Spring 2004 FYS 102.13: The Art of Mathematical Thinking:
An Introduction to the Beauty and Power of Mathematical Ideas

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Text: *The Heart of Mathematics: An invitation to effective thinking* by Edward B. Burger and Michael Starbird

Syllabus: This course will tentatively cover the major concepts of the following chapters in the text:

Ch. 1 Fun and Games: An Introduction to Rigorous Thought
Ch. 2 Number Contemplation
Ch. 3 Infinity
Ch. 4 Geometric Gems
Ch. 5 Contortions of Space
Ch. 6 Chaos and Fractals
Ch. 7 Risky Business

Examinations: There will be two tests (100 points each), *at least* eight quizzes (homework sets 25 points each), a semester project (100 points), and the final paper (100 points). The tentative dates are below.

Friday:		Friday:	
Jan. 30	Quiz 1	Mar. 5	Test 1
Feb. 6	Quiz 2	Monday:	
Feb. 13	Quiz 3	May 3	Test 2
Feb. 20	Quiz 4		
Feb. 27	Quiz 5		
Mar. 12	Quiz 6		
Mar. 26	Quiz 7		
Apr. 9	Quiz 8		
Apr. 16	Quiz 9		
Apr. 23	Quiz 10		

FINAL: F 9:00-11:00 Wednesday MAY 5

Grades: Final grades will be calculated based on performance in the following components of the course.

Component	Points
Quizzes (best 8 of __)	200
Tests (all)	200
Semester Project	100
Final Paper	100
Total	600

100-93% A, 92.9-90% A-, 89.9-87% B+,
86.9-83% B, 82.9-80%B-, 79.9-77% C+,
76.9-73% C, 72.9-70% C-, 69.9-67% D+,
66.9-63% D, 62.9-60% D-, 59.9-0%

Attendance: Regular attendance is expected. **No late work** will be accepted. **No make-up** exams will be given.

Disability Accommodation: Any student who feels he or she may need an accommodation based on impact of a disability should contact me privately as soon as possible to discuss your specific needs. I rely on the documented files at the Office of Academic Support in 104 Doane to verify the need.

Course Description: Here we will consider some of the greatest ideas of humankind - ideas comparable to the works of Shakespeare, Plato, and Michelangelo. The great ideas we will explore here are within the realm of mathematics. What is mathematics? Mathematics is an artistic endeavor which requires both imagination and creativity. In the course, we will experience what mathematics is all about by delving into some beautiful and intriguing issues. There are three basic goals for this course.

(1) To attain a better understanding of some rich mathematical ideas.
(2) To build sharper skills for analyzing life issues that transcend mathematics.
(3) To develop a new perspective and outlook at the way you view the world.

We will cover roughly six different topics. Although you will be challenged, the overriding theme of the course is to *gain an appreciation for mathematics and to discover the power of mathematical thinking in your everyday life.* We will follow the text reasonably closely although we will not cover all the material in class. The only prerequisites for this course are an open and curious mind and the willingness to put aside any preconceived prejudices or dislikes for mathematics. Very little mathematical background will be expected and hopefully this course should be (for the most part) "self contained."

Quizzes: All quizzes must be typewritten (with the exception of "diagrams"). Clarity of exposition is important and one should strive for well written, polished solutions.

Research Project: The only way to really understand mathematics is to learn and discover it on one's own. Thus, students will select a mathematical topic, read and teach themselves any necessary background to understand it and then investigate the topic. Students are **strongly** encouraged to work together in groups of two or three on this project. By working together, the individuals can learn from each other and share the experience. Each group will write a final paper on their findings and submit a completed work (a poster display, a creative work, etc.). Also, each student will write a short individual statement regarding the experience. Various interim reports will be collected throughout the term. Students will discuss all phases of the project with me according to the dates below. Projects are graded based on the following:

Grading		Mile Markers	
Mathematical content	$\frac{1}{3}$	March 12	Project outline due
Creativity	$\frac{1}{3}$	April 2, 23	Project update due
Quality	$\frac{1}{3}$	April 30	Project due

Important Date:
February 2, 2004 Last day to drop a course for the second semester.