COURSE OUTLINE

I. Catalog Description

EC 423/EC 423A  Economic Programming and Optimization Analysis (3/1)

Optimization analysis and programming techniques, including linear and nonlinear methods. Students work on case studies, deterministic model-building. Application of computer facilities and programming. 4 lecture/discussions. Prerequisite: EC 201, EC 202 and EC 406.

II. Required Background or Experience

EC 201, EC 202 and EC 406

III. Expected Outcomes

Students in EC 423 will:

a) express economic concepts and economic theories in the context of simple mathematical models,

b) manipulate the models and the mathematical relationships towards deriving the optimum solutions,

c) perform economic optimization, decision rule analysis and decision making techniques, and

d) apply linear and non-linear programming to several economic concepts.

IV. Text and Readings

Texts:


Software:

Wolfram, S. *Mathematica* (Champaign, IL: Wolfram Media, Inc., 1996)

V. **Minimum Student Materials**

Textbooks, notebooks, required reading materials, and access to computer equipped with Mathematica software.

VI. **Minimum College Facilities**

Library collection of references and related publications. Classroom for lecture/problem solving sessions. Computer lab equipped with student workstations equipped with Mathematica software.

VII. **Course Outline**

A. Overview of Quantitative Economic Requirements

1. Mathematical Relationships
2. Introduction to Mathematica
3. Types of Functions, Their Graphs, and Derivations
4. Critical Points and Optimization

B. Optimization and Economic Units: Firms, Consumers, and the Market

C. Programming Techniques

1. Linear, Nonlinear, and Dynamic Programming
2. Applications of Linear Programming Techniques:
   a. Input-Output Analysis
   b. Game Theory
   c. Pricing Strategies
   d. Profit Strategies

D. Project Evaluation
   1. Fundamentals of Project Evaluation
   2. Risk in Project Analysis

VIII. Instructional Methods

   Lecture/discussion sessions with problem solving applications using Mathematica software.
   Interactive lab sessions with problem solving applications using Mathematica software.

IX. Evaluation of Outcomes

   Weekly problem solving assignments and exercises using Mathematica software and other course materials, midterm and final examinations.