UNIVERSITY OF THE FRASER VALLEY

OFFICIAL UNDERGRADUATE COURSE OUTLINE (page 1)

COURSE IMPLEMENTATION DATE: September 2014
COURSE REVISED IMPLEMENTATION DATE:
COURSE TO BE REVIEWED: September 2020
(six years after UEC approval) *(month, year)*

OFFICIAL UNDERGRADUATE COURSE OUTLINE INFORMATION

Students are advised to keep course outlines in personal files for future use.
Shaded headings are subject to change at the discretion of the department – see course syllabus available from instructor

MATH 368	SCIENCE/MATH & STATS	3
COURSE NAME/NUMBER	FACULTY/DEPARTMENT	UFV CREDITS

Operations Research
COURSE DESCRIPTIVE TITLE

CALENDAR DESCRIPTION:

Operations research is a scientific approach to decision making that seeks to best design and operate a system, usually under conditions requiring the allocation of scarce resources. This course provides an introduction to various concepts and their applications, with attention to model building and computation. An in class presentation is also a component of this course.

Topics include linear programming, sensitivity analysis and duality, integer programming, dynamic programming, game theory, and queuing theory

Note: Students with credit for MATH 308 or MATH 360 may not take MATH 368 for further credit.

PREREQUISITES: MATH 221, or both MATH 152 and MATH 211.
COREQUISITES:
PRE or COREQUISITES:

SYNONYMOUS COURSE(S):
(a) Replaces: **MATH 308, MATH 360**
(b) Cross-listed with:
(c) Cannot take: **MATH 308, MATH 360** for further credit.

SERVICE COURSE TO: *(department/program)*

TOTAL HOURS PER TERM: 45
STRUCTURE OF HOURS:

Lectures:	45	Hrs
Seminar:		Hrs
Laboratory:		Hrs
Field experience:		Hrs
Student directed learning:		Hrs
Other (specify):		Hrs

TRAINING DAY-BASED INSTRUCTION:
Length of course:
Hours per day:

OTHER:
Maximum enrolment: 36
Expected frequency of course offerings: Every second year
(every semester, annually, every other year, etc.)

WILL TRANSFER CREDIT BE REQUESTED? (lower-level courses only)	☐ Yes	☐ No
WILL TRANSFER CREDIT BE REQUESTED? (upper-level requested by department)	☐ Yes	☒ No
TRANSFER CREDIT EXISTS IN BCCAT TRANSFER GUIDE:	☐ Yes	☒ No

Course designer(s):	Joseph Yu		
Department Head:	Greg Schlitt (acting)	Date approved:	**August 28, 2013**
Campus-Wide Consultation (CWC)		Date of meeting:	**September 27, 2013**
Curriculum Committee chair:	David Fenske	Date approved:	**December 13, 2013**
Dean/Associate VP:	Lucy Lee	Date approved:	**December 13, 2013**
Undergraduate Education Committee (UEC) approval		Date of meeting:	**January 31, 2014**

LEARNING OUTCOMES:

Upon successful completion of this course, students will be able to:

1) set up linear programming (LP) problems for various applications;
2) solve and perform sensitivity analysis for two variable problems using graphical techniques;
3) solve small LP problems by hand using the simplex algorithm and variations, and larger LP problems using computer programs such as Excel and Lindo (free OR software comes with the textbook);
4) use the dual theorem and its consequences to find optimal solutions for some LP problems;
5) solve simple pure and mixed integer programming problems using Branch and Bound method;
6) identify dynamic programming models and formulate dynamic programming recursions;
7) state and utilize basic terminology, assumptions, and classifications of game theory;
8) state and utilize the basic terminology and of queuing theory;
9) model the arrival and service processes in the context of queuing theory.

METHODS: *(Guest lecturers, presentations, online instruction, field trips, etc.)*

The course is primarily lecture-based, with student presentations and some computational support provided by Excel or other appropriate operations research software.

METHODS OF OBTAINING PRIOR LEARNING ASSESSMENT RECOGNITION (PLAR):

☐ Examination(s) ☐ Portfolio assessment ☐ Interview(s)

☒ Other (specify): Course Challenge

☐ PLAR cannot be awarded for this course for the following reason(s):

TEXTBOOKS, REFERENCES, MATERIALS:

[Textbook selection varies by instructor. An example of texts for this course might be:]

Winston, W. *Introduction to Mathematical Programming*. 3rd edition Thompson Brooks/Cole.
Winston, W. Operations Research 4th edition Thompson Brooks/Cole

SUPPLIES / MATERIALS:

STUDENT EVALUATION:

[An example of student evaluation for this course might be:]

Students write two tests during the semester, as well as a cumulative final exam. Students are also expected to turn in assignments and/or write quizzes periodically. A student must obtain at least 40% on the final exam in order to pass this course.

An example of student evaluation for this course:

Assignments	10%
Quizzes	10%
Presentation	10%
Tests (2)	30%
Final exam	40%

COURSE CONTENT:

[Course content varies by instructor. An example of course content might be:]

1. Linear Programming Formulation
2. Simplex Algorithm and Goa Programming
3. Sensitivity Analysis and Duality
4. Applications of Network Models
5. Integer Programming Formulation and Branch and Bound for solving pure and mixed integer programming problems
6. Game Theory: Two-Person Zero-Sum and Constant-Sum Games and introduction to n-Person Game Theory
7. Dynamic Programming: Deterministic Model and Formulation of Dynamic Programming Recursions
8. Queuing Theory: Terminology and Modeling Arrival and Service Processes