MEET YOUR INSTRUCTOR

Dr. Michael Prophet, Professor of Mathematics

As an undergraduate, I was a math major at Shippensburg University of Pennsylvania (near Gettysburg, PA) from 1983-87. After graduating I worked as a computer programmer near Philadelphia; but I missed doing mathematics too much and went back to school. I enrolled in the Ph.D. program in Mathematics at the University of California at Riverside in 1988. I finished my degree in 1993 and went to work at Idaho State University. From there I went to Murray State University (Kentucky) and then to the University of Northern Iowa.

COURSE OVERVIEW

Through this course we will see mathematics applied in a variety of settings - some of which will be quite familiar while others perhaps somewhat surprising. However, the common theme in all applications will be the utility of mathematics in decision making. Through the construction of mathematical models we will learn how complex questions can be answered in the areas of management science, statistics, social choice and finance.

Textbook:

*For All Practical Purposes* (8th Edition) by COMAP (W.H. Freeman publisher).

This course requires that you purchase a course packet. Course packets are available from Copyworks. Call 319-266-2306 to order your course packet over the phone with a credit card. Packets are available electronically or through hard copy.

Course Objectives:

The objective of this course is to further your development as a critical reader and logical thinker by considering settings in which mathematics is used to address challenges in business, social choice and consumer finance. Specifically, you will learn:

- about Euler and Hamiltonian circuits and how these structures can help to solve specific routing problems;
- a technique to maximize a company's profit by adjusting production levels;
- how to display and describe data using histograms and various measurements of center and spread;
- what probability is, as well as basic concepts such as equally likely events, probability mean and the normal probability distribution;
- how to determine characteristics of a large population via sampling and details regarding the distribution of sampled data;
- a variety of methods for selecting a winner in an election involving three or more candidates and see drawbacks to each selection scheme; you will see how to exploit these drawbacks in order to change the outcome of an election;
- optimal strategies for competitions involving two opponents vying for a finite resource or prize;
- how to calculate interest earned on a fixed principle for a variety of interest-payment methods;
- how to calculate the effect of inflation on a fixed principle;
- how to calculate important elements of a conventional loan, including monthly payment and total interest paid.

COURSE ORGANIZATION

The course is organized into 4 Units. Within each Unit there are Assignments. Each Assignment consists of readings from your textbook and problems from the book’s exercises. The solutions to the odd-numbered exercises are in the back of the textbook; solutions to the even-numbered exercises are included in the course packet. In addition, I have included within each Assignment comments over the material to read; there are Introductory comments (used before reading the assignment) and Summary comments. The Summary
comments are particularly important, as they highlight, and often restate, the main points from your reading assignment.

Each Assignment concludes with an Online Assessment.

**Online Assessments** - The details for completing the Online Assessments are:

- The Online Assessments are based on the readings and exercises.
- You have an unlimited amount of time for each Online Assessment.
- You may use your book and notes while taking the Online Assessment; keep in mind, however, that the exams are closed-book.
- Each Online Assessment consists of 4-10 multiple-choice questions.
- The Online Assessments are graded and count toward your final grade.

**Need help?** See the eLearning Tutorials for instructions on how to submit an assignment that is in a quiz format.

**Exams** - After each Unit there is a proctored exam. The details for exam-taking are:

- You have 90 minutes to take each exam.
- Each exam has 15-20 questions.
- The questions are multiple-choice and short-answer.
- All exams are closed-book; you may not use notes during the exams.
- Included on Exam 4 is a list of formulas that may be helpful; no other exam contains a formula list.

The course is organized like this:

- **Unit 1 Management Science**
  - Assignment 1: Euler Circuits
  - Assignment 2: Hamiltonian Circuits
  - Assignment 3: Linear Programming
  - Exam 1
- **Unit 2 Probability and Statistics**
  - Assignment 4: Statistics
  - Assignment 5: Probability
  - Assignment 6: Probability Distributions
  - Exam 2
- **Unit 3 Social Choice**
  - Assignment 7: Methods of Voting
  - Assignment 8: Manipulability of Voting Systems
  - Exam 3
- **Unit 4 Competition and Consumer Finance**
  - Assignment 9: Game Theory
  - Assignment 10: Savings Models
  - Assignment 11: Borrowing Models
  - Exam 4

**GRADING**

There are a total of 540 points available; they are summarized below:

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<th>Assessment</th>
<th>Points</th>
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<tr>
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