UNIVERSITY COLLEGE OF THE FRASER VALLEY

COURSE INFORMATION

DEPARTMENT: Mathematics **IMPLEMENTATION DATE:** January 1994

Math 360	Operations Research I (deterministic)	3
NAME & NUMBER OF COURSE	DESCRIPTIVE TITLE	UCFV CREDIT

CATALOGUE DESCRIPTION: The application of mathematical methods to business problems. Operations research was developed during and just after the last world war, and has had amazing success in enabling organisations to be more effective and efficient. The topics covered include: an overview of linear programming, duality theory and sensitivity analysis; transportation and assignment problems, network algorithms; dynamic and integer programming, scheduling; nonlinear programming, optimization with and without constraints; network models and applications; PERT AND CPM.

COURSE PREREQUISITES: Math 211, 221

COURSE COREQUISITES: None

HOURS PER TERM FOR EACH STUDENT	Lecture	60 hrs	Student Directed Learning		hrs
	Laboratory	hrs			
	Seminar	hrs	Other - specify:		
	Field Experience	hrs			hrs
			TOTAL	60	HRS

UCFV CREDIT TRANSFER	UCFV CREDIT NON-TRANSFER	NON-CREDIT

TRANSFER STATUS (Equivalent, Unassigned, Other Details)

UBC credits

SFU credits

UVIC units

Other

Math Curriculum Committee	J.D. TUNSTALL Ph.D.
COURSE DESIGNER	DEAN OF ACADEMIC STUDIES

Math 360 - Operations Research I (deterministic)
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COURSES FOR WHICH THIS IS A PREREQUISITE: Math 460	RELATED COURSES Math 460

TEXTBOOKS, REFERENCES, MATERIALS (List reading resources elsewhere)

TEXTS: **Hillier & Lieberman, Introduction to mathematical programming. (1990) McGraw Hill (includes 2 3.5" disks)**

OBJECTIVES:

1. **To introduce the students to the fundamental deterministic models in applied operations research.**
2. **To develop the students' skills in formulating and building mathematical models.**
3. **To familiarize the students with using computers to solve operational research problems in business industry.**

METHODS:

STUDENT EVALUATION PROCEDURE:

Assignments	**20%**
Mid-term exams	**30%**
Quizzes and short tests	**10%**
Final Examination	**40%**

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COURSE CONTENT

1. **Linear programming: simplex method, post-optimality analysis.**
2. **Duality theory, sensitivity analysis.**
3. **Special algorithms: transportation/transhipment problems, assignment problems, network algorithms.**
4. **Dynamic programming: formulation and solution; Bellman's principle of optimality.**
5. **Applications of dynamic programming: scheduling, inventory control with deterministic demand.**
6. **Integer programming: branch-and-bound technique, binary integer programming, mixed integer programming.**
7. **Applications of integer programming: facility layout, assignment problems.**
8. **Nonlinear programming: optimization without constraints, the one-dimensional search procedure, the gradient search procedure.**
9. **Optimization with constraints, the Karush-Kuhn-Tucker conditions, quadratic programming.**
10. **Separable programming; convex programming, Franl-Wolfe algorithm, non-convex programming, SUMT.**
11. **Applications of nonlinear programming: financial planning and operations management.**
12. **Network models: the shortest path problem, the minimum spanning tree problem, the maximum flow problem.**
13. **The minimum cost flow problem, PERT AND CRM.**