Math 214   Mathematical Methods in Operations Research
Spring 2009
Instructor: Kay B. Somers
E-mail: mekbs01@moravian.edu
Telephone: 610-861-1403
Office: PPHAC-220
Office Hours: Monday, Wednesday, and Friday, 10:15 to 11:15 a.m.; Thursday, 2:45 to 3:45 p.m., and by appointment or whenever you find me in my office.

Text: Winston, Wayne L. (1994). *Operations Research*, Fourth Edition. Belmont, California: Wadsworth Publishing Company.

Course Goals: Operations Research is the scientific or mathematical approach in the decision making and management of organizations and groups. We will investigate various types of decision problems and how to solve them with appropriate quantitative methods. After completing this course, successful students will:

- have an understanding of how mathematical models are constructed and gain experience setting up their own models.

- be able to effectively implement solution procedures for a variety of models, and interpret data and draw conclusions based on these models.

- understand that the purpose of mathematical modeling is to answer questions and make informed decisions.

- understand the role of probability and uncertainty in mathematical modeling.

- be able to explain clearly, both orally and in writing, how the results of a mathematical modeling process relate to the context from which they were obtained.

Topics: The course will include the following topics from the text:

  Chapter 1: Introduction to Operations Research.
  Chapters 3, 4, 5, & 6: Linear Programming, the Simplex Algorithm, Sensitivity Analysis, and Duality.
  Chapter 7: Transportation and Assignment Models.
  Chapter 8: Network Models.
  Chapter 13: Decision Making Under Uncertainty.
  Chapter 15: Game Theory.
  Chapter 22: Queuing Theory, if time allows.

Homework: Since mathematics, like sports, can only be learned and understood by being actively involved, homework problems will be assigned during each class and usually will be discussed during the next class. The homework will involve a variety of types of activities, including some writing assignments and some longer assignments, or projects. Some of these outside-of-class

assignments will be collected and graded. In all homework assignments that will be graded, you will be told in advance that the work will be collected. You are encouraged to study and work together on **ungraded** assignments; however, **all homework that is to be collected and graded is to be done <u>individually</u> unless it is specifically assigned as a group project.** Late homework will be accepted only if you are absent due to illness or emergency.

Recognized standards of honesty are part of the foundation on which the integrity of an academic community rests. Accordingly, the Moravian College Faculty in 1986 adopted a statement on Academic Honesty, the standards of which will be strictly applied in this course. You are encouraged to read carefully the description of this policy that is printed in your Student Handbook, and the clarification for mathematics courses on the next page of this syllabus. If you are unsure about the propriety of a given procedure or approach for completing assigned work in this course, you should consult with the instructor before completing the assignment.

Technology: We will use the computer program *Maple* and programs that are on the disk that comes with your textbook to help understand and solve some problems in this class. These programs are on Moravian's network and are accessible from the machines in the classrooms and from those in the lab. A very interesting website containing information about Operations Research and many relevant links is the website for the professional organization INFORMS: www.informs.org

In –class assessment: Working on the daily, ungraded homework problems and in-class activities is an important part of your learning process. To make sure you understand these problems and activities, we will normally have a short quiz each Friday. In addition, there will be two hour exams and a cumulative final exam. The hour exams will be given on the following dates:

> Friday, February 20
> Friday, April 3

You are responsible for knowing about any changes to the test or quiz dates made during class.

Grading: Your course grade will be based on class participation (10%), graded homework and projects (25%), two hour exams (15% each), in-class quizzes (your two lowest quiz grades will be dropped) (15%), and a cumulative final exam (20%).

Attendance and Classroom Etiquette: Attendance and participation in class are essential. It is **extremely** difficult to catch up once you have fallen behind. Please be on time, plan to stay for the whole class, and turn off all electronic equipment while you are here. You are responsible for all work covered in class and all assignments, even if absent from class. If you must miss a class, please notify Dr. Somers by e-mail or telephone beforehand, if possible. You are encouraged to ask questions in class and to see Dr. Somers for extra help outside of class.

Academic Honesty Policy Guidelines
Mathematics Courses

The Mathematics and Computer Science Department supports and is governed by the *Academic Honesty Policy of Moravian College* as stated in the Moravian College Student Handbook. The following statements will help clarify the policies for mathematics courses.

In all homework assignments that are to be graded, you may use your class notes and any books or library sources. When you use the ideas or thoughts of others, however, you <u>must</u> acknowledge the source. For graded homework assignments, you may not use a solution manual or the help, orally or in written form, of any individual other than your instructor. If you receive help from anyone other than your instructor or if you fail to reference your sources you will be violating the *Academic Honesty Policy of Moravian College*. For homework that is not to be graded, if you choose, you may work with your fellow students. You are responsible for understanding and being able to explain the solution of <u>all</u> assigned problems, both graded and ungraded.

All in-class or take-home tests and quizzes are to be completed by you alone without the aid of books, study sheets, or formula sheets unless specifically allowed by your instructor for a particular test.

In addition to the above guidelines, you may be asked to sign the following pledge when you hand in your assignments:

I have completed this work using only allowable resources, and have not consulted anyone other than my instructor in the process of completing this assignment.

Signed: _____   Date: _____