MATH 112 The Nature of Modern Mathematics

1.   <u>Catalog Description</u>

MATH 112 Nature of Modern Math   **4 units**
GE Area B1

Prerequisite: Passing score on ELM examination, or an ELM exemption, or credit in MATH 96 (formerly MATH 104).

Topics from contemporary mathematics, their development, applications, and role in society. Some typical topics, to be chosen by the instructor: graph theory, critical path analysis, statistical inference, coding, game theory, and symmetry. 4 lectures. Fulfills GE B1; for students admitted Fall 2016 or later, a grade of C- or better in one GE B1 course is required to fulfill GE Area B.

2.   <u>Required Background or Experience</u>

The ability to perform routine algebraic operations with accuracy and confidence.

3.   <u>Learning Objectives</u>

The student should:

a. Have an enhanced awareness and understanding of mathematical models as tools for solving a variety of complex problems.
b. Master some techniques basic to contemporary applications of mathematics.
c. Have an enhanced knowledge of some topics of current interest in mathematics.
d. Know that mathematical knowledge is growing at an astonishing rate, and that mathematics is an active area of research.
e. Be less likely to be misled by pseudo-mathematical arguments.

4.   <u>Text and References</u>

- Burger, Edward B. and Michael Starbird, <u>The Heart of Mathematics: An Invitation to Effective Thinking.</u> Key College Publishing, Emeryville.

   or

- Consortium for Mathematics and Its Applications (COMAP), <u>For All Practical Purposes: Mathematical Literacy in Today's World</u>, W. H. Freeman and Co., New York.

5.   Minimum Student Materials

Paper, pencils, and notebook.

6.   Minimum University Facilities

Classroom with ample chalkboard space for class use.

7.   Content and Method

The Heart of Mathematics is organized into six chapters:

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

For All Practical Purposes is organized into six chapters:

Chapter 1. Management Science
Chapter 2. Statistics: The Science of Data
Chapter 3. The Digital Revolution
Chapter 4. Social Choice and Decision Making
Chapter 5. On Size and Shape
Chapter 6. Modeling in Mathematics

The instructor should choose among these topics and cover them in as much depth as time permits.

8.   Methods of Assessment

The primary methods of assessment are: essay examinations, quizzes and homework. Typically, there will be one or more hour-long examinations during the quarter, and a required comprehensive final examination. Students are required to show their work, and are graded not only on the correctness of their answers, but also on their understanding of the concepts and techniques.