

Senior Seminar – Math 4160

Departmental Syllabus for Fall 2008

Course Information

Course Description: This “capstone” course is designed to evaluate what you have learned as a math major at UT Tyler as well as give you an opportunity to explore additional mathematical ideas from start to finish outside the classroom with a faculty mentor. After selecting a research topic, you will research that topic to prepare a paper using Latex and give an oral presentation at the end of the semester.

Credit hours: 1 hour

Course Prerequisites: You should be within 10 hours of completing all mathematics courses needed for graduation and satisfy at least *one* of the following

- Have a grade of C or better in Math 3336 (Abstract Algebra I)
- Have a grade of C or better in Math 3345 (Introduction to Analysis)
- Have a grade of C or better in Math 3365 (Geometric Systems)

Student Learning Outcomes: Upon completion of this course, students should be able to do the following:

- Construct a well-written mathematical research paper (critical thinking & communication)
- Typeset a mathematical document using Latex (critical thinking)
- Prepare a professional presentation using Latex or PowerPoint (critical thinking)
- Make an oral presentation (communication)

Course Timeline

Important Dates:

September 1 - Labor Day

November 26-29 - Thanksgiving Break

October 31 - Last day to drop a course with a W

Suggested Timeline for Project Development:

September 8 – Choose research topic.

September 22 – Submit 5 sources to mentor (at most 2 internet sources).

October 6 – Submit an outline of paper to mentor.

October 20 – Submit a written draft of paper (Latex not necessary here).

November 17 – Submit a Latex draft of paper to mentor.

December 1 – Submit an outline of presentation to mentor.

December 8 – Submit a PowerPoint (or Latex) file of presentation to mentor.

Tentative Schedule: The table below provides a tentative schedule for the semester.

Week	Dates	Activity
1	Sept 8	Choose topics & “Library Resources”
2	Sept 15	
3	Sept 22	Calculus Q&A
4	Sept 29	Trig & Differential Eqns Q&A
5	Oct 6	Linear algebra Q&A

6	Oct 13	Prob/Stat Q&A
7	Oct 20	Logic & Set Theory Q&A
8	Oct 27	Take Math Subject GRE
9	Nov 3	"How to use Latex"
10	Nov 10	TBA
11	Nov 17	"How to Give a Great Presentation"
12	Nov 24	TBA
13	Dec 1	TBA
14	Dec 8	Presentations
15	Dec 15	Presentations

Course Evaluation

Math Subject GRE: In order to evaluate your performance in the UT Tyler Mathematics program, you will take the Math Subject GRE midsemester. This test will not be given officially so you will not have a Math Subject GRE score for attending graduate school nor will you have to pay the fee associated with an official test. This test is to assess how much you have learned here at UT Tyler. There will be reviews for a handful of weeks to prepare you to take this test. The following information was taken from a website about the Math Subject GRE for more information:

- The test consists of approximately 66 multiple-choice questions drawn from courses commonly offered at the undergraduate level.
- Approximately 50 percent of the questions involve calculus and its applications - subject matter that can be assumed to be common to the backgrounds of almost all mathematics majors.
- About 25 percent of the questions in the test are in elementary algebra, linear algebra, abstract algebra, and number theory. The remaining questions deal with other areas of mathematics currently studied by undergraduates in many institutions.

The following content descriptions may assist students in preparing for the test. The percents given are estimates; actual percents will vary somewhat from one edition of the test to another.

Calculus - 50%

- Material learned in the usual sequence of elementary calculus courses - differential and integral calculus of one and of several variables - includes calculus-based applications and connections with coordinate geometry, trigonometry, differential equations, and other branches of mathematics

Algebra - 25%

- Elementary algebra: basic algebraic techniques and manipulations acquired in high school and used throughout mathematics
- Linear algebra: matrix algebra, systems of linear equations, vector spaces, linear transformations, characteristic polynomials, and eigenvalues and eigenvectors
- Abstract algebra and number theory: elementary topics from group theory; theory of rings and modules, field theory, and number theory

Additional Topics - 25%

- Introductory real analysis: sequences and series of numbers and functions, continuity, differentiability and integrability, and elementary topology of \mathbb{R} and \mathbb{R}^n
- Discrete mathematics: logic, set theory, combinatorics, graph theory, and algorithms
- Other topics: general topology, geometry, complex variables, probability and statistics, and numerical analysis

The above descriptions of topics covered in the test **should not be considered exhaustive**; it is necessary to understand many other related concepts. Prospective test takers should be aware that questions requiring no more than a good precalculus background may be quite challenging; some of these questions turn out to be among the most difficult questions on the test. In general, the questions are intended not only to test recall of information but also to assess test takers' understanding of fundamental concepts and the ability to apply those concepts in various situations.

Semester Grades: Your faculty mentor will submit a grade for you, and this will count 50% of your grade. Your performance on the mathematics subject portion of the GRE will count 25% of your grade. The panel's evaluation of your presentation will count 25% of your grade

University Policies

ADA Compliance:

If you have a disability, including a learning disability, for which you request disability support services/accommodation(s), please contact Ida MacDonald in the Disability Support Services office so that the appropriate arrangements may be made. In accordance with federal law, a student requesting disability support services/accommodation(s) must provide documentation of his/her disability to the Disability Support Services counselor. For more information, call or visit the Student Services Center located in the University Center, Room 282. The telephone number is 566-7079 (TDD 565-5579). Additional information may also be obtained at the following UT Tyler Web address: <http://www.uttyler.edu/disabilityservices>.

Social Security Statement:

It is the policy of The University of Texas at Tyler to protect the confidential nature of social security numbers. The University has changed its computer programming so that all students have an identification number.

Note Regarding Student Absence Due to Religious Observance:

Students who anticipate being absent from class due to a religious observance are requested to inform the instructor by the second class meeting of such absences.

Grade Replacement:

If you are repeating this course for a grade replacement, you must file an intent to receive grade forgiveness with the registrar by the 12th day of class. Failure to file an intent to use grade forgiveness will result in both the original and repeated grade being used to calculate your overall grade point average. A student will receive grade forgiveness (grade replacement) for only three (undergraduate student) or two (graduate student) course repeats during his/her career at UT Tyler. (2006-2008 Catalog, p. 35)