NJIT MARTIN TUCHMAN SCHOOL OF MANAGEMENT
NEW JERSEY INSTITUTE OF TECHNOLOGY

Decision Analysis with Quantitative Modeling
MGMT 630 102
Spring 2025

Instructor: Sathish Rajamani
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Class Time & Location: Online
Prerequisites:
Office Hours: By appointment. Online through Zoom on Mondays to Thursdays OR in person on pre-agreed dates at pre-scheduled times when I visit the campus.

In addition, every week, OPTIONAL ONLINE Office hours/Sessions will be conducted covering specific topics and the recordings will be uploaded. So, don't worry if you miss the live online sessions. The schedule of these sessions for the following week will be published every Saturday.

Course Overview

This course covers decision modeling and analysis tools based on managerial science (MS) methods and related computerized support systems to help managers in their decision-making processes. The offers a comprehensive overview of applied decision science techniques to solve managerial problems typically encountered in business and economics. The goal is to provide quantitative analysis skills for the treatment of sales, investments, employment, service/production, and related data from marketing, MIS, finance, human resources, manufacturing, supply chains distribution logistics, and other business operations. The course emphasizes on hand problem solving using models and solution methods developed with computerized tools such as Microsoft Excel and ready-to-use modern software packages designed for management science and decision support systems. Presently, the design, implementation, and use of such models and methods for Business Intelligence Systems are the fastest-growing areas of technology management-oriented MS and MBA programs. The perspective envisioned in this course is one of modeling and design of solutions with software tools; the processes of effective modeling and design require and enhance decision analysis, problem-solving, and solution implementation processes. The course emphasizes building the skills needed to formulate problems toward implementing model-oriented decision support systems. Using problems and case studies, this course provides opportunities to review many concepts in problem-solving by means of mathematical programming, statistical modeling, and decision evaluation via sensitivity analysis and feedback. Class projects and papers comprise realistic case studies on important problems dealing with modeling and model implementations for use in decision analysis.

Required Course Materials

Quantitative Analysis for Management, 13th Edition or 14th Edition, by Barry Render, Ralph Stair, and Michael Hanna, Prentice Hall (Pearson Publishing Company)

Learning Outcomes

1. Understand the applications of management science modeling tools and techniques to real-world business situations.
2. Be able to define and analyze problems, develop models, and construct computerized solutions with spreadsheet implementations to perform quantitative analysis.
3. Review the basic foundations of probability concepts and applications in quantitative analysis
4. Build understanding and skills in developing management science modeling tools for various business problem areas including (1) stochastic and (2) deterministic models listed below:

o Stochastic Models including models for decision analysis and decision trees; simple linear-nonlinear and multiple regression models; forecasting models; inventory models; waiting-lines and queuing models; and simulation models.

o Deterministic Models including Break-even analysis models; linear programming models and related applications; advanced linear programming models; transportation, transshipment, and assignment models; goal programming and other multi-criteria models for scoring and analytic hierarchy process evaluations; and project management models.

5. Understand the role of sensitivity analysis in solution implementations.
6. Use the knowledge and skills from the above to leverage information technology for building business intelligence systems to analyze complex problems and data for sound business decisions.
7. Accomplish all the above objectives as an individual or in a team environment.

Course Website

Please go to CANVAS. The Canvas site is where most course materials are posted. Make sure you have an NJIT UCID and password so that you are able to access Canvas. I will use Canvas to post announcements and supplemental materials throughout the semester. **So, please be sure to check the site (canvas.njit.edu) frequently. Please contact helpdesk (973-596-2900) for problems associated with Canvas.**

ASSIGNMENT COMPONENTS

1. **PART 1 - Individual Assignments covering the following 3 Case studies (each carrying 10 points) - 30 Points**
    i. **Case Study 1 - The Alset Electric Car**
    ii. **Case Study 2 - WTVX**
    iii. **Case Study 3 - Drink-At-Home,Inc**

2. **Midterm Exam - 20 Points (15 Multiple Choice Questions to be answered in 65 Minutes. Open Book test. You can take the exams any day between October 26th to November 3rd)**

3. **Individual Assignment on Qualitative and Quantitative Analysis with a goal to maximize profit. - 10 Points**

4. **Online Discussion Forum - Case Study of a Company that wants to leverage the latest technology - 15 Points (10 Points for your original answer and 5 points for your comments/feedback/ critical analysis of other's post)**

5. **Group Project - 25 Points (15 Points for the Quantitative analysis and 10 points for the Executive Management level Presentation - Presentation to be done in the form of a Video recording by the team)**

Timeline and Due Dates for the assignments

Assignment Details	Due Date by 1155 am EST/EDT	Remarks
Part 1 3 Case Studies, the Case Studies will be published every week starting week of 1/27/25	02/23/2025	The case studies are from the Topics - Cost Revenue & Profit - Probability - Decision Analysis
Mid Term Exams	Open from 10th March to 14th March	15 Multiple Choice Questions to be answered in 65 Minutes - Open Book
Individual Assignment	6th April	Assignment will be published on March 30th
Online Discussions Forum	Open from Nov April 1st to April 20th	This will be a real life case study of an organization where you can apply the concepts learnt in this course.
Group Project - Quantitative Analysis - Executive Management presentation	 - May 4 - May 7	

Video		

Final course grades will be based on the following scale (<u>there will be NO curve</u>):
<u>Grading Scale</u>

A	B+	B	C+	C	F
>91%	86% to 90.99%	81% to 85.99%	75% to 80.99%	70%to 74.99%	<70%

Late Assignments
Late assignments will not be accepted for grading unless there is a severe illness or an emergency situation. In these cases, legitimate documentation of the emergency must be presented and approved by the office of the Dean of Students before extensions will be granted.

Email Etiquette
This is a business course, and the expectation is that you will conform to appropriate business letter-writing practice in all of your emails to me. The following are the basics.

- Put the course name (e.g. course name or course number) in the subject line
- Identify the subject of the e-mail with a brief but descriptive summary of the topic: include a proper salutation and the assignment details such as the title, homework, or test.
- Proofread your email for proper sentence structure, capitalization, spelling, and punctuation.
- Conclude the e-mail message with a proper closing (e.g. Regards, Sincerely) and your full name.

(Note: Do not email requests for additional grade points unless there is an error in the grading. Please note that any grade discrepancies must be addressed within 2 weeks of the assignment due date. Grades are not 'given out' by the professor; they are 'earned' by the student. So, make sure that you 'earn' a grade that you can live with.)

Academic Integrity
Learning is both an individual and a cooperative experience. Asking for and giving help freely in appropriate settings helps you learn. However, you should present only YOUR work as your own. University rules and standards define and prohibit "academic misconduct" by all members of the academic community including students. You are asked and expected to be familiar with these standards and abide by them.

Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the academic code of integrity policy that is found at: *http://www5.njit.edu/policies/sites/policies/files/academic-integrity-code.pdf*.

Please note that it is my professional obligation and responsibility to report any academic misconduct to the Dean of Students Office. ***Any student found in violation of the code by cheating, plagiarizing or using any online software inappropriately will result in disciplinary action. This may include a failing grade of F, and/or suspension or dismissal from the university.*** If you have any questions about the code of Academic Integrity, please contact the Dean of Students Office at *dos@njit.edu*.

Accommodations

Educational access is the provision of classroom accommodations, auxiliary aids and services to ensure equal educational opportunities for all students regardless of their disability. If you are in need of accommodations due to a disability please contact Scott Janz (oars@njit.edu), Associate Director of the Office of Accessibility Resources & Services (OARS), Kupfrian Hall 201, to discuss your specific needs. A Letter of Accommodation Eligibility from the OARS authorizing your accommodations will be required. Accommodations need to be requested in advance and will not be granted retroactively.

Classroom Policies

I will submit your assignments to Turnitin to check for plagiarism.

Final Comments

I reserve the right to change any aspect of this syllabus or the course schedule, as the need arises. Students registered for this course assume full responsibility for reading and understanding the course policies as stated above.

Your In person, Synchronous sessions are scheduled on Jan 28, Feb 11, Feb 25, Mar 11, Apr 1, Apr 15 and Apr 29

The topics are tentative. Updates will be provided.

#	Dates	Course Topics	Remarks
1	Week of Jan 27th	Modules of Cost, Revenue, and Profit	
2	Week of Feb 3rd	Basic Probability Concepts and Applications	
3	Week of Feb 10th	Decision Analysis	
4	Week of Feb 24th	Regression Models	
5	**Feb 23rd 2025**	**PART 1 Assignment Due**	
6	**10th Mar to 14 Mar**	**Mid Term Exams**	**Based on topics 1 to 4**
7	Week of Mar 3rd	Forecasting Techniques and Models for Time Series	
8	Week of Mar 10th	An Introduction to Linear Programming Announcement of Group Project	

		Finalization of teams for group project	
10	**Week of Mar 17th**	**Spring Break**	
11	Week of Mar 24th	**Revision of topics covered till now**	
12	**30th March to 6th April**	**Complete Individual Assignment**	
13	Week of Mar 31st	Applications of Linear Programming	
11	**April 1 to 20th**	**Online Discussion Forum**	
12	Week of April 7th	Transportation, Assignment, Trans-shipment & Related Models	
13		**If Possible,** planning an **ONLINE GUEST LECTURE** on **Enterprise Resource Planning and relevance to Quantitative Methods**	Will create a poll to check the interest levels before arranging the lecture
14	Week of April 14th	Inventory Control and Impact on Financial decisions of an organization	
15	Week of April 21st	Overview of Integer Programming, Goal Programming, & Nonlinear Programming Models and its application on Management decision	
16	Week of April 28th	Overview of Project Management: PERT, CPM, and LP Formulation of Time/Cost Tradeoff Analysis	
17	Week of May 5th	For Project work completion	
18	**May 4th**	**Due date for Group Project - Submission of Quantitative Analysis report**	
19	**May 7th**	**Due date for Group Project - Submission of Presentation Video**	