

AGRICULTURAL ECONOMICS 7123
OPERATIONS RESEARCH METHODS IN AGRICULTURAL ECONOMICS
Fall Semester - 2004

Course Syllabus

Course Description: AGEC 7123 *Operations Research Methods in Agricultural Economics* (3) F, Application of operations research methods to economic problems in agricultural production, marketing, and resource use; linear programming, goal programming, nonlinear programming, integer programming, network analysis, simulation.

Class Schedule: 8:40-9:30 am M W F Room 208 Agricultural Admin. Bldg.

Instructor: Dr. Michael E. Salassi Office Hours: 9:30-10:30 MWF
Room 229, Agri. Adm. Bldg. E-mail Address: msalassi@agctr.lsu.edu
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Text: *Introduction to Operations Research*, Hillier, Frederick S., and Gerald J. Lieberman, Eighth Edition, McGraw-Hill, Inc., 2005.

Course Objectives: The objective of this course is to teach the basic operations research procedures commonly used to address economic problems associated with the production and marketing of agricultural commodities as well as the management of agribusiness firms. This course will provide the student with training in the use of a wide variety of operations research procedures and experience in using commercial software packages.

Specific objectives include:

1. Explain the nature of operations research and introduce the modeling approach used to find optimal solutions to economic problems.
2. Introduce the linear programming model, the simplex method, duality theory, and sensitivity analysis.
3. Present special types of linear programming problems as well as other types of operations research procedures including network analysis, integer programming, and deterministic and stochastic simulation.

Grading: Course grades will be based on four exams (including the final exam), three projects and attendance. Projects will focus on the actual use of operations research procedures to solve a particular problem. Students are expected to formulate the model, collect necessary data, and use model results to address the problem. A typed report (5-10 pages in length) must be turned in to the instructor which describes the problem, model selection and specification, data utilized, results, and interpretation.

	<u>Points</u>		<u>Grading Scale:</u>
Attendance	50	(8.3%)	90-100 = A
Project 1	50	(8.3%)	80-89 = B
Project 2	50	(8.3%)	70-79 = C
Project 3	50	(8.3%)	60-69 = D
Exam 1	100	(16.7%)	< 60 = F
Exam 2	100	(16.7%)	
Exam 3	100	(16.7%)	
Final Exam	<u>100</u>	(16.7%)	
Total	600		

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Topic Areas

Course Overview
Operations Research Modeling Approach
Linear Programming - Terminology & Assumptions
Linear Programming - Maximization / Minimization Problem
Linear Programming - Special Cases, Transfer Rows & Accounting Activities
Linear Programming - Classic Application Forms
Simplex Method - Solution Concepts, Algebra, Tableau Form
Simplex Method - Other Model Forms & Post-Optimality Analysis
Duality - Primal-Dual Relationships, Economic Interpretation
Sensitivity Analysis - Objective Function and RHS Values
Special Types of LP Problems - Goal Programming
Special Types of LP Problems - Transportation Problem
Special Types of LP Problems - Assignment Problem
Special Types of LP Problems - Transshipment Problem
Special Types of LP Problems - Multidivisional Problem
Special Types of LP Problems - Multiperiod Problem
Special Types of LP Problems - Stochastic Programming
Special Types of LP Problems - Chance Constrained Programming
Special Types of LP Problems - MOTAD
Special Types of LP Problems - Target MOTAD
Network Analysis - Shortest Path Models
Network Analysis - Maximum Flow Models
Network Analysis - Minimum Cost Flow Models
Network Analysis - Multi-commodity Flow Models
Simulation - Basic Terminology, Generating Random Numbers
Simulation - Monte Carlo Simulation
Simulation - Simulation with Continuous Random Numbers
Simulation - Stochastic Simulation and Statistical Analysis
Integer Programming - Lumpy Input Programs and Fixed Charge Models
Integer Programming - Capital Budgeting Models
Integer Programming - Knapsack, Cargo Loading and Cutting Stock Models
Integer Programming - Set Packing, Covering and Partitioning Models

Course Web Page: All reading assignments and overheads used for each class period, as well as homework assignments, project due dates, and exam dates will be posted on the course web page.

www.agecon.lsu.edu/webclasses/agec_7123/agec7123-04.htm