be completed within the last five years; basic science coursework taken more than five years ago, must be repeated.

Application Process

The deadline for application to the M.S.-Professional program that begins in the Fall term is February 15 of the preceding year. Rolling admissions begins November 1 and concludes February 15. Early submission of application for admission is recommended. Later applicants will be reviewed and admitted on a space-available basis. All applicants must be admitted to the Division of Occupational Therapy and to the Graduate School. The application process for the post-professional program is the same as that for the profes-

sional program. A brochure describing the occupational therapy program at UAB is available upon request from the Division of Occupational Therapy.

The following materials must be submitted directly to the Division of Occupational Therapy: UAB Graduate School and Division of Occupational Therapy applications; nonrefundable application fee; two official transcripts from each college or university attended; test scores (GRE or MAT); and three evaluation forms (references). International students should contact the Division of Occupational Therapy for further information.

The deadline for application is February 15 preceding the expected year of enrollment. Students are encouraged to submit completed applications as early as November 1 for review by the Admissions Committee.

The program accepts new students only in the Fall term.

Contact

For detailed information, contact Division of Occupational Therapy, UAB School of Health Related Professions, BB 102, 1530 3rd Avenue South, Birmingham, AL 35294-2030.

Telephone 205-934-3568

Email msot@uab.edu

Web www.uab.edu/OT

Course Listings

MSOT-Entry Level Program in Occupational Therapy (OT) -Track II

Students in the M.S. program may elect to take up to 6 hours of related elective coursework in anatomy, anthropology, biology, community health, education, gerontology, health services, nursing, physical therapy, public administration, and psychology. All elective nondepartmental coursework must be approved by the student's graduate advisor and by the faculty member who teaches the course.

606. Frameworks for Occupational Therapy Practice. Introduction to fundamental concepts of occupational therapy practice, history, philosophy, terminology, professional roles, ethics, scope, and models of practice. 4 hours.

607. Therapeutic Media. 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. 8 hours.

608. Neurophysiological Principles of Patient Care. 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. 5 hours. (Also PT 608)

609, 610. Barriers to Occupation Performance I, II. Evaluation of specific body systems and exposure to disease processes, injuries, and inherited or developmental abnormalities within these systems. 2 hours each.

611. Strategies of Evaluation. 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. 6 hours.

620. Gross Anatomy. Advanced study of human body by means of dissection, demonstration, and lecture. 4 hours.

623. Human Neuroanatomy. Advanced study of structure and function of central nervous system. 3 hours.

624, 625. Therapeutic Enhancement of Occupation I, II. Aspects of treatment planning, implementation, and treatment techniques across all diagnostic categories and throughout life span using holistic approach that incorporates all aspects of individual's lifestyle; focus on basic and instrumental activities of daily living, performance components and contexts, and affect on occupational performance; case studies and lab sessions that emphasize development of competencies in treatment techniques, treatment planning, and implementation. 8 hours each.

628. Pharmacology in Rehabilitation. Survey of pharmacology with emphasis on medications used by patients treated by occupational and physical therapists; pharmacological principles that apply to all groups of drugs; emphasis on medications used for movement related disorders that affect responses to physical activity, and used in common psychiatric conditions. 2 hours.

631. Manual Muscle Testing and Goniometry. Introduction to processes of clinical measurements; study of principles and technologies for obtaining data about status of patients'/clients' joint range of motion and muscle strength. 3 hours.

632,633. **Fieldwork Seminar I, II.** Forum for exchange of ideas and experiences; detailed casestudy/in-service on modality and treatment technique/intervention chosen from client/patient/consumer census during previous term's Level 1 Fieldwork experience. 2 hours 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. 1 hour.

651. **The Spectrum of Physical, Psychosocial and Developmental Patient Care.** Function progression from specific evaluative and treatment techniques to occupational performance perspective; small groups mentored by interdisciplinary faculty to stimulate individual and cooperative skills. 6 hours.

656. **Data Management for Clinical Research.** Skill development in use of computer-based techniques; methods for managing qualitative and quantitative data gathered in clinical settings; evaluation of treatment outcomes and service efficacy. 3 hours.

664. **Management and 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. 5 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. 3 hours. (Also GER 665).

666. **Splinting.** Introduction to concepts of splint fabrication, including purpose of orthotic construction and anatomical and biomechanical principles surrounding use of splints; examination of extremity for splinting; problem solving related to design, tissue response, and goal setting; material characteristics; splint fabrication for various populations, including neurological, pediatric, orthopedic, and geriatric intervention. 2 hours.

667. **Research Methods.** Research ethics, experimental design, basic statistical concepts, and discussion of various types of research to enable student to critically analyze and use scientific literature to improve clinical practice. Emphasis will be placed on understanding components of research report and concepts associated with judging of internal and external validity. 3 hours.

674. **Technology Applications for Clinicians.** RESNA technology competencies for occupational therapists; assessments used in evaluation of clients for technology prescription, seating and wheelchairs, computer software, hardware and input devices, augmentative communication systems, and environmental controls. 1 hour.

675. **History 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. Students will gain from an understanding of how leaders of the profession have articulated occupation and therapeutic applications across time. 3 hours.

684. **Functional Anatomy.** Basic kinesiological principles and functional movement patterns of the human body; evaluation and treatment strategies of persons with physical dysfunction; theoretical data followed by hands-on lab experience.. 3 hours. (Last taught Spring 2001).

684. **Introduction to PBL & Action Research.** Problem-based critical inquiry. Clinical problem solving from a client centered base using action research. 3 hours. (Begins Spring 2002)

685. **Advanced Fieldwork Experience I.** 8 hours.

686. **Advanced Fieldwork Experience II.** 8 hours.

688. **Advanced Practice Topics.** In-depth exposure to selected practice topic. 2 hours.

698. **Master's Level Nonthesis Research.** 1-6 hours.

M.S. Track I (Postprofessional Program)

The Occupational Therapy program leading to the Master of Science 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, clinical application, research methodology, and a project or thesis. Elective coursework 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. A full-time student can expect to complete the degree in 15 months and a part-time student in 2 1/2 years. 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.

Admission Requirements

The minimum requirements for unconditional acceptance are those set forth for admission to the Graduate School, including a GRE score of at least 500 on each section (verbal and quantitative) of the GRE general test or a MAT score of 50 or higher; a baccalaureate degree in Occupational Therapy with a minimum GPA of 3.0 in the last 60 hours of coursework; eligibility for licensure as an occupational therapist; and personal interviews with members of the faculty of the Division of Occupational Therapy. Students are admitted throughout the academic year.

MSOT - Postprofessional Program - Track I

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.

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.

635. Sensory Integration: Foundations and Applications. Advanced concepts of sensorimotor development, impairment, and remediation.

636. Occupational Therapy Intervention for Upper Extremity Dysfunction. 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.

640. Consultation Skills in Occupational Therapy. Consultation models, competencies, and practice as related to occupational therapy.

645. Advanced Theory of Psychosocial Processes. Advanced clinical theory and practice.

650. Ergonomic Aspects of Environmental Adaptation. Occupational performance and measurement of work-related behaviors.

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. 3 hours.

656. Data Management for Clinical Research. Skill development in use of computer-based techniques; methods for managing qualitative and quantitative data gathered in clinical settings; evaluation of treatment outcomes and service efficacy. 3 hours.

657. Health and Community Issues for Allied Health Care. Impact and importance of community issues in various health arenas.

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).

670. The Assessment Process in Occupational Therapy. Concepts of evaluation and measurement applied to specific assessment tools.

671. The Advanced Theory of the Assessment Process in Occupational Therapy. Advanced theory and concepts of evaluation and measurement.

674. Technology Applications for the Clinician. RESNA technology competencies for occupational therapists; assessments used in evaluation of clients for technology prescription, seating and wheelchairs, computer software, hardware, and input devices, augmentative communication systems and environmental controls. 1 hour.

675. Perspectives on Disability. Client issues regarding chronic disease adaptation throughout the life span; issues of stigma and how it relates to disability at different life stages. 3 hours.

680. Clinical Education and Supervision. Departmental management and supervision of employees, with a secondary focus on occupational therapy field-work supervision. 3 hours.

681. **Practicum in Consultation.** 1-2 hours.
682. **Advanced Clinical Practicum.** 1-3 hours.
683. **Practicum in Teaching.** 1-3 hours.
685. **Advanced Field Experience I.** 8 hours.
686. **Advanced Field Experience II.** 8 hours.
692. **Directed Readings.** Study of specific topic or area under guidance of faculty member. 1-3 hours. 1-3 hours.
699. **Master's Thesis Research.** Elements of proposal and development of thesis/project; thesis and institutional review board procedures. Includes student presentation, group discussion, recommendations, and critique. 1-6 hours. Prerequisite: admission to candidacy.

Oral Biology (M.S)

Graduate Program Director: *Li*

Faculty

Page W. Caufield, Professor (Oral Biology); Dental Caries, Genetics, Natural History and Molecular Epidemiology of Dental Caries

Noel Childers, Professor (Pediatric Dentistry); Mucosal Immunology as it Relates to the Immunobiology of Dental Caries

Ananda Dasanayake, Associate Professor (Oral Biology); Cariology, Oral Epidemiology, Oral Cancer, Low Birth Weight, Natural History of *Streptococcus, S. mutans* Colonization; Health Service Research, Dental Sealants

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

Kohtaro Fujihashi, Associate 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*, Hemag-

glutinins 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

Yihong Li, Assistant Professor (Oral Biology) Molecular Epidemiology, Early Childhood Caries, Transmission of Oral Biota

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

Fengxia (Felicia) Qi, Assistant Professor (Oral Biology); Bacterial Genetics, Antibiotics, Ecological Role of Bacteriocins in the Oral Cavity

Firoz Rahemtulla, Professor (Biomaterials); Proteoglycans, Biosynthesis, Soft Connective Tissue, Oxidants

Michael Reddy, Professor (Periodontics); Bone Resorption, Attachment Loss, Periodontitis, Implant Therapy, Regenerative Technology

Michael Russell, Research Professor (Microbiology); Mucosal Immunology, Immunity to Dental Caries, Antigens of *Streptococcus mutans*, Role of IGA in Periodontal Disease, Mucosal vaccines, Bacterial Proteases

Program Requirements

Applicants to the Oral Biology graduate program must have the D.M.D. or an equivalent degree.

Contact

For detailed information, contact Dr. Yihong Li, Program Director, UAB Department of Oral Biology, SDB 740, 1919 7th Ave. South, Mailing address: 1530 3rd Avenue South, Birmingham, AL 35294-0007.

Telephone 205-975-8233

Fax 205-975-6773

Email yihongli@uab.edu

Web www.dental.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.

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.

616. **Postgraduate Oral Histology**. Comprehensive knowledge of the development and histology of oral facial structures of the human. 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. **Current Issues in Nutrition and Oral Health**. Overview of nutrition as it relates to oral health. Spring.

657. **Prenatal Craniofacial Growth and Development**. Comprehensive knowledge of prenatal facial growth and development. Winter

663. **Saliva as a Diagnostic Fluid**. Comprehensive knowledge about planning, performing, and interpreting results of saliva analyses. Fall.

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 hours.

Pathology (Ph.D.)

Graduate Program Director: *Lincoln*

Faculty

Michael T. Anderson, Assistant Professor (Pathology); Genetic Analysis, T-Cell Costimulation

Peter G. Anderson, Associate Professor (Pathology); Cardiovascular Pathology, Comparative Pathology

William H. Benjamin, Jr., Assistant Professor (Pathology); Parasitology

David Briles, Professor (Microbiology); Cellular Immunology, Immunogenetics, Genetic Control of Disease Susceptibility

R. Pat Bucy, Associate Professor (Pathology); Immunology and Transplant Rejection

Danie, Bullard, Assistant Professor (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

Trudy L. Cornwell, Assistant Professor (Pathology); Nitric Oxide, Cyclic GMP, Uterine Smooth Muscle, Placenta, Preterm Labor

David T. Curiel, Professor (Pulmonary/Critical Care); Gene Therapy, Carcinogenesis, Growth Factors, Cell Regulation

Victor M. Darley-USmar, Associate Professor (Pathology); Oxygen Free Radicals, Atherosclerosis, Stroke and Alzheimer's, Coronary Heart Disease

Kevin F. Dybvig, Professor (Comparative Medicine); Molecular Genetics and Molecular Pathogenesis of Mycoplasmas

Ada Elgavish, Associate Professor (Comparative Medicine); Mechanisms of Cystitis and Prostate Cancer

Andra Frost, Associate Professor (Pathology); Biomarkers in Breast Cancer

Ken Fukuchi, Associate Professor (Comparative Medicine); Alzheimer's Disease, Study of Mechanisms Relating to Neuritic Plaques and Neurofibrillary Tangles

Candece L. Gladson, Associate Professor (Pathology); Tumor Cell Invasion

William E. Grizzle, Professor (Pathology); Endocrinology

Robert W. Hardy, Assistant Professor (Pathology); Cellular and Molecular Mechanisms of Fatty Acids in Disease

Dennis F. Kucik, Assistant Professor (Pathology); Cell Motility and Adhesion, Integrins, Laser Tweezers, Biophysics of Membrane Protein Movements

Thomas Lincoln, Professor (Pathology); Signal Transduction, Molecular Aspects of Vascular Biology

J. Russell Lindsey, Professor (Comparative Medicine); Mycoplasmal Respiratory Disease, Infectious Diseases of Laboratory Animals

Jay M. McDonald, Professor (Pathology); Diabetes, Calcium Metabolism

Joseph L. Messina, Associate Professor (Pathology); Regulation of Gene Transcription by Insulin; Molecular Endocrinology

Stephen A. Moser, Associate Professor (Pathology); Cytokines, Infectious Disease, Computerized Statistical Analysis of Scientific and Biological Data

Joanne E. Murphy-Ullrich, Associate Professor (Pathology); Endothelial Cell Adhesion

Rakesh Patel, Research Instructor (Pathology); Nitric Oxide, Heme Proteins, Blood Substitutes, Free Radicals and Cell Signaling

Carl A. Pinkert, Associate Professor (Comparative Medicine); Transgenic Animal Modeling and Development of Therapeutic Strategies for Human Metabolic Diseases

Selvaragan Ponnazhagan, Assistant Professor (Pathology); Adeno-associated Virus, Gene Therapy, Cancer Gene Therapy, Targeting Vectors

William H. Rodgers, Associate Professor (Pathology); Epithelial-stromal Interactions, Extracellular Matrix Formation in Human Tissue

Brad K. Rodu, Professor (Pathology); Dental Oncology

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

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

Casey T. Weaver, Associate Professor (Pathology); Costimulatory Molecules, T-cell Receptor Signaling

John P. Williams, Research Instructor (Pathology); Bone Cell Metabolism

Philip A. Wood, Professor (Comparative Medicine); 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 pathology, leading to the Ph.D. degree, is offered jointly by the Departments of Pathology and Comparative Medicine. The program is administered by a committee composed of seven members of the graduate faculty: Drs. T. M. Lincoln, D. Bullard, J.E. Murphy-Ullrich, K. Fukuchi, J.L. Messina, A. Elgavish, and S. Carroll.

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, 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, 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 in experimental pathology. 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) and Graduate Pathology (PAT 700, 701, 702).

Contact

For detailed information, contact Dr. Thomas M. Lincoln, UAB Pathology Graduate Program Director, VH G001, 1530 3rd Avenue South, Birmingham, AL 35294-0019.

Telephone 205-934-0043

Email lincoln@uab.edu

Web www.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.

IBS 700. Comprehensive and rigorous background in the principles of biochemistry, molecular biology, and cellular physiology.

IBS 701. Physiology, pathophysiology, and therapeutic approaches to diseases.

IBS 702. Genetics, genetic basis of disease and molecular medicine.

Pathology (PAT)

All courses require permission of instructor.

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. Winter, Spring. 3-4 hours. (Alexander)

503. **General Pathology** (Dental/Optomety). Fundamental mechanisms of disease. Prerequisites: Basic gross anatomy, histology, biochemistry, and physiology. Fall. 4 hours. (Waites)

504. **Systemic Human Pathology** (Dental/Optomety). Fundamental mechanisms of disease and pathologic processes of selected major organ systems of humans. Prerequisite: PAT 503 or equivalent. Winter. 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. (Anderson)

701. **Molecular Basis of Disease**. Alterations in molecular and cellular mechanisms of cells and tissues resulting in disease. Prerequisite: PAT 700. Winter (Murphy-Ullrich)

702. **Integrative Pathophysiology**. Physiological and pathophysiological principles governing organ system function in disease. Prerequisite: PAT 700. Spring. 3 hours (Lincoln)

703. **Introduction to Pathology Research**. A course designed to introduce first-year students to faculty research interests. Permission of instructor. Fall. (Lincoln)

704. **Pathology Research**. Data analysis and presentation. 1 hour each. Winter, Spring, Fall. (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. Winter, Spring. 4 hours each. (Lindsey)

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. Winter, 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. (Wood)

730. **Laboratory Rotation**. Original laboratory research conducted by the student under the supervision

of a graduate faculty member. Fall, Winter, Spring, Summer. 3-5 hours. (Staff)

756. **Molecular Biology of Cell Adhesion.** Techniques and the science. Spring, even years. (Murphy-Ullrich)

Seminars

791. **Advances in Molecular and Cellular Pathology Seminar.** Required attendance for all graduate students in pathology. Fall, Winter, Spring. Pass/Fail. 1 hour

792. **Comparative Histopathology Seminar.** Fall, Winter, Spring. Pass/Fail. 1 hour. (Brix)

793. **Oral Pathology Seminar.** Selected examples of disease, emphasizing clinicopathologic correlation. Prerequisite: PAT 705. Fall, Winter, Spring. Pass/Fail. 1 hour. (Rodu)

794. **Comparative Medicine Seminar.** Fall, Winter, Spring. Pass/Fail. 1 hour. (Gerrity)

Research Problems and Special Topics

797. **Comparative Medicine Rotation.** Clinical pathological correlation in laboratory animal medicine. Fall, Winter, Spring, Summer. 1-12 hours. (Gerrity)

798. **Research Problems** (Doctoral Nondissertation Research). Pass/Fail. 1-12 hours.

799. **Research Problems** (Doctoral Dissertation Research). Prerequisite: Admission to candidacy. Pass/Fail. 1-12 hours.

Pharmaceutical Design Training Program

Graduate Program: *Luo*

Faculty

Stephen Barnes, Associate Professor (Pharmacology); Structural Aspects of Bile Acids and Isoflavones

Christie Brouillette, Research Associate Professor (Biochemistry and Molecular Genetics); Structural Thermodynamics

Wayne J. Brouillette, Associate Professor (Chemistry); Drug Design and Synthesis

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

Mahmoud H. el Kouni, Associate Professor (Pharmacology); Drug Development for Cancer, AIDS and Parasites

Gabriel A. Elgavish, Associate Professor (Biochemistry and Molecular Genetics); Paramagnetic NMR Shift and Contrast Agents

Jeffrey A. Engler, Professor (Biochemistry and Molecular Genetics); Structure of Virus Proteins

Tracy P. Hamilton, Assistant Professor (Chemistry); Electronic Structure, Intermolecular Interactions

Stephen C. Harvey, Professor (Biochemistry and Molecular Genetics); Molecular Modeling of Proteins, Nucleic Acids and Lipids

N. Patrick Higgins, Associate Professor (Biochemistry and Molecular Genetics); Molecular and Biochemical Approaches

Eric Hunter, Professor (Microbiology); Retrovirus Molecular Biology and Structure

Marek J. Jedrzejas, Assistant Professor (Microbiology); Protein Structure, X-ray Crystallography, Structure-Based Drug Design

N. Rama Krishna, Associate Professor (Biochemistry and Molecular Genetics); NMR Spectroscopy of Biological Macromolecules

Naomi Lang-Unnasch, Assistant Professor (Microbiology); Chemotherapeutic Targets in *Plasmodium falciparum* and *Toxoplasma gondii*

Ming Luo, Professor (Microbiology); Viral Protein Structure and Antiviral Drug Design

Suzanne Michalek, Professor (Microbiology); Mucosal Immune System and Vaccine Development

Donald M. Miller, Professor (Biochemistry and Molecular Genetics); Triplex DNA-Based Modulation of Transcription

John A. Montgomery, Adjunct Professor (Chemistry); Drug Design and Chemotherapy

Donald D. Muccio, Associate Professor (Chemistry); Chemopreventive Retinoids

James R. Piper, Adjunct Professor (Chemistry); Organic Synthesis and Medicinal Chemistry

Peter E. Prevelige, Jr., Assistant Professor (Microbiology); Virus Assembly, Capsid, Bacteriophage, Protein Structure

Robert C. Reynolds, Adjunct Professor (Chemistry); Medicinal Chemistry

Ted T. Sakai, Associate Professor (Biochemistry and Molecular Genetics); Conformation of Biomolecules

John A. Secrist, III, Adjunct Professor (Chemistry); Drug Design and Synthesis, Medicinal Chemistry

Narayana V.L. Sthanam, Assistant Professor (Biochemistry and Molecular Genetics); Protein Structure Determined by X-ray Crystallography; Inhibitor Design Using 3-D Structure

Tim M. Townes, Associate Professor (Biochemistry and Molecular Genetics); Human Globin Gene Regulation

Charles L. Turnbough, Jr., Professor (Microbiology); Regulation of Gene Expression

Mark R. Walter, Assistant Professor (Microbiology); X-ray Diffraction, Protein Structure and Molecular Recognition

Janet L. Yother, (Microbiology); Bacterial Mechanisms of Pathogenicity

Program Information

Graduate Program Objectives

Pharmaceutical Design is an innovative new program that combines structure-based approaches to drug design with training in pharmacology, synthetic organic chemistry, and molecular biology. During the first year, each student will complete a core curriculum consisting of biochemistry, pharmacology, advanced organic chemistry, molecular biology, medicinal chemistry and drug design. In addition, each student will participate in laboratory rotations designed to aid in selecting a thesis project and advisor. The faculty for the Pharmaceutical Design Program consists of individuals from the Departments of Biochemistry and Molecular Genetics, Chemistry, Microbiology, and Pharmacology whose research involves drug design and development. Completion of the program will result in a Ph.D. degree in one of these four departments with a concentration in pharmaceutical design.

Activities during the second year will consist primarily of advanced course work and research within the chosen department. The time required to complete the pro-

gram will be typical of other Ph.D. programs in the basis sciences. In addition to on-campus training, each student will be allowed to compete for internships within the pharmaceutical industry after he or she has been admitted to candidacy.

Structure-based drug design is a field currently undergoing rapid change. Because of advances in fields such as X-ray crystallography, 2-D NMR, and theoretical molecular modeling, our knowledge of the structures of drugs and drug targets is increasing at an unprecedented rate. Similarly, development of new techniques in other areas of science has led to a greater understanding of biochemical pathways, drug metabolism, and compound synthesis. It is now possible to identify key macromolecular targets, determine their structures, and utilize the structural information to design new drugs. The Pharmaceutical Design program is designed to provide the participants with an overall understanding of this process while specializing in a chosen area of interest. Those who complete this program will have the necessary training to compete in the pharmaceutical and chemical industries or to carry out basic research in an academic environment.

Admission Requirements

This program is targeted toward chemistry majors or other individuals with strong backgrounds in chemistry, physics and mathematics. Candidates will be considered on the basis of the overall quality of their undergraduate degree rather than the specific major area. Undergraduate courses should include mathematics through differential equations, organic and physical chemistry, and introductory physics.

Ph.D. Program Requirements

It is expected that four to five years will be needed to complete the curriculum for students entering with B.S. or B.A. degrees. There are no language requirements.

Requirements for the Ph.D. Degree

1. Completion of the core curriculum as listed under "Course Descriptions";
2. Attendance and participation in at least one Journal Review and research workshop during each quarter of residence;
3. Satisfactory performance in one preliminary examination in which the student must propose and defend an original research proposition;
4. 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);

5. A dissertation reporting the results of original, significant, and publishable scientific research;
6. A formal public seminar presentation of the dissertation research; and
7. A final oral examination on the dissertation following the student's seminar, conducted by the student's dissertation committee.

Contact

For detailed information contact Dr. Ming Luo, UAB Pharmaceutical Design, Tinsley Harrison Tower-79, 1918 University Boulevard, Room MCLM-260 Birmingham, AL 35294-0005.

Telephone 205-934-4259

Email ming@orion.cmc.uab.edu or

Cookie Woodruff,

UAB Pharmaceutical Design,

Tinsley Harrison Tower-79, Room MCLM-260, 1918 University Boulevard, Birmingham, AL 35294-0005.

Telephone 205-934-3841

Fax 205-975-9578

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.

Cellular and Molecular Biology (CMB)

See Cellular Molecular Biology listing for full descriptions.

700. **Cellular and Molecular Biology I.** Structural and biochemical properties of proteins, enzymes, and coenzymes. 5 hours.

701. **Cellular and Molecular Biology II.** Prokaryotic genetics and molecular biology. 5 hours.

702. **Cellular and Molecular Biology III.** Eukaryotic molecular biology. 5 hours.

703. **Cellular and Molecular Biology IV.** Cell and developmental biology. 5 hours.

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

Chemistry (CH)

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. Winter.

Pharmaceutical Design (PCD)

700. **Introduction to Drug Design.** Computer programs and graphics for analysis of molecular interactions in nucleic acids and proteins.

701. **Medicinal Chemistry.** Selected overview of important organic medicinal agents with emphasis on receptor-based structure-function relationships and current approaches to drug design.

721. **Laboratory Research.** One quarter in each of three laboratories conducting research; 3-page single-spaced typed report on accomplishments each quarter. 5 hours.

798. **Doctoral Nondissertation Research.** 1-12 hours per quarter.

Pharmacology (PHR)

701. **Graduate Pharmacology I.** Introduction to graduate pharmacology. Dose-response relationships, drug absorption, disposition and metabolism, drug receptors, agonists and antagonists. 5 hours.

Pharmacology (Ph.D.)

Graduate Program Director: *Meezan*

Faculty

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 and 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

George B. Brown, Professor (Pharmacology and Toxicology, Psychiatry, and Behavioral Neurobiology); CNS Cell Excitability; Molecular Pharmacology and Molecular Biology of Ion Channels; Clinical Correlations

Donald Buchsbaum, Professor (Radiation Oncology and Pharmacology and Toxicology, and Director, Radiation Biology); Experimental Therapeutics With Radiolabeled Monoclonal Antibodies and Immunotoxins; Radiation Biology

Erika Cretton-Scott, Research Assistant Professor (Pharmacology and Toxicology); Drug Metabolism; Cytochrome P₄₅₀; Human and Animal Hepatocytes in Pharmacology and Toxicology Studies

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

Ada Elgavish, Associate Professor (Comparative Medicine, Pharmacology and Toxicology, and Urology); Molecular Mechanisms of Epithelial Cell Membrane-Extracellular Matrix Interactions: Role In Chronic Inflammation and Cancer Etiology and Chemoprevention. Studies are Carried Out *in vitro*, In Cell Cultures Isolated From Human Bladder and Prostate Biopsies, as well as *in vivo*, In Transgenic Mouse Models of Prostate Cancer

Charles N. Falany, Associate 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 and 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

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 and Cell Biology and Cytoskeletal Proteins in Normal and Dis-

ease 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 and Division of 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

Thomas M. Lincoln, Professor (Pathology and Pharmacology and Toxicology); Signal Transduction and Molecular Aspects of Vascular Biology

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, Associate Professor (Pharmacology and Toxicology); Endocrine Pharmacology; Administration of Insulin in Eye Drops and Nose Drops; Diagnosis and Treatment of Diabetes Mellitus

Chandra Sekar, Research Assistant Professor (Pathology and Pharmacology and Toxicology); Second Messengers Derived From Phosphoinositide and Their Role in Stimulus Response Coupling; Metabolic Alterations in Diabetes

Denise R. Shaw, Research Associate Professor (Pharmacology and Toxicology and Medicine); 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

Jean-Pierre Sommadossi, Professor (Pharmacology and Toxicology); Cellular, Molecular, and Clinical Pharmacology of Drugs Used in the Treatment of AIDS and Viral Diseases.

Ruiwen Zhang, Assistant 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

Thomas P. Dooley, Adjunct Associate Professor (Pharmacology and Toxicology); Director, Molecular Pharmacology (Southern Research Institute) Molecular and Cellular Biology; Dermatologic and Cancer Drug Discovery

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

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.

Contact

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

Email 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.

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. **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.

721. **Medical Pharmacology I.** Principles of pharmacology and neuropharmacology. Designated for nondegree students. 6 hours.

722. **Medical Pharmacology II.** Cardiovascular, renal, G.I. and endocrine pharmacology and chemotherapeutics. Designated for nondegree students. 6 hours.

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.

*790. **Advanced Pharmacology Seminar.** Recent advances in pharmacology and toxicology and departmental research in progress. Weekly seminar presented by faculty, advanced students, and invited guests. 1 hour.

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.

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

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 Director: *Shaw*

Primary Faculty

Cara C. Adams, Associate Professor (Physical Therapy); Exercise and Postural Deviations

Joan Bergman, Professor Emerita (Physical Therapy); Developmental Disabilities

Jo Ann Clelland, Professor (Physical Therapy); Pain Management

Betty G. Denton, Associate Professor (Physical Therapy); Clinical Education, Curriculum Development

Kennon T. Francis, Professor (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

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*

*Program changes are under review. Please contact Dr. Claire Peel, Director, Postprofessional Program, Division

of Physical Therapy, 900 19th Street South, UAB School of Health Related Professions, Birmingham, AL 35294-2030.

Admission Options

Postprofessional graduate study is offered for the physical therapist who wishes to pursue advanced preparation for professional practice in the assessment and management of musculoskeletal disorders or in preparation for clinical or academic teaching in physical therapy. The program is designed for physical therapists who desire advanced theoretical and clinical coursework in either of these two areas or who may elect to combine the areas.

The course of study for full-time students extends through a minimum of five terms (education concentration) or six terms (musculoskeletal concentration) of study.

Requirements for Admission

For unconditional acceptance, an applicant must satisfy the following requirements:

- a baccalaureate degree or certificate from an accredited physical therapy program,
- eligibility for licensure as a physical therapist,
- a minimum GRE score of 1,000 (minimum of 500 verbal and minimum of 500 quantitative) or MAT score of 50,
- an overall grade point average of at least 3.0 (A = 4.0),
- a minimum of two years of clinical experience at the time of enrollment in the program (requirement may be waived upon petition to the Committee on Graduate Admissions),
- personal interviews with members of the faculty of the Division of Physical Therapy, and
- if accepted, completion of a medical history questionnaire and a physical examination, including required immunizations, with satisfactory screening by the UAB Medical Center Student Health Service.

Additional requirement for musculoskeletal concentration:

- evidence of clinical experience with patients who have musculoskeletal problems.

Essential Requirements

Fundamental tasks, behaviors, and abilities that are necessary to successfully complete the academic and clinical and residency requirements of the program and to satisfy licensure and certification requirements 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.

Application Process

In addition to meeting the application requirements of the UAB Graduate School, the Division of Physical Therapy requires a divisional application form, one official transcript from each college attended, and evidence of fulfillment of special requirements. Application materials to begin in the Winter term **must be submitted by August 1** of the preceding year, or four months preceding any other term of desired enrollment. If the application materials are not satisfactory or not submitted by the appropriate deadlines, the application will not be considered unless acceptable intervening circumstances have been described to the chair of the committee on graduate admissions. When all application materials have been received, eligible applicants will be contacted to arrange for interview appointments. Acceptance into the program is pending satisfactory interviews.

Requirements for Degree

The student must complete total course credits and an extended practicum appropriate to the declared area of concentration, including satisfactory completion of major papers and projects. All students are required to complete a research activity. While the Graduate School Plan I is the preferred mode for completion of the research requirement, the student may follow Plan II in fulfilling this requirement.

Contact

For detailed information, contact Dr. Claire Peel, Director, Postprofessional Program, Division of Physical Therapy, UAB School of Health Related Professions, 1530 3rd Avenue South, Birmingham, AL 35294-2030 (telephone 205-934-3566, email mspt@uab.edu).

M.S.-Professional Program

The M.S.-Professional program course of study is for the student who holds a baccalaureate degree in a field other than physical therapy. The program prepares the student to enter the profession as a physical therapist capable of assuming responsibilities in administration, consultation, research, or education. The graduate is eligible for licensure as a physical therapist upon completion of the program.

Requirements for Admission

The applicant must hold a baccalaureate degree from an accredited college or university. 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:

- a minimum GRE score of 1,000 (minimum of 500 verbal and minimum of 500 quantitative) or MAT of 50,
- submit GRE writing analysis score
- a minimum 3.0 (A = 4.0) overall grade point average or for the last 60 semester hours of coursework,
- a minimum of C in each of the prerequisites courses,
- meet the nonacademic eligibility requirements for licensure to practice physical therapy upon completion of the program,
- a personal interview with the Division of Physical Therapy faculty, and
- if accepted, completion of UAB medical history questionnaire and physical, including required immunizations, 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 Graduate School Dean.

The applicant must have completed successfully the following courses:

<i>Area</i>	<i>Semester hours</i>
Psychology	9
Calculus ¹⁰	3
Statistics (must be taken in math, psychology, or sociology)	3
Physics (with labs) ¹¹	8-9
General Chemistry for science majors (with labs)	8-9
Biology, including Human or Mammalian Physiology	16
English Composition	6

¹⁰ A course in elementary calculus is required regardless of the level of physics studied, and it is recommended that the calculus course precede the study of physics.

¹¹ A course of study in physics with elementary calculus as a prerequisite is the preferred level of coursework and is strongly recommended. The physics course must be designed for science majors and must include laboratory sessions. A minimum of 8 semester hours or 10 quarter hours is required. The following topics must be studied: mechanics, heat, electricity, magnetism, wave motion and sound, and light.

Application Process

The deadline for application to the M.S.-Professional program that begins in the Winter term is **January 15 of the preceding year**. The application process for the professional program is the same as that for the post-professional program. A brochure describing the physical therapy program at UAB is available upon request from the Division of Physical Therapy.

Additional Scholastic Requirements

In addition to maintaining good academic standing as defined by the Graduate School, the following policy applies to students in the physical therapy graduate programs. Patient care demands at least a minimum level of competence; therefore, the student must successfully pass each course for progression to the next sequential physical therapy course. The faculty reserves the right to require that a student demonstrate the minimally acceptable achievement in all portions of the program, whether this be a unit of work within a course or the total course content. A student making an F (failure) in any professional course must withdraw from the program.

Degree Requirements

The Master of Science degree will be awarded when the student successfully completes the coursework and a minimum of 6 credit hours in elective coursework. Thesis or nonthesis research may be completed to meet elective requirements. Students completing requirements under Plan I of the Graduate School will prepare and defend a thesis. Students completing requirements under Plan II of the Graduate School will complete an elective research project or other elective coursework.

Contact

For detailed information, contact Chair, Division of Physical Therapy, UAB School of Health Related Professions, 1530 3rd Avenue South, Birmingham, AL 35294-2030.

Telephone 205-934-3566

Email mspt@uab.edu

Course Descriptions

Physical Therapy (PT)

600. **Human Gross Anatomy I.** Study of the 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. Winter. 4 hours. (Ogard, Nicholson)

601. **Human Gross Anatomy II.** Study of the 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. Spring. 4 hours. (Ogard, Nicholson)

602. **Functional Anatomy I.** Disciplines of anatomy, kinesiology, muscle biology, and biomechanics integrated to develop an understanding of, and an ability to analyze and describe, normal and pathologic human motion. Provides foundation for the ability of the physical therapist to evaluate and treat clients/patients with dysfunction of the neuromusculoskeletal system. Winter. 2 hours. (Ogard, Nicholson)

603. **Basic Pathology.** Basic pathophysiologic processes underlying disease with emphasis on the relationship of the science of pathology to clinical disease entities. Fall. 2 hours. (Wade)

604. **Functional Anatomy II.** Disciplines of anatomy, kinesiology, muscle biology, and biomechanics integrated to develop an understanding of, and an ability to analyze and describe, normal and pathologic human motion. Provides foundation for the ability of the physical therapist to evaluate and treat clients/patients with dysfunction of the neuromusculoskeletal system. Spring. 2 hours. (Ogard, Nicholson)

605. **Neuroanatomy.** A study of the microscopic and pathologic anatomy of nervous tissue and the gross anatomy of the human nervous system with special attention to the brain and spinal cord; functional aspects of the central nervous system and the cause-effect relations between lesions and their symptoms. Summer. 4 hours. (Casey)

606. **Human Physiology.** Overview of cell, electrophysiology, cardiopulmonary, urinary, neuromuscular, and endocrine physiology of the human. Emphasis on the

structure-function relationships at the micro and macro organization level. Winter. 4 hours. (Francis)

607. **Exercise Physiology.** Physiological effects of exercise and training; bioenergetics, neuromuscular concepts, cardiorespiratory considerations, nutrition, body composition, and test and measurement techniques of physical fitness; and basic cardiopulmonary considerations for working with patients. Spring. 3 hours. (Francis/Peel)

608. **Neurophysiological Principles of Patient Care.** A study of underlying neuroanatomical and neurophysiological principles as basis for evaluation and treatment of patients with neurological disorders; includes study of current research in selected areas of applied neurophysiology. Fall. 4 hours. (Clelland)

610. **Pharmacology in Rehabilitation.** Survey course in pharmacology with emphasis on medications used by patients treated by physical and occupational therapists, and medications administered by physical therapists. Pharmacological principles that apply to all groups of drugs. Emphasis on medications used for movement-related disorders and medications that affect responses to physical activity. Winter. 2 hours. (Peel)

611. **Introduction to Clinical Measurements I.** Principles and techniques for obtaining data about status of patient's/client's joint range of motion and muscle strength, with emphasis on lower quadrant. Winter. 2 hours. (Clelland/Freeman)

612. **Introduction to Clinical Measurements II.** Principles and techniques for obtaining data about status of patient's/client's joint range of motion and muscle strength, with emphasis on upper quadrant. Spring. 1 hour. (Clelland/Freeman)

613. **Introduction to Clinical Measurements III.** Kinesiological principles and techniques used to obtain data about status of patient's/client's posture and gait; analysis of these and other data in clinical decisions relative to orthotics. Winter. 3 hours. (Adams/Murphy)

614. **Basic Patient Care Skills.** Basic patient assessment and principles of clinical decision making; monitoring vital signs, transfer techniques, use of assistive devices; massage, principles and methods for therapeutic applications of thermal agents, and therapeutic exercise. Summer. 5 hours. (Sherer/Hoobler/Adams)

618. **Electro: Testing, Evaluation, and Therapy.** Physical and physiological rationale for use of specific electrotesting and electrotherapeutic techniques. Spring. 3 hours. (Lein)

640. **PT Evaluation/Intervention I.** Musculoskeletal disorders and dysfunctions; diagnosis, clinical decision making in treatment and prevention, medical and surgical diagnostics and management with implications for physical therapy and rehabilitation. Emphasis on disorders and dysfunctions of extremity joints. Summer. 3 hours. (Nicholson/Ogard)

641. **PT Evaluation /Intervention II.** Application, analysis, and synthesis of musculoskeletal, neurodevelopmental, and cardiopulmonary principles in physical therapy evaluation, program planning, treatment including techniques for therapeutic intervention with use of exercise. Fall. 5 hours. (Adams, Tutors)

642. **PT Evaluation /Intervention III.** Continuation of PT 640 with emphasis on disorders and dysfunctions of spinal regions, including thoracic cage and pelvic girdle; includes industrial rehabilitation/FCE. Fall. 4 hours. (Nicholson)

643. **Physical Therapy Evaluation /Intervention IV.** Pathology/etiology, clinical manifestations and medical treatment of selected patient problems. Application, analysis, synthesis of musculoskeletal and neurodevelopmental principles in physical therapy evaluation, program planning, treatment, including techniques for intervention using exercise, orthotics, and equipment. Winter. 6 hours. (Shaw, Tutors)

644. **Physical Therapy Evaluation /Intervention V.** Pathology etiology, clinical manifestations, medical/surgical management for specific disorders related to the integumentary system. Evaluation of problems related to amputations; biomechanical and design principles and indications for prostheses; program planning and treatment in preparation for prosthesis. Summer. 3 hours. (Hoobler)

645. **Seminar: PT Evaluation and Intervention.** Synthesis of approaches to evaluation, program planning, implementation of therapeutic and preventive programs. Development and presentation patient case studies. Summer. 1 hour. (Denton)

651. **PT Clinical Arts I.** Supervised clinical education with emphasis on following skills: transfers, gait with assistive devices, goniometry, manual muscle testing, massage, application of thermal agents, therapeutic exercises, history taking, examination and program planning for musculoskeletal system disorder/dysfunction of joints of the extremities. Fall. 3 hours. (Morris, Sherer, Clinicians)

652. **PT Clinical Arts II.** Continuation of PT 651. Application of previous classroom studies in patient care with emphasis on evaluative skills, program planning, and interventions appropriate to problems related to neuromusculoskeletal and cardiorespiratory systems. Spring. 6 hours. (Morris, Sherer, Clinical Faculty)

653. **PT Clinical Arts III.** Continuation of PT 652. Integration of all care skills; evaluation of patient progress and appropriate progression of patients in therapeutic programs; includes experiences in supervision, consultation, research, management, and teaching. Fall. 10 hours. (Morris, Sherer, Clinical Faculty)

660. **Introduction to the Role of the Physical Therapist.** Concepts of accountability, communication, and decision making in relation to physical therapy, orientation to roles of the physical therapist: clinician, teacher, manager, researcher, consultant; orientation to the profession and scope of practice. Winter. 2 hours. (Knowles, Murphy, Denton)

661. **The PT/Patient Relationship.** Educational and communication skills applied to the physical therapist's interactions with patients, families, other health care providers, the public. Emphasis on verbal, nonverbal, and documentation skills used by physical therapists and the moral and legal ramifications. Spring. 2 hours. (Knowles, Denton)

664. **Scientific Inquiry I.** Introduction to evaluation of methods and analysis of research techniques and critical review of literature relevant to selected research problems. Fall. 1 hour. (Peel)

665. **Scientific Inquiry II.** Concepts of measurement principles, experimental design, qualitative, survey, outcomes research and basic statistical concepts to enable student to critically analyze and use the scientific literature to improve clinical practice. Emphasis on understanding the components of a research report and the concepts associated with the judging of internal and external validity. Winter. 3 hours. (Peel, Vogtle)

666. **Seminar: Ethical and Professional Issues in PT.** Synthesis of ethical principles and theories and application of these to ethical dilemmas facing the physical therapist who functions in a multifaceted role; values clarification and decision making applied to current professional issues. Winter. 1 hour. (Knowles)

667. **The PT in the Health Care System.** Experiential learning in group process re: health care system of the U.S. and relationship of its components as the focus of group presentations. Spring. 2 hours. (Knowles)

668. **Consultation and Management in the Role of the PT.** Study of principles of consultation and management and application in healthcare organizations with emphasis on community health context. Includes study of organizational behavior and ethical behavior in organizations; the relationship of administrative, business, and regulatory law to the practice of physical therapy; defining a health problem and identifying alternative solutions to the problem. Summer. 4 hours. (Knowles)

PTGR

647. **Seminar in Interdisciplinary Services for Infants, Children, and Youth with Developmental Disabilities.** Also OT 660. Synthesis of team-based approaches to intervention for infants, children, and youth (0-21) with known or suspected disabilities. Focus is on legislation and policy, team processes and practices, and family-centered applications. The course is open to upper-level students in disciplines that have roles in service provision for the described population. Prerequisite: Previous or concurrent work experience, recommendation of advisor, or consent of department. Summer. 1-2 hours. (Murphy/Vogtle)

648. **Normal and Abnormal Development.** In-depth review of developmental sequence, developmental assessments, and commonly seen developmental disabilities including the infant in NICU. Includes clinical exposure to the population. Prerequisite: Previous or concurrent work experience, recommendation of advisor, or consent of department. Summer. 2-3 hours. (Murphy)

661. **Mindfulness-Based Stress Reduction Techniques.** Presentation of latest research on effects of stress on learning and health, including basic information on the growing field of psychoneuroimmunology. Presentation and practice of meditation-based stress reduction techniques shown to be effective in working with patient populations. Winter. 1 hour. (Knowles)

683. **Practicum in Administration.** Individually designed, directed experience in administrative principles and skills in selected health care settings. All terms. 1-6 hours. (Knowles)

684. **Practicum in Physical Therapy Patient Care.** Individually designed, directed experience in specialized areas of physical therapy. All terms. 1-6 hours. (Sherer, Denton)

694. **Special Readings in Neuroscience.** All terms. 1-5 hours. (Clelland)

696. **Special Readings in Physiology.** All terms. 1-5 hours. (Francis)

698. **Master's Nonthesis Research.** Implementation of research. All terms. 1-3 hours.

699. **Master's Thesis Research.** Implementation of research. Prerequisite: Admission to candidacy. All terms. 1-6 hours.

PTMS

647. **Musculoskeletal Evaluation and Treatment I.** Examination and treatment of human movement dysfunction; movement dysfunction involving spine and extremities. Prerequisite: Permission of instructor. Summer. 3-4 hours.

691. **Special Readings in Treatment of Musculoskeletal Problems.** All terms. 1-5 hours.

695. **Special Readings in Treatment of Neuromusculoskeletal Problems.** All terms. 1-5 hours.

PTED

685. **Practicum in Physical Therapy Education.** Individually designed, directed experience in selected area of physical therapy education. All terms. 1-3 hours.

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

Graduate Program Director: *Vohra*

Faculty

David G. Agresti, Professor (Physics); Mössbauer Spectroscopy, Computer Data Fitting, Extraterrestrial Magnetic Materials

Robert P. Bauman, Professor Emeritus (Physics); Molecular Physics, Teaching-Learning Theory

Ivan A. Brezovich, Professor (Radiation Oncology); Physics of Radiation Oncology, Hyperthermia

Herbert C. Cheung, Professor (Biochemistry and Molecular Genetics); Time-Resolved Fluorescence Spectroscopy and Rapid Kinetics of Proteins, Mechanism of Muscle Contraction

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 Metals

Stephen C. Harvey, Professor (Biochemistry and Molecular Genetics); Biophysics, Dynamic Aspects of Structures of Biological Macromolecules

Ryoichi Kawai, Associate Professor (Physics); Condensed Matter Physics Theory, Computational Physics, Science of Complexity

N. Rama Krishna, Professor (Biochemistry and Molecular Genetics); NMR Studies of Biomolecules, Molecular Dynamics in Solution, Bimolecular Structure and Function

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 and X-ray Optics, Optical System Design, Holographic, Theoretical Optics, Processing of Micro-Optics, Internet2

William A. Sibley, Professor (Physics); Experimental Solid-state Physics, Optical Properties of Solids, Radiation Damage in Solids

H. Tilt Tohver, Professor (Physics); EPR Spectroscopy, Radiation-Induced Defects in Insulating Crystals

Yogesh K. Vohra, Professor (Physics); High Pressure Materials Research, Growth and Characterization of Synthetic Diamond, 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, Assistant 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, 650-652, and 671-673 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 an intercessor 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 561-563; Electromagnetic Theory, PH 545-547; and Quantum Mechanics, PH 550-552), 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 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 and 711, 750 and 751, 771, and 772 or 773. 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 admin-

nister 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.

Contact

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

Email 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 217 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 217 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 217 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 for PH 533: PH 532 and PH 550. 3 hours each.

545-547. **Electromagnetic Theory I-III.** Electromagnetic theory approached from standpoint of fields and using Maxwell's equations. Prerequisites: PH 217 and MA 444, or equivalent. 2 hours each.

550-552. **Introductory Quantum Mechanics I-III.** 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 563, PH 252 recommended. 2 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 552 or equivalent. 3 hours each.

561-563. **Classical Mechanics I-III.** Kinematics and dynamics, including central forces, rotating coordinate systems, and generalized coordinates; Lagrangian and Hamiltonian. Prerequisites: PH 217 and MA 252. 2 hours each.

567. **Special Relativity.** Foundations and principles of special relativity with applications to mechanics and electrodynamics. Prerequisites: PH 547 and PH 563.

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 552.

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 217. 3 hours each.

585. **Laser Spectroscopy.** Practical applications of lasers and modern techniques and instrumentation in laser spectroscopy. Prerequisites: PH 217.

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 563. 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 217, MA 252. 2 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 552.

650-652. **Electromagnetic Theory I-III.** Boundary value and Green function methods for solving potential problems; fields in dielectric, magnetic media and radiation fields. Prerequisite: PH 547. 3 hours each.

653, 654. **Solid-state Physics I, II.** Structure and dynamics of solids; optical, magnetic, and transport properties. Prerequisites: PH 331, 552. 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 251.

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 547 and 552. 3 hours each.

673. **Applications of Quantum Mechanics.** Scattering theory, density matrix, and polarization; applications to atomic and nuclear reactions. Prerequisites: PH 671-672. Spring.

697. **Special Topics in Physics.** Topics of current interest, such as theoretical physics, computational physics, experimental techniques. May be repeated for credit. 1-3 hours.

698. **Nonthesis Research.** May be repeated for credit.

699. **Thesis Research.** May be repeated for credit. Prerequisite: Admission to candidacy. 1-6 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.

750-752. **Classical Electrodynamics I-III.** 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 547. 3 hours each.

753-755. **Advanced Solid State I-III.** Properties of electrons and photons in crystal lattices; electromagnetic interactions with solids; lattice defects. 2 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 547 and 552. 3 hours each.

773. **Applications of Quantum Mechanics.** Scattering theory, density matrix, and polarization; applications to atomic and nuclear reactions. Prerequisites: PH 771 and 772. Spring.

791-793. **Seminar in Physics I-III.** 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. 1-6 hours.

*798. **Nondissertation Research.** Prerequisite: Permission of instructor. 1-6 hours.

*799. **Dissertation Research.** Prerequisite: Admission to candidacy. 3-9 hours.

Physiology and Biophysics

Graduate Program Director: *Schwiebert*

Primary Faculty

Susan L. Bellis, Instructor (Physiology & Biophysics); Cellular Physiology

Dale J. Benos, Professor and Chair (Physiology & Biophysics); Epithelial Transport, Membrane Biochemistry

Kathleen H. Berecek, Professor (Physiology & Biophysics); Cardiovascular Physiology

J. Edwin Blalock, Professor (Physiology & Biophysics); Neuroimmunoendocrinology

James K. Bubien, Assistant Professor (Physiology & Biophysics); Ion Transport Systems-Nephrology

Catherine M. Fuller, Assistant Professor (Physiology & Biophysics); Membrane Transport, Molecular Biology of Ion Channels

F. Shawn Galin, Assistant Professor (Physiology & Biophysics); Neuroimmunology

Gilbert R. Hageman, Professor (Physiology & Biophysics); Neural Regulation of the Heart

Iskander I. Ismailov, Assistant Professor (Physiology & Biophysics); Molecular Biophysics of Ion Channels

Sham S. Kakar, Assistant Professor (Physiology & Biophysics); Molecular Mechanisms of GnRH Receptor in Tumor

Kevin L. Kirk, Professor (Physiology & Biophysics); Molecular Physiology of the Cystic Fibrosis Gene Product; Polarized Membrane Traffic

Robert D. LeBeouf, Professor (Physiology & Biophysics); Tumor Suppressor Genes and Cell Cycle Control

Pamela 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

Charles J. Venglarik, Instructor (Physiology & Biophysics); Identification and Development of New Blockers for the CFTR Cl-Channel.

Douglas A. Weigent, Associate Professor (Physiology & Biophysics); Immunoendocrinology

Teresa Wilson Wilborn, Instructor (Physiology & Biophysics); Regulation of Membrane Transport

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

Larry Boots, Professor (OB/GYN); Endocrinology/Reproductive Biology

Scott Curtis, Associate Professor (Pediatrics); Respiratory Physiology

Louis Dell'Italia, Associate Professor (Medicine-Cardiology); Cardiovascular Physiology

William Evanochko, Associate Professor (Medicine-Cardiology); Cardiovascular NMR

Michael Friedlander, Professor and Chair (Neurobiology); Neurophysiology

Michael Goran, Professor (Nutrition Sciences); Exercise Physiology

Craig Garner, Associate Professor (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

Timothy W. Kraft, Associate Professor (Ophthalmology); Vision Neurophysiology

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

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

Michael Quick, Assistant Professor (Neurobiology); Neurophysiology

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

Diane Tucker, Professor (Social and Behavioral
Science); Cardiovascular Behavioral Sciences

Ferdinand Urthaler, Professor (Medicine-
Cardiology); Cardiovascular Physiology

David Warnock, Professor (Medicine-Nephrology);
Renal Physiology

David Weiss, Associate Professor (Neurobiology);
Neurophysiology

John Whitaker, Professor and Chair (Neurology);
Neuroimmunology

Roger White, Assistant Professor (Medicine-
Cardiology); Cardiovascular 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.

To receive full acceptance into the program, the following undergraduate coursework should have been completed: introductory physics, calculus, organic chemistry, and a course in zoology or biology. An advanced course (e.g., comparative anatomy, embryology, genetics, or physiology) is recommended. Whenever there is any question about the student's academic background, the graduate committee may require examinations for evaluation purposes.

Ph.D. Program Requirements

Courses. All students are required to take PHY 701 (Medical Physiology), PHY 710 (Cell and Molecular Physiology), PHY 750 (Molecular Physiology and Medicine), four of the five Cellular and Molecular Biology courses (CMB 700-704) or an appropriate substitute, and a statistics course (Biometry, PHY 704). Each

student is also required to take five reading courses (PHY 790, 791, 792) and PHY 796 (Seminars in Physiology). 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 and communication skills that our graduate students are encouraged to attend. **Full-time students are required to register for 10 hours per quarter.**

Grades. At the completion of a course, students are normally assigned a letter grade. Research courses for candidates are Pass/Fail. Students must maintain a B average. If one C grade or lower is received, the student will be placed on academic probation. It usually takes two semesters to get off probation. If a total of two C grades (or lower) are received, the student is subject to dismissal from the program, pending appeal to the 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 seminars (PHY 790-792) and teaching programs of the Department of Physiology and Biophysics.

Admission to Candidacy and Ph.D. Program Completion

After completing required courses, each student must take a qualifying exam subject to review by the student's Graduate Study Committee. This exam should be completed by the beginning of the student's third year. Specifically, this exam will entail a written dissertation proposal and an oral defense of this proposal. The dissertation proposal should be written in a format similar to an NIH grant (i.e., Abstract, Specific Aims, Background and Significance, Preliminary Data, and Research Design) or in a format that corresponds to a grant for another funding agency. The dissertation proposal should be handed out to all committee members two weeks before the oral defense. All faculty members will be invited to participate in the oral defense. After the student has successfully completing this exam, the student's mentor will recommend the student for formal

admission to candidacy in the Physiology and Biophysics graduate program by notifying the Graduate Program Director and the Graduate School Dean in writing. An inadequate performance calls for re-examination and, possibly, completion of a written comprehensive exam, a step that may be permitted only once with permission of the mentor, graduate director, and the department chair.

Upon entering candidacy, each student must enroll in PHY 799, Doctoral Dissertation Research. Completion of 30 credit hours (i.e., 3 terms @ 10 hrs each) of PHY 799 is required prior to the dissertation defense. For further information regarding the dissertation defense, please contact the Physiology and Biophysics graduate program office.

Financial Assistance

Doctoral students will receive financial aid in the form of a fellowship. Current stipends are \$14,000 per year plus tuition for entering students and up to \$16,000 per year for advanced candidates, contingent upon availability of funds. Health insurance is also provided by the fellowships.

Faculty Advisor and Graduate Committee

Upon admission to the graduate program, each student will select a temporary graduate faculty advisor until a field of research is selected. The departmental graduate committee can serve as the student's temporary Graduate Study Committee. By the end of the first year, the student is expected to have selected an area of research and a permanent advisory from the physiology and biophysics faculty roster. International students must select a permanent mentor when applying for admission.

Contact

For detailed information contact Dr. Lisa Schwiebert, Graduate Program Director, UAB Department of Physiology and Biophysics, McCallum Building, Room 966, 1918 University Blvd., Birmingham, AL 35294-0005.

Telephone 205-934-3970

Fax 205-975-9028

Email schwiebert@phybio.bhs.uab.edu

Web www.physiology.uab.edu

Course Listings

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.

CMB 700. **CMB I.** Biochemistry. 5 hours.

CMB 701. **CMB II.** Prokaryotic Genetics 5. hours.

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. Winter. 8 hours.

701. **Physiology Graduate Students.** Physiology for graduate students.

702. **Physiology for Optometry Students.** General principles of organ system physiology. Spring. 6 hours. (Weigent)

703. **Physiology for Dental Students.** General principles of organ system physiology. Spring. 6 hours.

704. **Biometry.** Statistical concepts and tests for biological data sets. 1-4 hours. (LeDoeuf, Quick)

710. **Cell and Molecular Physiology.** Molecular basis of physiology with special emphasis on membrane, receptors, and channels. (Blalock)

All courses listed below have a prerequisite of PHY 700, 701, and 710, or permission of instructor.

725. **Respiratory Physiology.** Exchange of gases between cells of body and atmosphere. Lectures, seminars, and laboratory demonstrations. Minimum enrollment of three students. Fall. (Curtis, Matalon).

727. **Cardiovascular Physiology.** Cardiac ultrastructure, electrophysiology, excitation-contraction coupling, dysrhythmia analysis, neural regulation, cardiac pharmacology, and control of arterial pressure. Spring. 3 hours. (Berecek)

730. **Endocrinology.** Chemistry and mode of action of selected hormones, analysis of original literature. Spring. (Neill)

735. **Renal Physiology.** The role of the kidney in body fluid homeostasis and mechanisms involved in process. Fall. (Bell, Schafer)

741. **Neurophysiology.** Cellular and systems analysis of integrative action of CNS (sensory transduction, synaptic structure, function and modifiability, and neural motor control systems). Winter. (Friedlander)

750. **Molecular Physiology and Medicine.** Fundamental insights into common diseases. hours (Blalock)

755. **Neuroimmunology.** Spring. 5 hours (Weigent)

790-793 **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.** 1-10 hours per term.

799. **Doctoral Dissertation Research.** Prerequisite: Admission to candidacy. 1-10 hours per term.

Psychology (Ph.D.)

Director of Behavioral Neuroscience Specialization: *Randich*

Director of Cognitive Science Specialization: *Sloane*

Director of Developmental Psychology Specialization: *Windle*

Director of Medical (Clinical) Psychology Specialization (APA Approved): *Milby*

Primary Faculty

Franklin R. Amthor, Associate Professor (Psychology); Neurophysiology of Vision

Fred J. Biasini, Assistant Professor (Psychology); Mental Retardation, Developmental Disabilities

Karlene Ball, Professor (Psychology); Cognitive Science; Aging

Don Baucum, Research Assistant Professor (Psychology); Lifespan Human Development, Learning

Norman W. Bray, Professor (Psychology); Mental Retardation, Cognitive Development, Neural Networks

Edwin W. Cook III, Associate Professor (Psychology); Clinical Psychology, Health Psychology, Anxiety Disorders

James E. Cox, Associate Professor (Psychology); Physiological Psychology, Obesity

Linda Warren Duke, Associate Professor (Psychology); Cognitive Psychology, Human Psychophysiology, Aging

Mary Hagan, Assistant Professor (Psychology); Behavioral Neuroscience, Eating Disorders

Joshua Klapow, Assistant Professor (Psychology); Health Care Outcomes

Carl E. McFarland, Jr., Professor and Chairperson (Psychology); Cognitive and Developmental Psychology

Jesse B. Milby, Jr., Professor (Psychology); Clinical Psychology, Medical Psychology, Behavior Therapy

George E. Passey, Professor Emeritus (Psychology); Industrial Psychology, History of Psychology

Craig Ramey, University Professor (Psychology); Life-Span Developmental Psychology

Alan Randich, Professor (Psychology); Experimental Psychology

David L. Roth, Associate Professor (Psychology); Clinical Psychology, Health Psychology, Neurophysiology, Exercise Physiology

David C. Schwebel, Assistant Professor (Psychology); Clinical Child Psychology

Michael E. Sloane, Associate Professor (Psychology); Visual Perception and Psychophysics

Edward Taub, Professor (Psychology); Medical Psychology, Biofeedback

Diane C. Tucker, Professor (Psychology); Clinical Psychology, Physiological Psychology, Psycho-oncology and Genetic Testing

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

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 Associate 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

Frank A. Brotherton, Clinical Assistant Professor (Medicine); Psychology

Carol E. Cornell, Assistant Professor (Medicine/Preventive Medicine); Health Behavior

Dwayne A. Crist, Clinical Assistant Professor (Psychology); Clinical Psychology

Jeffrey J. Dolce, Assistant Professor (Medicine); Health Psychology

Daniel M. Doleys, Clinical Professor (Nutrition Sciences); Clinical Psychology, Behavioral Medicine, Behavior Therapy

Molly A. Engle, Associate Professor (Medicine/Preventive Medicine); Disease Prevention

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); Biocommunication, Psycholinguistics

Paul Gamlin, Associate Professor (Physiological Optics) Eye Movements

George Graham, Professor (Philosophy); Behavior and Philosophy

Paul B. Greene, Assistant 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

Michael M. Holt, Clinical Associate Professor (Psychology); Clinical Psychology

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

Beth Jacobs, Clinical Assistant Professor (Psychology); Clinical Psychology, Child and Adolescent Psychology

Rachelle Jansevics, Clinical Assistant Professor (Psychology); Substance Abuse

Gayle Janzen, Clinical Assistant Professor (Psychology); Clinical Psychology

Barbara R. Johnson, Clinical Associate Professor (Psychology); Clinical Psychology

Gail V. W. Johnson, Assistant 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

Julie McDonald, 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

Mark S. Mennemeier, Assistant Professor (Medicine); Rehabilitation Medicine

Ronald L. Meredith, Clinical Associate 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

Thomas A. Novack, Associate Professor (Rehabilitation Medicine); Clinical Psychology, Rehabilitation, Neuropsychology

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

Samuel J. Popkin, Adjunct Assistant Professor (Psychology); Geriatric Cognition, Integration of Spirituality in Psychotherapy

Lucas Pozzo-Miller, Assistant Professor (Neurobiology); Actions of Neurotrophins at Synapses, Neuronal Calcium Signaling and Plasticity

James M. Raczynski, Professor (Behavioral Medicine); Clinical Psychology, Behavioral Medicine, Human Psychophysiology

Sharon Ramey, Professor (Psychiatry); Developmental Psychology

Kevin D. Reilly, Professor (Computer Science); Neural Net

Scott Richards, Professor (Rehabilitation Medicine); Clinical Psychology

Gloria M. Roque, Clinical Assistant Professor (Psychology); Clinical Child Psychology

Allen E. Shealy, Clinical Professor (Psychiatry); Clinical Psychology, Alcoholism

Joseph E. Schumacher, Assistant Professor (Preventive Medicine); Drug Abuse

Alan B. Stevens, Assistant Professor (Medicine); Gerontology

Katharine Stewart, Research Assistant Professor (Medicine); HIV

Robert E. Taylor, Clinical Associate Professor (Psychiatry); Clinical Psychology

A. Hal Thurstin, Associate Professor (Psychiatry); Clinical Psychology, Eating Disorders, Geriatrics

Leland C. Tolbert, Associate Professor (Psychiatry); Neurochemistry

Gaye B. Vance, Clinical Assistant Professor (Psychology); Psychology

Laura Whitworth, Clinical Assistant Professor (Psychology); Psychotherapy

Herman C. Willcutt, Professor (Psychiatry); Clinical Psychology

Dale W. Wisely, Clinical Associate Professor (Psychology); Clinical Psychology, Child Clinical Psychology

J. Michael Wyss, Professor (Cell Biology); Neuroanatomy, Physiological Psychology

Program Information

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; neurochemistry and neuroanatomy of disorders of movement; models of memory dysfunction; development precursors of nerve-target interactions; hypertension; structure-activity relationships of hallucinogens; psychiatric disease; and the neurochemistry and neurophysiology of pain.

Cognitive Science

The graduate training program in Cognitive Science at UAB is an interdepartmental effort that unites cognitive and behavioral disciplines throughout the university community, including departments in the arts and sciences, engineering, and medical center. As of academic year 1996-97, five departments with doctoral programs participate in the program: Biomedical Engineering, Computer and Information Sciences, Physiology and Biophysics, Psychology, and Vision Science. Research and pedagogical interests of the faculty include among many other topics the following: mind/brain, vision, language development, cognition, and neural networks.

The program is built around core courses and select offerings in participating doctoral programs and associated departments. Students may enter before or after admission to a participating doctoral program. If before, they major in cognitive science during the first year and prepare for admission to a participating doctoral program. If after, they minor in cognitive science and distribute study of cognitive science throughout their doctoral studies. Seminar series and regular colloquia as well as rotating mentorships with cognitive science faculty complement the course work of all students. Students who successfully complete the training program and the Ph.D. receive recognition of the major or minor in cognitive science with their Ph.D. degree.

Probably the greatest strength of the training program is the diversity of participating faculty, which includes cognitive scientists both within and outside of participating doctoral programs. Faculty are laboratory scientists, field scientists, clinicians, and theoreticians. Some are neuroimagers, others human or animal experimenters, others programmers and modelers, still others methodologists and philosophers.

Developmental Psychology

The Developmental Psychology specialization trains students to conduct independent research on 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, the Sparks Center for Developmental and Learning Disorders, the Center for Aging, the Center for Research on Child and Adolescent Development, 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, including projects on mental retardation and developmental disabilities, adolescent mental health and substance use, cognition, aging, and communication disorders. Much of this research is funded by federal research grants. Research subareas include mental retardation and developmental disabilities (with special interest in prediction of cognitive functioning based on novelty performance during infancy, development of memory strategies in nonretarded and mentally retarded children, semantic memory in mentally retarded and nonretarded children, and how family members adapt to the problems of a handi-

capped child); adolescence (with special interest in alcohol and drug use, predictors of depression and suicide, family and peer relations); young adulthood (with special interest in adaptations to marriage, parenting, and work environments); aging (with special interest in visual-perceptual problems of older adults with low vision, memory skills training with elderly populations, the psychological aspects of chronic illness in the elderly, chronically ill individuals, caregiving in families of elderly persons, human factor issues in vision and aging); pediatric psychology (with special interest in how handicapped children adapt and develop socially, and parental cognition and affective reactions as mediators of behavioral responses toward their young children); 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 program faculty research is extramurally funded by private foundations and federal support, especially the Center for Disease Control and multiple institutes of the National Institutes of Health.

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 31 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 grade point averages of 3.2 (on a 4.0 scale) overall, over the last two years and in psychology courses, are required for admission.

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.

For admission to the Cognitive Science specialization, the minimal criteria are those of the Graduate School. Among items seriously considered are quality of undergraduate and any other graduate work, background in-

terests and research experience, letters of recommendation, and GRE scores.

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.

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.

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 chooses 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

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 711-715, PY 726-728, PY 758, PY 783). Developmental psychology students are also required to complete two terms of teaching practicum (PY 796), and a four-course sequence in statistics and research design (PY 716, 717, 719, 725). Additional requirements include at least 8 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 skills biological and psychological skill, 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, cardiology, and neuropsychology; 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 22 semester hours of research and 22 semester hours of clinical clerkship. A master's project 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.

Contact

For detailed information, contact the UAB Department of Psychology, Campbell Hall, Room 415, 1300 University Blvd., Birmingham, AL 35294-1170.

Dr. Alan Randich,

Behavioral Neuroscience Specialization Director

Telephone 205-934-3850

Email arandich@uab.edu

Dr. Michael Sloane,

Cognitive Science Specialization Director

Telephone 205-934-3850

Email sloane@uab.edu

Dr. Michael Windle,

Developmental Psychology Specialization Director

Telephone 205-975-9463

Email windle@uab.edu

Dr. Jesse Milby,

Medical Psychology Specialization Director

Telephone 205-934-8723

Email medpsych@uab.edu

Web www.uab.edu/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.

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.

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. **Developmental Aspects of Sensation and Perception.** Theoretical models and empirical findings; life span development of sensory capabilities.

715. **Seminar in Emotional Development.** Contemporary topics in the development of emotional responsiveness, 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.

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.** Applying theories and techniques learned in PY 731 and 732 to clinical populations. Selected medical diseases and syndromes; psychological sequelae and intervention strategies.

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.

740. **Psychopathology.** Theoretical and research issues in maladaptive behavior; description and classification schemes; theories of etiology and maintenance of psychopathology.

741. **Child and Adolescent 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.

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. **Psychological Assessment: Cognitive Adult.** Traditional test and measurements topics and applied training of adult cognitive assessment. 2 hours.
764. **Psychological Assessment: Cognitive Child.** Cognitive assessment of children focusing on Wechsler scales, Stanford-Binet, and additional cognitive, academic, memory, and learning tests. 2 hours.
765. **Psychological Assessment: Personality Assessment I.** Objective personality assessment, primarily focusing on Minnesota Multiphasic Personality Inventory. 2 hours.
766. **Psychological Assessment: Personality Assessment 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.
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.
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. Research 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.** 6 hours.

791. **Special Topics in Psychology.** 1-3 hours.

793. **Cognitive Neuroscience.** Prerequisite: Permission of instructor.

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.

Cognitive Science (CGS)

700. **Foundations of Cognitive Science.** An introduction to the interdisciplinary study of mind and intelligence, embracing philosophy, psychology, computer science, neuroscience, and linguistics; past and future of cognitive science; key concepts and methods.

702-708. **Special Topics.** Mind/brain; brain mapping and functional imaging; formal languages and neural nets; language development and cross-cultural language studies; select current topics in cognitive science.

710. **Proseminar Journal Club in Cognitive Science.** Pass/Fail. 1 hour.

712-720. **Research Rotation.** Cognitive science research as practiced by participating cognitive science faculty. Pass/Fail. 1-3 hours each.

The following departments or programs offer courses available to and recommended for cognitive science graduate students. Further information may be obtained by contacting the Committee on Graduate Study in Cognitive Science.

Anthropology (ANTH)
Biocommunication (BIC)
Biomedical Engineering (BME)
Computer and Information Sciences (CS)
English (Linguistics) (EH)
Neuroscience (NEUR)
Philosophy (PHL)
Psychology (PY)
Physiology and Biophysics (PHY)
Vision Science (VIS)

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

Steven H. Haerberle, 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

Lisa Pickett, Visiting Assistant Professor (Government and Public Service); Statistical Analysis, Social Services and Citizen Empowerment

James D. Slack, Professor, Department Chair, (Government and Public Service); Human Resources Management, Disabilities Policy, Workplace Ramifications to Antidiscrimination to HIV/AIDS, Workplace Diversity Policy, Anti-discrimination Policy, Local Government

Dr. Pamela Valentine, Assistant Professor (Government and Public Service); Research Design, Social Services, and Program Evaluation.

Bobby M. Wilson, Professor (Government and Public Service); Urban Geography, Urban and Environmental Planning, Political Economy and Globalization

Dr. Gabriela Wolfson, Assistant Professor (Government and Public Service): Public budgeting (comparative state budgeting, state fiscal and tax policy, state budgeting for health care); health policy and finance; research and quantitative methods (including program evaluation); organization theory; nonprofit management

Program Mission

As an essential component of an urban research university, the Master of Public Administration (MPA) program at the University of Alabama at Birmingham provides a department-based multidisciplinary faculty dedicated to the advancement of the public service through teaching, research, and service.

Program Objective

The MPA program prepares individuals for positions of leadership in the public and nonprofit sectors of the economy. The MPA is a professional graduate degree for both precareer 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 MPA curriculum is designed to ensure that students: (1) understand the political, economic, social, and legal contexts of the public service; (2) understand and appreciate the transcending values of ethics/morality and diversity in the public service; and (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 and for long-term development and advancement in public service management and leadership positions. The MPA program is accredited by the National Association of Schools of Public Affairs and Administration (NASPAA).

Degree Requirements

Students in the MPA 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 non-thesis option. For students who are interested in both public administration and the delivery of public

health services, a coordinated MPA/MPH program is offered; for students who are interested in both public administration and the law, a coordinated MPA/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 grade point average 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 or a score of 500 on the GMAT. 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 MPA 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 MPA student is awarded the Ron Casey Fellowship based on his/her academic performance. Also, the MPA Alumni Association provides scholarship to the outstanding student of the year. Other financial resources are available through the Office of Student Financial Aid.

MPA 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 Placements

Students may apply for an internship placement at any time after they have completed MPA 659. Several paying opportunities exist, although the majority of internships do not offer pay. 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 members in the program also assist students in job placement.

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 4 courses in one of the following specializations, plus 3 electives, for a total of 15 courses.

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 subspecializations: general organizational management and nonprofit management. The first subspecialization is designed for students interested in general management, human resources, and organizational development. The second subspecialization is designed for those interested in nonprofit management.

Students must take 2 of the following 3 courses:

MPA 667, Public and Administrative Law
MPA 675, Ethics and Morality in Public Service
MPA 676, Financial Management in the Public Sector

Plus 2 courses from either of the following groups:

General Organizational Management

MPA 668, Intergovernmental Relations
MPA 677, Managing Information in the Public and Nonprofit 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 Nonprofit 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 professions include economic and community development, budget analysis, and financial affairs.

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 MPA 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 MPA-MPH Program

The MPA-Master of Public Health (MPA-MPH) is designed to train individuals for administrative positions in public health and related health organizations. The MPA degree prepares students for careers as administrators in public and nonprofit agencies, and the MPH 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 MPA-JD Program

The M.P.A. program at UAB and the Cumberland School of Law at Samford University offer a coordinated MPA/JD 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 MPA 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 or she may be required to enroll in the subsequent term for MPA 692 in order to rewrite the questions missed.'

Contact

For additional information refer to the web site of the UAB MPA program: <http://www.uab.edu/gps/mpa>. Also detailed information can be found in the MPA graduate manual available at the program office. Questions concerning enrollment in the M.P.A. Program should be directed to:

Dr. Akhlaque U. Haque
Director, MPA Program
Department of Government and Public Service
U 238, 1530 3rd Avenue South
Birmingham, Alabama 35294-3350
(205) 934-9680

Course Descriptions (MPA)

Unless otherwise noted, all courses are for 3 semester hours of credit.

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, including elements of urban development, public works, public finance, the politics-administration interface, neighborhood participation, and the government-business interface.

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 subnational 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 antidiscrimination policy and strategies, ethics/morality and personnel law.

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.

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.

668. Intergovernmental Relations

The various relations among governments in the US 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.

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.

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.

673. Community Planning and Organization

Covers the principles of citizen empowerment in the planning process, performing needs assessments, and organizing citizens for action.

674. Geographic Information Systems

Examines the use of Geographic Information Systems (GIS) using GIS software. Course integrates theory and socioeconomic applications of GIS in the public and nonprofit sector.

675. Ethics and Morality in Public Service

Ethical and moral foundations to public service behavior.

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.

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.

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.

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, and the role that planning and urban development play in the nonprofit sectors in urban settings.

681. Local Government Planning

Overview of theories, methodologies, and political aspects of municipal planning.

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.

684. Welfare Policy

History, development, and operation of welfare policy in the United States. Special focus on philosophy and service delivery.

685. **Special Topics in Public Administration**

Special topics seminar based on the research and substantive interests of the MPA faculty and students.

686. **Research Design**

Quasi-experimental and experimental research design, including issues of internal and external validity, causal analysis, mass and elite interview techniques, archival analysis, and 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).

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.

689. **Program Evaluation**

Analytic tools for evaluating public and nonprofit programs and services. Prerequisite MPA 687.

690. **Seminar in Public Service Issues**

Special topics focusing on current pressing issues in government and governance, and the nonprofit sectors.

691. **Economic Development**

Develops an understanding of the impact of market and non-economic forces on local and regional economic development.

692. **Independent Study in Public Administration**

One-on-one learning experience between student and an instructor with permission of the Program Director.

693. **Internship in Public Administration**

Supervised field placement in public or nonprofit agency for directed work experience arranged by the Program Director.

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.

Contact

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

Email osas@ms.soph.uab.edu

Web www.uab.edu/PublicHealth

Sociology (M.A.)

Medical Sociology (Ph.D.)

Graduate Program Director: *Clair*

Primary Faculty

Jeffrey M. Clair, Associate Professor (Sociology); Gerontology, Medical Sociology, Social Psychology, Policy

William C. Cockerham, Professor (Sociology); Medical Sociology, Mental Health, International Aspects of Health

Patricia Drentea, Assistant Professor (Sociology); Family, Gender, Aging

Kevin M. Fitzpatrick, Associate Professor (Sociology); Urban, Mental Health, Youth-Adolescence

Sean-Shong Hwang, Associate Professor (Sociology); Statistics and Methodology, Demography, Human Ecology and Urban Sociology

Mark E. LaGory, Professor (Sociology); Urban Ecology, Human Ecology, Sociology of Mental Health for Special Populations, Homelessness

Bronwen Lichtenstein, Assistant Professor (Center for Social Medicine); AIDS, Gender

Guenther R. Lueschen, Professor (Sociology); Sociology of Health, Comparative Sociology, Policy Analysis

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, Associate Professor (Medicine); Doctor-Patient Communication

Patricia Baker, Assistant Professor (Center for Aging); Gerontology

David W. Coombs, Professor (Public Health); Medical Sociology, International Health

Craig T. Ramey, Professor (Psychology); Developmental Psychology

Sharon Ramey, Professor (Psychiatry); Developmental Psychology

Kim D. Reynolds, Associate Professor (Health Behavior); Disease Prevention and Health Behavior

Affiliated Faculty

Janet Bronstein, Associate Professor (Public Health)

Stuart Capper, Associate Professor (Public Health)

Hughes Evans, Assistant Professor (Medicine)

Harold Kincaid, Professor (Arts and Humanities)

Michael Morrisey, Professor (Public Health)

John Sloan, Associate Professor (Social and Behavioral Sciences)

Brent Smith, Professor (Social and Behavioral Sciences)

Alan Stamm, Associate 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, and the demography of health and aging, 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 is establishing 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 grade point averages of 3.0 (on a 4.0 scale), 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

Each student is advised by a Graduate Study Committee consisting of two faculty mentors. The function of the Graduate Study Committee is to 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. Although initially assigned by the graduate director, the Graduate Study Committee may be changed at the student's request.

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:

1. Medical Sociology Core (9 hr: Choose from SOC 721, SOC 780, SOC 787, SOC 788);
2. Sociological Theory Core (6 hr: SOC 707 and 720);
3. Research Methods and Statistics Core (12 hr: SOC 701, 703, 705, and 711);
4. Elective hours (30 hr);
5. Professional Proseminar (3 hr);
6. 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.

Contact

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

Email 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 micro-computer software; bivariate statistical analysis. Prerequisite: SOC 110 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.

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.

711. Qualitative Methods. Field research design, observational research; in-depth interviewing strategies, gaining access to research sites.

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.

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 sociopsychological theories of deviant behavior; recent empirical findings.

755. Race and Ethnic Relations. Income inequality, school and residential segregation, intermarriage, and interracial crimes.

756. **Gender Inequality.** Theories of inequality, applicability to gender stratification; macro and micro research.

757. **International Inequality.** Economic, political, and ecological bases of inequalities between countries, including "developed" and "developing" countries. Racial, ethnic, and gender variations in inequality.

759. **Social Gerontology.** Structural and behavioral implications of older adulthood. Relationship of aged 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; 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 of health professions, lay and folk healers, and health marketers; role boundary conflicts among health professions.

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, African Americans, and others; service delivery systems.

787. **Sociology of Mental Health.** Impact of life events and social supports of 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

Ronald Goldman, Professor Emeritus (Speech and Hearing Sciences)

Samuel E. Fletcher, 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, Assistant 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 Hear-

ing Sciences, didactic coursework and clinical education experiences are available to qualified graduate students. Training is also available in speech-language pathology and audiology through full- and part-time residency and internship programs.

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 disordered 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.

Contact

For detailed information, contact Dr. Larry E. Adams, UAB Division of Speech and Hearing Sciences, BB 101, 1530 3rd Avenue South, Birmingham, Alabama 35294-2030.

Telephone 205-934-4644

Email 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. Winter. 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. Contact *Department Chair, UAB Department of Theatre, Bell Building 101, 1530 3rd Avenue South, Birmingham, Alabama 35294-3340. Telephone 205-934-3236 Email bshel@uab.edu*

Toxicology

Graduate Program Director: *Lamartiniere*

Faculty

Charles D. Amsler, Assistant Professor (Biology); Microbial 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

Trudy L. Cornwell, Assistant Professor (Pathology); Cyclic GMP in Vascular and Nonvascular Smooth Muscle

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, (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

Frances G. Kern, (Hematology and Oncology); 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, Chemo-prevention of Mammary and Prostate Cancers

Thomas M. Lincoln, Professor (Pathology); Role of Nitric Oxide and Cyclic GMP in Signal Transduction

Russell Lindsey, Professor (Comparative Medicine); Veterinary Toxicology; Respiratory Mycoplasmosis and Animal Models of Diseases

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, Associate 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

Carl A. Pinkert, Associate Professor (Comparative Medicine); Gene Transfer, Expression and Regulation Using Transgenic Animal Models

Ronald O. Rahn, Professor (Environmental Health Sciences); Radiation Effects on Halogenated Pyrimi-

dines, Binding of Heavy Metals to DNA Including Cisplatinum, Quantitation of DNA Adducts, Chemical Actinometry for Germicidal and Solar Radiation

Jeffrey M. Roseman, Professor (Epidemiology); Genetic Epidemiology

Deodutta Roy, Associate Professor (Environmental Health Sciences); Environmental Estrogens and Reproductive Health

Jeffrey Smith, Professor (Pharmacology and Toxicology); Membrane Transport: Toxicology of Heavy Metals

Jean-Pierre Sommadossi, Professor (Pharmacology and Toxicology); Cellular, Molecular and Clinical Pharmacology and Toxicology of Drugs

R. Douglas Watson, Associate Professor (Biology); Effects of Endocrine Disruptors 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, cardiovascular

pathology and toxicology, clinical toxicology, developmental toxicology, environmental toxicology, epidemiology and risk assessment, forensic toxicology, hazardous waste biodegradability, 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.

Application 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.

Contact

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

Email 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. Winter.

712. **Actions and Assessments of Toxicants.** Comprehensive information on the origin, distribution, and mechanistic actions of toxicants on the mammalian system. Spring.

713. **Advanced Topics in Toxicology.** Molecular endocrinology, toxicology, transgenics, histomorphology, and biostatistics. Summer.

720. **Toxicology Lab Rotation.** 1-9 hours.

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.

CMB 700. **Cellular and Molecular Biology I.** Biochemistry. Fall. 5 hours.

CMB 701. **Cellular and Molecular Biology II.** Prokaryotic genetics and molecular biology. Fall. 5 hours.

CMB 702. **Cellular and Molecular Biology III.** Eukaryotic molecular biology. Winter. 5 hours.

CMB 703. **Cellular and Molecular Biology IV.** Signal Transduction. Spring. 5 hours.

Vision Science (M.S., Ph.D.)

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, Associate 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

Michael J. Friedlander, Professor (Neurobiology); Molecular Physiology of Synaptic Learning in the Cortex

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

Clyde R. Guidry, Assistant Professor (Ophthalmology); Retinal Wound Healing and Fibroplasia

Kent T. Keyser, Associate Professor (Physiological Optics); Neurotransmitters and Receptors

Timothy W. Kraft, Assistant Professor (Ophthalmology); Retinal Photoreceptors and Color Vision

Thomas K. Kuyk, Adjunct Assistant Professor (Department of Veterans Affairs); Visual Psychophysics

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, Assistant 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, Associate Professor (Pharmacology); Ocular Drug Delivery

A. Christopher Snyder, Professor (Optometry); Corneal Physiological Response to Contact Lens Wear

Om P. Srivastava, Assistant Professor (Physiological Optics); Cataractogenesis

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

Graeme Wilson, Professor Emeritus (Physiological Optics); Corneal and Tear Physiology

Allan C. Dobbins, Assistant Professor (Biomedical Engineering); Space and Form in Vision

Patti S. Fuhr, Clinical Assistant Professor (Department of Veterans Affairs); Vision Rehabilitation

Christopher A. Girkin, Assistant Professor (Ophthalmology); Optic Nerve and Retinal Imaging

Robin A. J. Lester, Assistant Professor (Neurobiology); Central Nicotinic Channel Kinetics and Synaptic Function

Steven J. Pittler, Associate Professor (Physiological Optics); Photoreceptor Function in Health and Disease

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

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 make important contributions to research and develop innovative approaches to teaching in Vision Science. To meet this objective, the M.S. and Ph.D. degrees require a curriculum covering major top-

ics 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 ten 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 masters 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 and/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 Test Of English as a Foreign Language (TOEFL) exam. Over the past fifteen years, 40% of the graduates of the program have been women. We continue to encourage qualified women and under represented minorities to apply.

M.S. Degree

Some students may wish to pursue graduate training at the masters 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 Doctor of Optometry degree (O.D.) 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 must then select three additional courses, in addition to a course in statistics, which are determined by the student's advisory committee in consultation with the Program Director. The program is flexible so that students who have interests in Visual Neuroscience may take the Neuroscience sequence: VIS 729, Introduction to Neurobiology; Cellular and Molecular Neurobiology; Integrative Neuroscience; and Developmental Neuroscience. Students interested in the Cellular and Molecular Biology of the Visual System may take the CMB (Cellular and Molecular Biology) 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 which combine clinical optometry and clinical and/or basic research in vision science. This program will involve 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 a career 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 Program Director.

Contact

For detailed information, contact Graduate Program Director, UAB Department of Physiological Optics, Worrell Building, Room 664, 924 18th Street South, Birmingham, AL 35294-4390.

Telephone 205-934-6743.

Email ktkeyser@uab.edu

Web icare.opt.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 Core Curriculum (VIS)

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

701. Visual Sensitivity and Resolution. Photochemical processes, transduction, absolute and increment thresholds, light and dark adaptation, spatial interac-

tions, 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.** 6 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.

UAB Policies

Appendix I: Policies

August 8, 2000

In addition to the UAB policies contained in these appendices, 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

<http://main.uab.edu/show.asp?durki=16434>

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 avail-

able 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 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 (below).

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 ab-

sence 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

A. 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 sta-

tus 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 Col-

leges 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 department/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, preparing 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

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:

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

Federal Trafficking Penalties

As of November 18, 1988

CSA	PENALTY		Quantity	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. Fine of not more than \$4 million individual, \$10 million other than individual.	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 of not more than \$2 million individual, \$5 million other than individual.	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. Fine of not more than \$4 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.
			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	LSA	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.)

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 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

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)

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)

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

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

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.2
(55 Federal Register 33590)

DRUGS/CSA SCHEDULES		TRADE OR OTHER NAMES	MEDICAL USES	DEPENDENCE		TOLERANCE	DURATION (hours)	USUAL METHODS OF ADMINISTRATION	POSSIBLE EFFECTS	EFFECTS OF OVERDOSE	WITHDRAWAL SYNDROME	
				Physical	Psychological							
NARCOTICS												
Opium	II III IV	Dover's Powder, Paregoric, Papaverine	Analgescic, antidiarrheal	High	High	Yes	3-6	Oral, smoked	Euphoria, drowsiness	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	Roemer, W.S. Codein, Roemer, Bourcel SR	Analgescic, antitussive	High	High	Yes	3-6	Oral, smoked, injected	Depression, constricted pupils, nausea			
Codeine	II III IV	Various combinations: Ergonin w/Codein, Moltusan A.C., Fentinal w/Codein	Analgescic, antitussive	Moderate	Moderate	Yes	3-6	Injected, smoked, injected				
Heroin	I	Diacetylmorphine, Heroin, Smack	None	High	High	Yes	3-6	Injected, smoked				
Hydromorphone	II	plaudid	Analgescic	High	High	Yes	3-6	Oral, injected				
Meperidine (Pethidine)	II	Demoran, Mepergan	Analgescic	High	High	Yes	3-6	Oral, injected				
Methadone	II	Methadone, Methadone, Methadone	Analgescic	High	High-Low	Yes	12-24	Oral, injected				
Other Narcotics	I II III IV V	Nalmophon, Percodan, Percocet, Tylenol, Tylenol, Fentanyl, Duran, Lomoli, Talwin	Analgescic, antidiarrheal, antitussive	High-Low	High-Low	Yes	Variable	Oral, injected				
DEPRESSANTS												
Chloral Hydrate	IV	Noclor	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, Butel, Fenital, Leticate, Veronal, Veronal, Talval, 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, Versivan, Versid, Valium, Fenalan, Restoran	Anxiolytic, anticonvulsant, sedative, hypnotic	Low	Low	Yes	4-8	Oral				
Methaqualone	I	Quaalude	Sedative, hypnotic	High	High	Yes	4-8	Oral				
Glutehlimide	III	Doridan	Sedative, hypnotic	High	Moderate	Yes	4-8	Oral				
Other Depressants	III IV	Equanil, Miltown, Noludar, Prochlor, Valmid	Anxiolytic, sedative, hypnotic	Moderate	Moderate	Yes	4-8	Oral				
STIMULANTS												
Cocaine*	II	Coke, Flake, Snow, Crack	Local anesthetic	Possible	High	Yes	1-2	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	Biphennamine, Desobutose, Desoxyn, Benzedrine, Obetrol	Weight control	Possible	High	Yes	2-4	Oral, injected				
Phenmetrazine	II	Preldan	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	Adipon, Cylert, Difenox, Ionamin, Mefital, Phlegmin, Salsoran, Tenuate, Topical, Prelu-2	Weight control	Possible	High	Yes	2-4	Oral, injected				
HALLUCINOGENS												
LSD	I	Acid, Microdot	None	None	Unknown	Yes	8-12	Oral				
Mescaline and Peyote	I	Mexic, Buttons, Cactus	None	None	Unknown	Yes	8-12	Oral	Illusions and hallucinations, poor perception of time and distance	Longer, more intense "flig" episodes, psychosis, possible death	Withdrawal syndrome not reported	
Amphetamine Variants	I	2,5-DMA, DMA, STP, MDA, MDMA, TMA, DMG, DOB	None	None	Unknown	Yes	Variable	Oral, injected				
Phencyclidine	II	PCP, Angel Dust	None	None	Unknown	High	Yes	Days				
Phencyclidine Analogues	I	PCP, PCP, PCP	None	None	Unknown	High	Yes	Days				
Other Hallucinogens	I	Bufotenin, Ibogaine, DMT, DET, Phallocyon, Phallocyon	None	None	Unknown	Possible	Variable	Oral, injected, smoked				
CANNABIS												
Marijuana	I	Pot, Acapulco Gold, Grass, Reeder, Sinsemilla, Thai Sticks	None	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	THC, Marinol	Cancer chemotherapy antineoplastic	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				

*Designated a narcotic under the CSA. **Not designated a narcotic under the CSA.

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, nonprescribed use of alcohol and nonprescribed use of drugs can have an adverse effect on overall health and well-being. Consider the following facts:

1. Drinking more than one or two alcoholic beverages a week promotes more visible signs of aging;
2. Consuming one and one-half or more alcoholic beverages per day increases the risk of breast cancer;
3. Drinking alcoholic beverages poisons the heart muscle, counteracts the benefits of exercise, increases male impotence, and depresses the body's immune system;
4. 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;
5. Cocaine use is responsible for kidney damage, stroke, lung and heart diseases, seizures, and intense psychological problems.
6. Many forms of narcotics are highly addictive to users.
7. 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;
8. The nonprescribed use of tranquilizers, barbiturates, and amphetamines is dangerous and may cause major health problems, including death;
9. 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 as-

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

December 4, 2000

(Replaces policy dated June 21, 1991.)

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).

Policy Statement--First-Time Entering UAB Students

Beginning with the Fall Term 1991, 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 physicians. If the person has never been immunized, two injections of the vaccine at least one month apart are required.

Policy Statement--International Students, Visiting International Scholars, and Students Enrolled in Health Affairs Schools

Because of the lack of immunization requirements in many foreign countries, all UAB international students and international scholars currently are required, and will continue to be required, to be immunized against Tetanus, Diphtheria, and Rubeola (Red Measles). Furthermore, all international students and international scholars must show proof of a non-reactive Tuberculin Skin Test (or successful treatment) within one year prior to enrollment. 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 campus academic, research, or clinical programs and activities.

Because of the nature of their work, students engaged in health professional training programs could have a higher risk of contracting Rubeola, Rubella, Mumps, Tetanus, and Diphtheria. 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 currently are required, and will continue to be required, to be immunized against Tetanus, Diphtheria, Mumps, Rubeola (Red Measles), and Rubella. Furthermore, all students enrolled in health-related schools must have had a Tuberculin Skin Test with negative results (or successful treatment) prior to matriculation, and it is recommended that they have a Tuberculin Skin Test at least once per year. 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 be immunized against these diseases prior to being admitted, attending, enrolling, or participating in campus academic, research, or clinical programs and activities.

The UAB Student Health Service will provide such immunizations on a fee-for-service basis for any student who needs to meet his or her immunization requirements. Students may choose to fulfill these requirements at the

Jefferson County Health Department or with a private physician.

Individual health-related schools may impose additional immunization requirements (such as Varicella, Hepatitis B, or other vaccines) 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.

The Office of International Scholar and Student Services is responsible for procedures to implement this policy for international students and international scholars.

The Director of University Relations and Marketing will be responsible for conveying to UAB's publics the fact that this policy is promulgated in an effort to be responsive to the health needs of our constituencies and that it is not intended to impede the enrollment process for 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 plagiarism 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 soft-

ware. 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 installed 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:

- A. 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.
- B. The original software distribution media.
- C. The original documentation.
- D. 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.
- E. 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 School¹², (b) for graduate students entirely under UAB jurisdiction, elected by the graduate students at large¹³; 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

¹² 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.)

¹³ The elected student members are to be in good standing, enrolled and registered, each in a different program.

intellectual property often arise from UAB-related student efforts.

The policies governing the administration of inventions are included in the Board of Trustees Rule 509 and in the UAB Patent Policy. 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 UAB's 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 student 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 a student of the University and which relates to the inventor's field of study 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, students may not themselves assign or grant any option to any such intellectual property developed during the course of their enrollment 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 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: 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 student efforts.

The policies governing the administration of inventions are included in the Board of Trustees Rule 509 and in the UAB Patent Policy. 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 UAB's 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 student 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 a student of the University and which relates to the inventor's field of study 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, students may not themselves assign or grant any option to any such intellectual property developed during the course of their enrollment without a release from UAB.

Questions concerning intellectual property rights should be directed to the UAB Research Foundation.

Appendix XIV: 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 non-academic 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 XV: 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 XVI: 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 reason-

able 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 deter-

mined 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 responsi-

bility 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 students. 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 recapped 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.