

Course Name:	Selected Topics in Operations Research
Course Code:	MATH3414
Level:	3
Semester:	1
Number of Credits:	3
Pre-requisites:	MATH2140

RATIONALE: The objective of this course is to introduce students to an applied area of Mathematics that is generally encountered in Economics, Business, and Finance. We will present mathematical models for some special types of problems. By solving such problems we rely on optimality conditions discussed in a previous course.

COURSE DESCRIPTION: In this course, we look at a selected number of problems that are generally encountered in business. The topics tend to be distinct (unrelated) and the theory involved in solving them vary from topic to topic.

OBJECTIVES:

By the end of the course, students will be able to:

- Identify various linkages between pure mathematics and applied mathematics that are often seen in business or finance.
- Acquire mathematical skills to solve non-standard problems that are practical in nature.
- To incorporate the computer and software to assist in solving business problems.

CONTENT

- (a) The Theory of Holding Inventory
Various inventory models are examined - both deterministic and stochastic
- (b) Queuing Theory
Random walk process, The M/M/1/1, M/M/1/N, M/M/n/1, M/M/n/N Models. Birth and death processes
- (c) Game Theory
Two-person zero sum games - Games with and without saddle points. Dominance. The use of linear programming to solve games.
- (d) Decision Theory
Decision Trees. Maximizing expected return, EVPI and EVSI

- (e) Replacement Theory
Optimal time to dispose of fixed assets that depreciate with time.

TEACHING METHODOLOGY: There will be a total of 39 contact hour. The course will be delivered via lectures and tutorials in the ratio of 2 to 1: New material will be presented in lectures with the help of a white board and a projector. Exercise sheets will be discussed during tutorial sessions. This will be interactive and less formal than lectures. Lecture notes, exercise sheets, solutions and interesting readings will be posted on the OURvle webpage:

<http://ourvle.mona.uwi.edu/>

ASSESSMENT: The course assessment will have a course-work component worth 30% and a final examination worth 70%. The Final examination will be two hours in length. The Coursework consists of

- i) Four graded assignments weighting 20% (5% each)
- ii) One computer-based group project 10%

REFERENCE MATERIAL: Books:

Prescribed:

Winston. W. L. Operations Research: Applications and Algorithms, Fourth Edition, Thomson – Brooks/Cole (2003), ISBN-10: 0534520200

Highly Recommended:

Hillier F. and Lieberman, G.J., Introduction to Operation Research, Holden Day, NY (2006)
ISBN-10: 0073017795

Recommended:

Taha, H. A. Operations Research: An Introduction, Ninth Edition, Pearson Education Edition, Asia, New Delhi, (2002). ISBN-10: 013255593X

Online Resources:

1. <http://www.me.utexas.edu/~jensen/ORMM/>

This is an excellent site with a variety of operations research materials including models, methods, problems, simulations, software and a blog.

2. <http://www.solver.com>

An Excel Add-On Solver Tutorial from Frontline Systems is found here.