University of Alabama at Birmingham

Syllabus

MA311 and MA501 History of Mathematics

Fall Semester 2020

Instructor: Dr. Ivan Mann, (205) 934-2154, ivanmann@uab.edu

Office hours: On line, email, or telephone by appointment.

UAB Policies and Resources:

Drop/Add and Course Withdrawal

* Drop/Add: Deadlines for adding, dropping, or withdrawing from a course and for paying tuition are published in the Academic Calendar available online. Review the Institutional Refund Policy for information on refunds for dropped courses.
* Withdrawal: To avoid academic penalty, a student must withdraw from a course by the withdrawal deadline shown in the academic calendar and receive a grade of W (withdrawn). Failure to attend class does not constitute a formal drop or withdrawal.

UAB United: Safe Entry to Campus

Please go to the UAB United website for guidance and resources related to our safe entry to campus in Fall 2020, including information on:

* Testing
* Academic resources and in-depth information
* Student Affairs resources to support all students (housing, dining, extracurricular activities, parking, etc.)
* Health and safety resources and recommendations for on and off-campus
* Information for graduate students, School of Medicine students, Post-Docs and International Students

All students should use the Student COVID-19 Entry Checklist to see what they have to

do in order to enter the campus safely. Non-compliance with the required items will result in students not being able to remain on campus or participate in any in-person classes, meetings, jobs, extracurricular activities, and events.

Misconduct

• Academic Honor Code

<https://www.uab.edu/students/one-stop/policies/academic-honor-code>

• Non-Academic Student Code of Conduct

https://www.uab.edu/students/conduct/

DSS Accessibility Statement

Accessible Learning: UAB is committed to providing an accessible learning experience for all students. If you are a student with a disability that qualifies under Americans with

Disabilities Act (ADA) and Section 504 of the Rehabilitation Act, and you require accommodations, please contact Disability Support Services for information on accommodations registration and procedures. Requests for reasonable accommodations involve an interactive process and consist of a collaborative effort among the student, DSS, faculty and staff.

If you are registered with Disability Support Services, please contact DSS to discuss accommodations that may be necessary in this course. If you have a disability but have not contacted Disability Support Services, please call (205) 934-4205, visit their website or their office located in Hill Student Center Suite 409. You can also contact them by email at dss@uab.edu.

COVID-19 Adjustments for Students:

Attendance will not be a part of your grade in this course. Students concerned about their attendance as a result of COVID-19 should register with Disability Support Services. UAB Disability Support Services (DSS) has established a process for UAB students to request temporary adjustments based on the impact of COVID-19. The process is similar to the traditional DSS registration procedures for accommodations based on disability. However, these requests will be referred to as ”COVID-19 Related Temporary Adjustments”. On the DSS website, there is a section (next to the traditional DSS application process) titled ”Request COVID-19 Temporary Adjustments” where students can read the process and click to complete an application. On the application, the student must complete an attestation and identify which of the following category(s) applies to their situation. Students will be allowed to submit documentation to support their requests.

* I am 65 or older
* My medical provider has determined that I am an individual who is considered high risk according to Centers for Disease Control and Prevention
* I care for or reside with an individual who has been determined to be high risk according to Centers for Disease Control and Prevention
* I have tested positive for COVID-19
* I am requesting adjustments for another reason

Any questions regarding this process should be referred directly to dss@uab.edu. For qualifying students, DSS staff will create a Notification of Temporary Adjustment Letter (PDF format) which will be provided to students. Students will share this letter, as needed, with instructors to request adjustments.

Title IX Statement

The University of Alabama at Birmingham is committed to providing an environment that is free from sexual misconduct, which includes gender-based assault, harassment, exploitation, dating and domestic violence, stalking, as well as discrimination based on sex, sexual orientation, gender identity, and gender expression. If you have experienced any of the aforementioned conduct we encourage you to report the incident. UAB provides several avenues for reporting. For more information about Title IX, policy, reporting, protections, resources and supports, please visit UAB Title IX webpage for UAB’s Title IX, UAB’s Equal Opportunity, Anti-Harassment, Duty to Report, and Non-Retaliation policies.

MA311 Course Description: (3 semester hours)

The course will study the development of mathematical principles and ideas from a historical viewpoint, and their cultural, educational, and scientific significance; from their earliest beginnings through the twentieth century. The focus will be on individual mathematicians and the contributions they have made, including the historical background for their development.

MA311 Course Description: (4 semester hours)

When taken as a four-hour course History of Mathematics follows the same general syllabus as the three-hour version with the following additional requirement: each student will be assigned additional reading and journal entries.

MA501 Course Description: (3 semester hours)

When offered as a graduate-level course, History of Mathematics follows the same general syllabus as MA 311 with the following additional requirement: each graduate student will be assigned additional reading and journal entries.

Prerequisites:

MA311/501 has the prerequisite MA125 (Calculus I) grade of C or better.

Required Reading:

Burton, David M., *The History of Mathematics*, 7th ed., McGraw-Hill, New York, 2011.

Graduate students and undergraduates in the four-hour course additional reading as described below.

Course Objective:

Students will acquire an understanding of the scope and interrelationship of mathematics development from the earliest documentation through the early twentieth century, from many sources around the world. Students will learn to see many mathematicians as complex individuals.

Assessment and Grading:

Student achievement on the items assessed will determine the final course grade. Course letter grades are assigned traditionally. There are points assigned for each assignment, for the final, and for the mid-term. There are points assigned for the journal entries for graduate students.

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | Undergraduate 3-hr Course | Graduate /4-hr Course |
|  | Mid-term Test  |  200 |  200 |
|  | Final Exam |  320 |  320 |
|  | Exercise Grade |  480 |  480 |
|  | Journal Entries  |  |  200 |
|  | Total  | 1000 | 1200 |

Points required for grades:

|  |  |  |
| --- | --- | --- |
|  | Undergraduate 3-hr Course | Graduate /4-hr Course |
| A | 900 | 1080 |
| B | 800 |  960 |
| C | 700 |  840 |
| D | 600 |  720 |

Exercise Grade:

Exercises will be in Canvas as quizzes, one for each week when reading is assigned. The exercise grade will be calculated based on points earned on the assignments in Canvas. Exercises usually have a 30-point value. Late assignments receive no credit.

Typical Exercise Problems:

Each reading assignment in the syllabus is associated with a set of typical exercise problems. Some of the homework exercises will come from this list, or at least resemble them strongly. Some of the test problems will come from this list. A few problems will be essay questions that require short answers or computations that require arithmetical answers.

Mid-Term Test and Final Exam:

The midterm and final will be in Canvas at stated times. If you must miss the Mid-term Test or Final Exam for any reason it is best that you inform the instructor in advance if at all possible; otherwise, scheduling conflicts may preclude you from completing the course requirements on a timely basis. Tests will be open book and open notes.

Schedule Dates:

|  |  |
| --- | --- |
| Mid-term test date: | 10/15/20 5:00 – 7:00 PM |
| Final exam test date: | 12/10/20 7:00 – 9:30 PM |

Attendance:

This class meets for 14 class sessions, one of which is the mid-term test. There is an additional class meeting for the final exam. Any missed class is equivalent to missing one entire week of a normal 3-hour course. Attendance is therefore important. I consider it very important that students be on time and do not leave the class until the end of the class period.

Additional Information:

Hand-held calculators can be used throughout the course. Homework assignments in Canvas are usually quizzes and will be taken in Canvas. Tests will be Canvas quizzes consisting of multiple choice, true/false, numerical, and a essay questions.

Graduate and Four Hour Undergraduate Journal:

Each graduate student and four-hour undergraduate student will prepare a reading journal based on the additional reading below.

Submission dates:

|  |  |  |
| --- | --- | --- |
|  First submission  |   |  9/24/2020 |
|  Second submission  |   | 10/15/2020  |
|  Third submission  |   | 11/12/2020 |
|  Fourth submission  |   | 12/03/2020  |

Journal Instructions

The journal should be written in a Word document or something similar that I can read easily. Write this for yourself, not for me. I would like you to be able to keep the journal and look back at it sometime in the future. There are sample topics in the table below, which are usually people. Read the book entries about the people, read additional information about them (usually Wikipedia and similar sites), use your imagination to turn the printed words into people.

Write your impression of the subject or the person, what difficulties they had, what made it possible to have their names in history, what impact they had on the world, and anything else of interest. A guiding thought might be, “How do I make this person interesting to a high school class?” At Thanksgiving family meetings, what do I say to interest people in something I read?

Date each entry honestly, and keep up with the reading schedule. Otherwise this will become a more difficult and less enjoyable assignment.

History of Mathematics

Fall Semester 2020

Reading Schedule in *The History of Mathematics*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Class meeting  | Date  | Chapters to read by class meeting  | Topic |  |  Typical Exercise Problems  |
| Page  | problems  |
| 1  | 8/27  | none  |  |   | none  |
| 2  | 9/03  | 1  | Early Number Systems | 18  | 1-4, 11, 12, 13  |
|   |   |   | 29  | 1-5, 13-17  |
| 3  | 9/10  | 2.1 – 2.4  | Egyptian Math | 51  | 1-5, 19-24  |
|   |   |   |  | 61  | 1-5  |
| 4  | 9/17  | 3.1 – 3.3  | Early Greek Math | 103 | 1 thru 6  |
|   |   |   |  | 117 | 1 thru 4, 15, 16, 17  |
| 5  | 9/24  | 4.1 – 4.5  | Alexandrian School, Euclid, Eratosthenes, Archimedes | 168 | 1, 2, 11, 12  |
|   |   |   | 182 | 1, 2, 16(a), 17, 18  |
|  |  |  | 192 | 4  |
|  |  |  | 208 | 1(e), 2, 11, 12  |
| 6  | 10/1  | 5.1 – 5.4  | Later Greek | 231\* | 13, 14, 16  |
|   |   | 5.5  | Near and Far East | 266  | 14, 18, 20  |
| 7  | 10/8  | 8.1 -8.2  | Beginnings of Modern Math; Descartes | 328  | 1b, 4  |
|   |   |   | 336  | 1b  |
|   |   |   | 362  | 3, 7, 13  |
|   |   |   |  | 382  | 5, 6  |
| 8  | 10/15  | Mid-Term  |  |   |   |
| 9  | 10/22  | 8.3 – 8.4  | Newton and Leibniz | 409  | 1, 2, 3, 4  |
|  |  |   |  | 433  | 3, 4, 11, 12, 13  |
| 10  | 10/29  | 9.1 – 9.2 | Probability | 287  |  |
| 11  | 11/5  | 10.1 – 10.3 | Number TheoryFermat, Euler, Gauss |  |  |
|   |   |   | 295  |  |
| 12  | 11/12  | 11.1, 11.3,  | 19th Century | 328  |  |
|   |   |  11.4 |  | 336  |  |
| 13  | 11/19  | 12.1 – 12.3 | Cantor, PoincaréSet Theory | 328  |  |
|   |   |   | 336  |  |
|   |   |   | 362  |  |
|   |   |   | 382  |  |
|   | 11/26  | HOLIDAY  |  |   |  |
| 14  | 12/3  | 13.1  | Ramanujan, Von Neumann, Turing, Noether | 409  |  |
|   |   |  13.3 | 433  |  |
|  |  |  |  |  |
| 15  | 12/10  | Final  |  |   | 7 – 9:30 PM  |

History of Mathematics

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Journal Topics

|  |  |  |  |
| --- | --- | --- | --- |
| Class meeting  | Date  | Chapters in Burton | Individual mathematicians and possible topics |
| 1  | 8/27  | none  |   |
| 2  | 9/03  | 1  | Herodotus, “primitive” mathematics, John Chadwick |
| 3  | 9/10  | 2.1 – 2.4 | Champollia, Democritus, Golden Ratio, Babylonian algebra, Egyptian arithmetic |
| 4  | 9/17  | 3.1 – 3.3  | Thales, Pythagoras, Nichomachus, Zeno |
| 5  | 9/24  | 4.1-4.5  | Euclid, Claudius Ptolemy, Archimedes, Eratosthenes  |
| 6  | 10/01  | 5.1-5.5  | Diophantos, Pappus of Alexandria, Hypatia, Bhaskare, Boethius, Abû Kâmil. Al-Khowârizmï  |
| 7  | 10/08  | 8.1-8.2 | Napier, Kepler, Descartes  |
| 8  | 10/15  | Mid-term  |   |
| 9  | 10/22  | 8.3-8.4  | Newton, Leibniz, John Wallis, John Barrow |
| 10  | 10/29  | 9.1-9.2 | Pascal, Bernoulli, Laplace |
| 11  | 11/05  | 10.1-10.3  | Fermat, Euler, Gauss  |
| 12  | 11/12  | 11.1, 11.3, 11.4 | Legendre, Riemann, Cauchy, Koralevsky, Fourier |
| 13  | 11/19  | 12.1-12.3 | Russell, Benjamin Bannaker, Wiener, Hilbert, Cantor, Poincaré  |
|   | 11/26  | Holiday  |   |
| 14  | 12/03  | 13.1, 13.3 | Turing, von Neumann, Noether, Ramanujan, Hardy, Katherine Johnson, Dorothy Vaughan, Mary Jackson  |
| 15  | 12/10  | Final  | 7 – 9:30 PM  |

Journal Grading Scale:

|  |  |
| --- | --- |
| Has the student kept up with the reading assignments?  | 40 points  |
| Is the student’s writing reflective of a thoughtful and or creative approach?  | 40 points  |
| Is the student’s writing reflective of a thorough approach?  | 40 points  |
| Is the writing clear and readable, using good grammar etc.?  | 40 points  |
| Has the student demonstrated a grasp of the subject and ideas?  | 40 points  |

You will lose points for obvious copying from just one source. Read Burton, at least one article in Wikipedia, and other sources. Write in your own terms.

“If you copy from one person it is plagiarism. If you copy from many people it is research” – Paul Moore