Math 460QW: Senior Seminar
Fall 2014
Course Syllabus

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Class Meetings: Thursday 2:10 - 3:40 Room 320 BDK Science Center
Office Hours: see web site

Text  
*Journey Through Genius*; W. Dunham:  
*More Great Theorems* – A Supplementary Text for Math 460 (handouts)

**Course Objectives:** This is a capstone course for mathematics majors. Its purpose is to let you think about and reflect on what mathematics is and to tie together your years of studying mathematics. Dunham's book, *Journey Through Genius*, covers the story of mathematics from the 5th century BC up to the 20th century AD by looking at some famous problems and theorems (especially theorems) and the mathematicians who worked on them. The book is many things. It is a selective history of mathematics. It is a look at some of the more famous and colorful characters who were mathematicians. It presents rigorous but readable proofs of some interesting and famous theorems in mathematics. Additional readings and theorems are given in the supplementary handout *More Great Theorems*

The course will also make use of a number of on-line resources; two in particular are The MacTutor History of Mathematics Archive at The University of St. Andrews in Scotland ([http://www-history.mcs.st-andrews.ac.uk/history/index.html](http://www-history.mcs.st-andrews.ac.uk/history/index.html)) which contains a wealth of biographical and historical essays on mathematicians and mathematics and Kevin Brown’s Mathpages.com ([http://www.mathpages.com](http://www.mathpages.com)) which is source of articles on a number of unusual and interesting mathematical topics.

Dunham’s book is well written, fun to read. Augmented by the papers by Grabiner, and Becerra & Barnes and your own explorations of on-line resources this course will give you a deeper appreciation for the unique endeavor we call mathematics.

**Grading:** The grade for the course will be based on the following criteria:

1. Reading Comprehension Quizzes – short 3 minute quizzes given at the beginning of each class based on the reading assignment for that class (10%)
2. Class participation (10%)
3. In-class presentations on various mathematical topics including presentation of the theorems we’ll read about. (15%)
4. Written homework assignments based on the readings and topics covered in class (25%)
5. An expository paper on a mathematical topic (your choice). Final copies (paper and electronic) are due the Thursday after Thanksgiving. Copies will then be made available to the rest of the class for written critiques on each paper (due at Oral Presentations - see below). The solicited feedback, “critiques”, will be used to help determine grade for the paper. (35%)
6. Oral presentation on your paper given during Final Exam Period. (5%).

**Reading Comprehension Quizzes:** These short and very easy quizzes given at the beginning of each class will be the starting point for a class discussion of reading. Make ups will not be given so be sure not to miss any classes. If you have a legitimate excuse to miss class and I am contacted ahead of time, the missed quiz will not be counted against your quiz average.

**In-Class Presentations:** This class is a seminar so members are expected to research, prepare and present material to the rest of the class. Eventually each of you will present to the rest of the class one of the theorems you will have read about for that week. In additional I might call upon you to make an oral presentation on some related topic.
Since there is a lot of interesting mathematics readily available on the internet, the websites listed should be used as starting points for your research. Good, interesting, and informative presentations require some work so don’t put them off to the last minute. Use of technology is encouraged. Feel free to use me as a resource person for ideas & suggestions.

**Written Homework Assignments:** This is a course about theorems and proving results. Based on the materials we cover each week I will assign a problem based on the topics covered to be written up and handed in. Write ups should be polished; neatness and legibility count! These are not pledged assignments. Collaboration on understanding the material is okay but write ups must be your own. Therefore don’t copy one another.

**Mathematical Paper and Class Presentation:** Since this is a writing intensive seminar, you will be expected to research some topic of interest in mathematics and present your findings to the rest of seminar. Paper should be expository (a research paper is not required) and should be approximately 10 - 12 pages in length (double spaced). The paper will be graded on mathematical content and on context; for example presenting the solution of some mathematical problem or theorem within its the historical setting as a background much like what Dunham does in his book.

CSE Style (Council of Science Editors) should be used for citations and documentation (use the citation-sequence system). A link to CSE style web-page resources can be found on the course web-site (under Web Links). See Sample pages from a paper: CSE style.

The final paper is due the class period after Thanksgiving; both a paper copy and an electronic copy must be submitted. Copies will then be made available to the rest of the class in preparation for the final presentations.

During time allocated for the final everyone will give a 15 minute presentation on their paper.

**ETS Major Field Test in Mathematics:** “The Major Field Tests are objective, end-of-program tests .... Based on the Graduate Record Examination Subject Test they have been shortened to two hours each, made less difficult than the GRE tests, and revised to reflect undergraduate programs and to be appropriate for all seniors majoring in a field, not just those planning graduate study.

Score on these tests provide useful information for institutions seeking outcomes measures, for departments in evaluating their curriculum, and for faculty in measuring the progress of their students and considering curriculum changes.” (from Major Field Tests Program Manual).

Performance on the ETS test will in no way affect your grade for the course or affect your graduation status unless you do not take the test. This is for our own internal departmental assessment. Of course we expect you to take this test seriously and do the best you can.

To help prepare for this test, as a class we will work though a sample GRE test. This will provide a review of undergraduate mathematical knowledge.

The test will be scheduled at a mutually agreeable time and date sometime in late November. It will require a 3 hour block of time.

Finally - a quote from Sir Isaac Newton

“I do not know what I may appear to the world; but to myself I seem to have been only like a boy playing on the seashore, and diverting myself in now and then finding a smoother pebble or a prettier shell than ordinarily, whilst the great ocean of truth lay all undiscovered before me.” - Isaac Newton

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