

**Course Syllabus for
Applied Management Science in Agricultural Systems I
AGET 784**

Department of Agriculture, Geosciences, and Natural Resources
College of Agriculture & Applied Sciences

- Course Title: Applied Management Science in Agricultural Systems I (3)
Course Discipline: Agricultural Engineering Technology (AGET)
Course Number: AGET 784
Classification: Graduate
Credit: 3 hours
Clock Hours: Modular presentation via the Internet
Course Prerequisites: MSANR requirements
- Instruction Type: Web-based-Online (Blackboard and audio enhanced PowerPoint)
- Instructor: Timothy N. Burcham, P.E., Ph.D.
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Office Hours: 9:00 AM to 5:00 PM Mon – Fri or by appointment
- Person with a Disability: Any student eligible for and requesting academic accommodation due to a disability is requested to provide a letter of accommodation from PACE (Phone: 587-7195, Location: Gooch Hall, Rm 124) or Student Academic Support (Phone: 587-7744, Location: Clement Hall Rm 208). Please submit this documentation during the first 2 weeks of the semester.
- Textbook: Applied Management Science: Modeling, Spreadsheet Analysis, and Communication for Decision Making, 2nd Edition, Copyright 2002. Authors: John A. Lawrence and Barry A. Pasternack. The textbook includes a CDROM with example spreadsheets,
- Lecture Format: Lecture modules will be posted using the UTM Blackboard interface. It is the student's responsibility to explore and complete each module by the assigned date (as determined by the instructor). *This is NOT a self-paced course. It is NOT a self-study. It is NOT a correspondence course. Quizzes and cases studies will be assigned and completed by the student according the instructor posted due date. Mid-term and Final Examinations will follow the published UTM calendar for the semester the course is offered.*

COURSE REQUIREMENTS/EXPECTATIONS

- Grading: 25% - Case studies (A formal management report including: mathematical formulation, spreadsheet solution(s), and recommendation(s)). Examples of the management reports are illustrated and described in the required text. Case studies will be assigned for each major topic area covered.
45% - Online Quizzes
15% - Mid-term Exam (proctored)
15% - Final Exam (proctored)
- Grade Assignment: 90 – 100 average = A
80 – 90 average = B
70 – 79 average = C
65 – 69 average = D
< 65 average = F
- Punctuality: Each lecture module and associated assignments will have a definite completion date (as assigned by the instructor). Assignments, case studies, quizzes, etc. turned in after the posted due date will receive a 10-point deduction per day late.

COURSE PURPOSE, GOALS, AND OBJECTIVES

Catalog Description:

784 Applied Management Science in Agricultural Systems I (3)
Mathematical programming and constrained optimization research methods for applied decision making in agriculture. Development of computer and writing skills necessary for finding optimal solutions to complex applied problems in addition to succinctly communicating results in the proper format and context. Theory, implementation and optimal solution sensitivity of linear and integer programming as well as network and project scheduling models are examined (Same as AGECE 784).

Course Purpose,

Goals & Objectives: To find optimal solutions for agricultural and natural resources related industries and agencies using management science principles.

Student Outcome: For the student to be competent in formulating and applying management science principles for solving “real-world” problems in agricultural and nature resources related businesses and industries.

AGET 784 Course Outline

(This outline is subject to change based on class progress and the instructor's discretion.)

Using Blackboard

- i.1 Navigating the Blackboard shell
- i.2 Communicating using Blackboard
- i.3 Using the Digital Drop Box
- i.4 Uploading and downloading files

Using Excel

- ii.1 Spreadsheet basics
- ii.2 Using formulas to solve problems
- ii.3 Using built-in Excel functions
- ii.4 Formatting a spreadsheet
- ii.5 Graphing in Excel

Chapter 1. Introduction to Management Science Models

- 1.1 What is Management Science
- 1.2 A Brief History of Management Science
- 1.3 Mathematical Modeling
- 1.4 The Management Science Process
- 1.5 Writing Business Reports/Memos
- 1.6 Using Spreadsheets in Management Science Models
- 1.7 Summary

Chapter 2. Linear and Integer Programming Models

- 2.1 Introduction to Linear Programming
- 2.2 A Linear Programming Model-A Prototype Example
- 2.3 A Graphical Analysis of Linear Programming
- 2.4 The Role of Sensitivity Analysis of the Optimal Solution
- 2.5 Using Excel Solver to Find the Optimal Solution and Analyze Results
- 2.6 Using Computer Output to Generate a Management Report
- 2.7 Models Without Unique Optimal Solutions-Infeasibility, Unboundedness, and Alternate Optimal Solutions
- 2.8 A Minimization Problem
- 2.9 Integer Linear Programming (ILP) Models
- 2.10 Algebraic Solution Approaches for Linear Models
- 2.11 Summary

Chapter 3. Applications of Linear and Integer Programming Models

- 3.1 The Evolution of Linear Programming Models in Business and Government
- 3.2 Building Good Linear and Integer Programming Models
- 3.3 Building Good Spreadsheet Models
- 3.4 Applications of Linear Programming Models
- 3.5 Applications of Integer Linear Programming Models
- 3.6 Summary

Chapter 4. Network Models

- 4.1 Introduction to Networks
- 4.2 Transportation Networks
- 4.3 Capacitated Transshipment Networks
- 4.4 Assignment Networks
- 4.5 Shortest Path Networks
- 4.6 Maximal Flow Networks
- 4.7 Traveling Salesman Network
- 4.8 Minimal Spanning Tree Networks
- 4.9 Summary

Chapter 5. Project Scheduling Models

- 5.1 Introduction to Project Scheduling
- 5.2 Identifying the Activities of a Project
- 5.3 The PERT/CPM Approach for Project Scheduling
- 5.4 A Linear Programming Approach to PERT/CPM
- 5.5 Obtaining Results Using Excel
- 5.6 Gantt Charts
- 5.7 Resource Leveling
- 5.8 PERT-The Probabilistic Approach to Project Scheduling
- 5.9 Cost Analysis Using the Expected Value Approach
- 5.10 The Critical Path Method (CPM)
- 5.11 PERT/Cost
- 5.12 Summary