

Quantitative Models for Decision Makers

MASY1-GC 1210 | 100 | Spring 2024 | 01/25/2024 - 05/02/2024 | 3 Credit

Modality: In-person

Course Link: <https://brightspace.nyu.edu/>

General Course Information

Name/Title (Pronouns): Moustafa Ahmed, Ph.D., Adjunct Instructor, He/Him/His

NYU Email: mma204@nyu.edu

Class Meeting Schedule: 01/25/2024 - 05/02/2024 / Thursday | 06:20pm -- 08:55pm

Class Location: Bldg: MIDC Room 507

Office Hours: Students will have an opportunity to schedule via email or phone meetings are by appointment.

Description

This course prepares students to analyze operational and strategic business situations and select appropriate and optimal courses of action. Using quantitative tools, students learn to analyze the firm's operation, employ sound critical decision making to initiate appropriate action and move the organization to creative problem solving. This course provides students with the tools and techniques required to manage these processes efficiently and make decisions effectively.

Prerequisites

N/A

Learning Outcomes

At the conclusion of this course, students will be able to:

- Apply appropriate mathematical concepts and computational methods in economics, operations research, logistics, and business planning
- Design, business case solutions using probability theory, numerical computations, and quantitative methods
- Apply skills and knowledge of advanced analytical methods and tools to facilitate decision making
- Analyze business problems using linear programming and network flow management for decision making

Communication Methods

Be sure to turn on your [NYU Brightspace notifications](#) and frequently check the "Announcements" section of the course site. This will be the primary method I use to communicate information critical to your success in the course. To contact me, send me an email. I will respond within 24 hours.

Credit students must use their NYU email to communicate. Non-degree students do not have NYU email addresses. Brightspace course mail supports student privacy and FERPA

guidelines. The instructor will use the NYU email address to communicate with students. All email inquiries will be answered within 24 hours.

Structure | Method | Modality

There are 10 session topics in this course.

The course overview: A general knowledge of the uses of Management Science in problem solving and an introduction to some commonly used techniques. The ability to model, analyze, and solve business problems using graphic and algebraic methods of linear programming.

Active learning experiences and small group projects are key components of the course. Assignments, papers, and exams will be based on course materials (e.g., readings, videos), lectures, and class discussions. Course sessions will be conducted synchronously on NYU Zoom, which you can access from the course site in [NYU Brightspace](#).

Expectations

Learning Environment

You play an important role in creating and sustaining an intellectually rigorous and inclusive classroom culture. Respectful engagement, diverse thinking, and our lived experiences are central to this course, and enrich our learning community.

As graduate students, you are expected to conduct yourselves in a professional manner and engage and collaborate with your classmates. SPS classrooms are diverse and include students who range in age, culture, learning styles, and levels of professional experience. To maintain an inclusive environment that ensures all students can equally participate with and learn from each other, as well as receive feedback and instruction from faculty during group discussions in the classroom, all course-based discussions and group projects should occur in a language that is shared among all participants.

Participation

You are integral to the learning experience in this class. Be prepared to actively contribute to class activities, group discussions, and work outside of class.

Assignments and Deadlines

All assignments due are submitted with standard template provided and must be submitted via Brightspace by the end of each week.

Students are required to complete (on their own) homework assignments following each chapter covered in the text, group case problems which will be periodically assigned, and a final exam.

Assignments and readings must be executed and are due on the dates indicated at the time of assignment. Missed assignments will lower the student's grade based on the percentage of the grade allocable to it. Late assignments are permitted only with advance notice to, and permission from, the instructor. Assignments will be graded for content and clarity.

Course Technology Use

We will utilize multiple technologies to achieve the course goals. I expect you to use technology in ways that enhance the learning environment for all students. All class sessions require use of Zoom. All class sessions require use of technology (e.g., laptop, computer lab) for learning purposes.

Feedback and Viewing Grades

I will provide timely meaningful feedback on all your work via our course site in NYU Brightspace. You can access your grades on the course site Gradebook.

Attendance

Students are expected to attend all on-line class sessions. Excused absences are granted in cases of documented serious illness, family emergency, religious observance, or civic obligation. In the case of religious observance or civic obligation, this should be reported in advance. Unexcused absences from sessions may have a negative impact on a student's final grade. Students are responsible for assignments given during any absence.

If for some reason (excused absence) you will not be in class, you must notify the instructor prior to the scheduled session if you will not be attending and the reason.

Each unexcused absence or being late may result in a student's grade being lowered by a fraction of a grade. A student who has three unexcused absences may earn a Fail grade.

Students who join the course during add/drop are responsible for ensuring that they identify what assignments and preparatory work they have missed and complete and submit those per the syllabus.

Refer to the [SPS Policies and Procedures page](#) for additional information about attendance.

Textbooks and Course Materials

An Introduction to Management Science: Quantitative Approaches to Decision Making, 16th Edition; Published: 2018; Anderson, Sweeney, Williams, Camm, Cochran, Fry, Ohlmann. CENGAGE Learning. Relevant chapters to be assigned during the term.
Published Year: ISBN-13: 978-0357715468 / ISBN-10: 0357715462 Occasional additional short readings may be provided during the term.

Grading | Assessment

Your grade in this course is based on your performance on multiple activities and assignments. Since all graded assignments are related directly to course objectives and learning outcomes, failure to complete any assignment will result in an unsatisfactory course grade. All written assignments are to be completed using APA format and must be typed and double-spaced. Grammar, punctuation, and spelling will be considered in grading. Please carefully proof-read your written assignments before submitting them for a grade. I will update the grades on the course site each time a grading session has been completed— typically three (3) days following the completion of an activity.

DESCRIPTION	PERCENTAGE
Class Participation	10%
Individual Homework	30%
Midterm Exam	20%
Group Assignment	20%
Final Exam	20%
<hr/> TOTAL POSSIBLE	<hr/> 100%

See the [“Grades” section of Academic Policies](#) for the complete grading policy, including the letter grade conversion, and the criteria for a grade of incomplete, taking a course on a pass/fail basis, and withdrawing from a course.

Course Outline

Week	Date	Topic to Complete	Topic / Assignment	Topic to Complete	Due Date
1	01/25/2024	Chapter 1	Introduction	Homework	01/28/2024
2	02/01/2024	Chapter 2	An Introduction to Linear Programming	Homework	02/04/2024
3	02/08/2024	Chapter 3	Linear Programming: Sensitivity Analysis and Interpretation of Solution	Homework	02/11/2024
4	02/15/2024	Chapter 4	Linear Programming Applications in Marketing, Finance, and Operations Management	Homework	02/18/2024
5	02/22/2024	Chapter 6	Distribution and Network Models	Homework	02/25/2024
6	02/29/2024		Midterm Exam	Chapters: 1,2, 3, 4 & 6	
7	03/07/2024	Chapter 7	Integer Linear Programming	Homework	03/10/2024
8	03/14/2024	Chapter 9	Project Scheduling: PERT/CPM	Homework	03/17/2024
N/A	03/21/2024		Spring Break		
9	03/28/2024	Chapter 10	Inventory Models	Homework	03/31/2024
10	04/04/2024	Chapter 13	Decision Analysis	Homework	04/07/2024
11	04/11/2024	Chapter 15	Time Series Analysis and Forecasting	Homework	04/14/2024
12	04/18/2024		Final exam Review		

Week	Date	Topic to Complete	Topic / Assignment	Topic to Complete	Due Date
13	04/25/2024		Group Project Presentation		
14	05/02/2024	Final Exam	Comprehensive Final Exam		

Start/End Dates: 01/25/2024 - 05/02/2024 | Thursday

Time: 06:20pm -- 08:55pm

No Class Date(s): Thursday - 3/21/2024

Special Notes: Spring Break 03/18/24 - 03/24/24

Session 1 - 01/25/24

Chapter 1: Introduction to Quantitative Analysis

In this week, we will have a general knowledge of the uses of Management Science in problem solving and an introduction to some commonly used techniques:

Syllabus Review & Course Overview

Group Creation

Homework: Chapter 1, Problems 6, 8, 10, 11, 13 due 01/28/2024.

Session 2 – 02/01/24

Chapter 2: An Introduction to Linear Programming

In this week, we will understand the ability to model, analyze, and solve business problems using graphic and algebraic methods of linear programming:

Homework: Chapter 2, Problems 4, 6, 8, 10, 12, due 02/04/2024.

Session 3, 02/08/24

Chapter 3: Linear Programming: Sensitivity Analysis and Interpretation of Solution

In this week, we will discuss Linear Programming: Sensitivity Analysis and Interpretation of Solution:

Homework: Chapter 3, Problems 4, 6, 15, due 02/11/2024.

Session 4, 02/15/24

Chapter 4: Linear Programming Applications in Marketing, Finance, and Operations Management

In this week, we will discuss Linear Programming Applications in Marketing, Finance, and Operations Management.

Homework: Chapter 4, Problems 1, 4, due 02/18/2024.

Session 5, 02/22/24

Chapter 6: Distribution and Network Models

In this week, we will learn Distribution and Network Models

Homework: Chapter 6, Problems 2, 5a-b (formulate only), due 02/25/2024.

Session 6, 02/29/24

Midterm Exam

The midterm exam will cover chapters: 1, 2, 3, 4, and 6

Session 7, 03/07/24

Chapter 7: Integer Linear Programming

In this week, we will learn Integer Linear Programming

Homework: Chapter 7, Problems 3, 9, due 03/10/2024.

Session 8, 03/14/24

Chapter 9: Project Scheduling: PERT/CPM

In this week, we will discuss the ability to utilize analytical tools such as Critical Path Method (CPM) and Program Evaluation and Review Technique (PERT) to solve planning and scheduling problems.

Homework: Chapter 9, Problems 4, 6 7, due 03/17/2024.

No Class - 03/21/24

Spring Break

Session 9, 03/28/24

Chapter 10: Inventory Models

In this week, we will discuss Inventory Models.

Homework: Chapter 10, Problems 1, 4 due 03/31/2024.

Session 10, 04/04/24

Chapter 13: Decision Analysis

In this week, we will discuss decision analysis, which includes Problem Formulation, Decision Making with and without Probabilities, and Risk Analysis and Sensitivity Analysis.

Homework: Chapter 13, Problems 2, 5, due 04/07/2024.

Session 11, 04/11/24

Chapter 13: Time Series Analysis and Forecasting

In this week, we will learn Time Series Analysis and Forecasting, where we will learn Quantitative Approaches to Forecasting and Forecast Accuracy.

Homework 6: Chapter 15, Problems 2, 4 due 04/14/2024.

Session 12, 04/18/24

Final Exam Review

Session 13, 04/25/24

Group Project Presentation (Oral)

Session 14, 05/02/24

Final Exam: Comprehensive Final Exam

This class will cover the following content:

Chapter 1: Introduction to Quantitative Analysis

Chapter 2: An Introduction to Linear Programming

Chapter 3: Linear Programming: Sensitivity Analysis and Interpretation of Solution

Chapter 4: Linear Programming Applications in Marketing, Finance, and Operations
Management

Chapter 6: Distribution and Network Models

Chapter 7: Integer Linear Programming

Chapter 9: Project Scheduling: PERT/CPM

Chapter 10: Inventory Models

Chapter 13: Decision Analysis

Chapter 15: Time Series Analysis and Forecasting

If time permits, we may discuss some of these other topics:

Queuing Theory / Waiting Line Models

Quality Control

Nonlinear Optimization Simulation

NOTES:

The syllabus may be modified to better meet the needs of students and to achieve the learning outcomes.

The School of Professional Studies (SPS) and its faculty celebrate and are committed to inclusion, diversity, belonging, equity, and accessibility (IDBEA), and seek to embody the IDBEA values. The School of Professional Studies (SPS), its faculty, staff, and students are committed to creating a mutually respectful and safe environment (*from the [SPS IDBEA Committee](#)*).

New York University School of Professional Studies Policies

1. **Policies** - You are responsible for reading, understanding, and complying with [University Policies and Guidelines](#), [NYU SPS Policies and Procedures](#), and [Student Affairs and Reporting](#).
2. **Learning/Academic Accommodations** - New York University is committed to providing equal educational opportunity and participation for students who disclose their dis/ability to the [Moses Center for Student Accessibility](#). If you are interested in applying for academic accommodations, contact the [Moses Center](#) as early as possible in the semester. If you already receive accommodations through the Moses Center, request your accommodation letters through the Moses Center Portal as soon as possible (mosescsa@nyu.edu | 212-998-4980).
3. **Health and Wellness** - To access the University's extensive health and mental health resources, contact the [NYU Wellness Exchange](#). You can call its private hotline (212-443-9999), available 24 hours a day, seven days a week, to reach out to a professional who can help to address day-to-day challenges as well as other health-related concerns.
4. **Student Support Resources** - There are a range of resources at SPS and NYU to support your learning and professional growth. For a complete list of resources and services available to SPS students, visit the [NYU SPS Office of Student Affairs site](#).
5. **Religious Observance** - As a nonsectarian, inclusive institution, NYU policy permits members of any religious group to absent themselves from classes without penalty when required for compliance with their religious obligations. Refer to the [University Calendar Policy on Religious Holidays](#) for the complete policy.
6. **Academic Integrity and Plagiarism** - You are expected to be honest and ethical in all academic work. Moreover, you are expected to demonstrate how what you have learned incorporates an understanding of the research and expertise of scholars and other appropriate experts; and thus recognizing others' published work or teachings—whether that of authors, lecturers, or one's peers—is a required practice in all academic projects.

Plagiarism involves borrowing or using information from other sources without proper and full credit. You are subject to disciplinary actions for the following offenses which include but are not limited to cheating, plagiarism, forgery or unauthorized use of documents, and false form of identification

[Turnitin](#), an originality detection service in NYU Brightspace, may be used in this course to check your work for plagiarism.

Read more about academic integrity policies at the NYU School of Professional Studies on the [Academic Policies for NYU SPS Students](#) page.

7. **Use of Third-Party Tools** - During this class, you may be required to use non-NYU apps/platforms/software as a part of course studies, and thus, will be required to agree to the “Terms of Use” (TOU) associated with such apps/platforms/software.

These services may require you to create an account but you can use a pseudonym (which may not identify you to the public community, but which may still identify you by IP address to the company and companies with whom it shares data).

You should carefully read those terms of use regarding the impact on your privacy rights and intellectual property rights. If you have any questions regarding those terms of use or the impact on the class, you are encouraged to ask the instructor prior to the add/drop deadline.