

# Quantitative Models for Decision Makers

MASY1-GC 1210-101 | Fall 2022 | 9/06/2022 - 12/13/2022 | Tuesdays | 3 Credits

Modality: In-Person

Course Site URL: <https://brightspace.nyu.edu/>

## General Course Information

**Name/Title:** Joseph Ng, Adjunct Assistant Professor, He/Him/His

**NYU Email:** [Joseph.Ng@nyu.edu](mailto:Joseph.Ng@nyu.edu)

**Class Meeting Schedule:** 9/06/2022 - 12/13/2022 | Tuesdays / 6:20 pm - 8:55 pm ET

**Class Location:** Bldg.: MIDC Room:415

**Office Hours:** To schedule, please email me at: [Joseph.Ng@nyu.edu](mailto:Joseph.Ng@nyu.edu)

## 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.

Students have the opportunity to add their pronouns, as well as the pronunciation of their names, into Albert. Students can have this information displayed to faculty in Albert, Brightspace, and other NYU systems. Students can also opt out of having their pronouns viewed by their instructors.

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<https://www.nyu.edu/students/student-information-and-resources/registration-records-and-graduation/forms-policies-procedures/change-of-student-information/pronouns-and-name-pronunciation.html>

## **Structure | Method | Modality**

There are 14 session topics in this course. The session topics are organized into three (3) areas of study: 1) History, 2) Learning Principles, and 3) Instructional Design in Practice.

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.

### 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

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.

All students must complete all course assignments. You should come to each class fully prepared, having read the assigned readings and completed the assignment(s), and actively engage in class discussions.

All assignments must be uploaded to the folder on NYU Brightspace labeled "Assignments." Each assignment sub-folder will include the detailed assignment description and grading criteria/rubric. The number of the assignments and their due dates are on the course outline that follows. Assignment due dates are final and non-negotiable. Late assignments are not accepted without prior written permission from the faculty and cannot be granted more than once throughout the semester. Failure to submit assignments on time will result in a grade reduction of 100%\_for assignment.

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. 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.

**NYU**SCHOOL OF  
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(212)-998-3333

24 hours a day, 7 days a week

Email: [AskIT@nyu.edu](mailto:AskIT@nyu.edu)**Zoom Support**

- [NYU Zoom Guide for Students](#)
- Make sure you are using [NYU Zoom](#) to log-in for class
- Check the [NYU Zoom site](#) often for updates. (To update Zoom, you can also open from your desktop and click menu, then "Check for Updates.")

**Brightspace Support**

- Log-in to the [Brightspace](#) platform or visit the [Student Training](#) website.
- Video on how to [Navigate the Bright Space Learning Environment](#)

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.

University Calendar Policy on Religious Holidays:

<https://www.nyu.edu/about/policies-guidelines-compliance/policies-and-guidelines/university-calendar-policy-on-religious-holidays.html>

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; Anderson, Sweeney, Williams, Camm, Cochran, Fry, Ohlmann. CENGAGE Learning; 2019; 15th Edition.

ISBN-13: 978-1337406529

ISBN-10: 133740652X

Relevant chapters to be assigned during the term.

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.

Contributing factors for determining your course grade include:

Class Participation:	20 percent	
Individual Homework Assignments:		35 percent
Group Assignments	30 percent	
Methodology (50%) & Presentation (50%)		
Final Exam:	15 percent	
<b>TOTAL</b>		<b>100 percent</b>

<b><u>DESCRIPTION</u></b>	<b><u>PERCENTAGE</u></b>
Individual Homework Assignments (total of 6)	35%
Group Assignments (total of 2)	30%
Methodology (50%) & Presentation (50%)	
Class Participation	20%
Final Exam	15%
<b>TOTAL POSSIBLE</b>	<b>100%</b>

There will be six individual homework assignments (a total of 35 problems from the textbook), given out as we progress through the text. The weight per each homework toward the total Individual Homework Assignment grade is a function of the number of problems assigned in that homework. E.g., if Homework 1 has five problems, and over the semester a total of thirty-five homework problems are assigned, then Homework 1 comprises 5/35ths or 5% of your total Individual Homework Assignment grade. All homework assignments are graded and returned.

I expect we will have time for two Group Assignments. If two, each Group Assignment will contribute 15% to your total Group Assignments grade. Fifty percent of each Group Assignment grade will be based on whether the group uses the appropriate methodologies and determines the correct answer to the problems. The Group Assignments are Case Problems from the text or similar problems. Fifty percent of the grade will be assessed on the group's ability to clearly present the problems and solutions.

Each team member will be expected to be responsible for analyzing a specific aspect of the strategic decision-making metrics for the team's chosen company. This analysis will form the basis for assessing each individual student's contributions towards the group results.

Class Participation consists of asking questions and engaging in class discussions.

The Final Exam will consist of fifteen to twenty quantitative problems. The weight of each problem toward the calculation of the Final Exam grade will be indicated on the exam.

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.

### NYU SPS Graduate Grading Scale

<b>A</b>	95-100	4.000	<b>Exceptional:</b> Demonstrates exceptional mastery of all learning outcomes of the course and thorough and complete understanding of all concepts.
<b>A-</b>	90-94	3.667	<b>Excellent:</b> Demonstrates highly competent mastery of all learning outcomes of the course and strong understanding of all concepts.
<b>B+</b>	87-89	3.333	<b>Very Good; exceeds course standards:</b> Demonstrates mastery of all learning outcomes of the course and understanding of core concepts.
<b>B</b>	83-86	3.000	<b>Good; meets course standards:</b> Demonstrates mastery of some learning outcomes; understanding of some core concepts could be improved.
<b>B-</b>	80-82	2.667	<b>Somewhat Satisfactory; meets some course standards and requires improvement:</b> Demonstrates basic understanding of some learning outcomes; improved understanding of all core concepts is needed.
<b>C+</b>	77-79	2.333	<b>Less than Satisfactory; requires significant improvement:</b> Demonstrates partial understanding of all learning outcomes and core concepts; requires significant improvement.
<b>C</b>	73-76	2.000	<b>Unsatisfactory; requires substantial improvement:</b> Demonstrates partial understanding of some learning outcomes and core concepts; requires substantial improvement.
<b>C-</b>	70-72	1.667	<b>Unsatisfactory; requires extensive improvement:</b> Demonstrates poor understanding of all learning outcomes and core concepts; requires extensive improvement.
<b>F</b>	Below 70		<b>Fail:</b> Demonstrates minimal to no understanding of all key learning outcomes and core concepts; work is unworthy of course credit towards the degree.

[From NYU SPS Policies and Procedures](#)

### Course Outline

**Start/End Dates:** 9/06/2022 - 12/13/2022 | Tuesdays

**Time:** 6:20 pm - 8:55 pm ET

**No Class Date(s):** No class date: Tuesday, 10/11/2022 - Legislative Day

**Special Notes:** Due to Legislative Monday, there will be no class on Tuesday, October 11, 2022. This day is reserved for Monday class sessions only.

Learning Goals: (Classes and dates below are estimates and subject to change)

All assignments due are submitted with standard template provided and must be submitted via the NYU Brightspace site by 5 PM before the beginning of each class.

Filename format is as follows: QMDM\_ (Assignment #) \_ (Last name First name).docx

Example: QMDM\_HW1\_LastnameFirstname.docx

### **Session 1, 09/06/22**

A general knowledge of the uses of Management Science in problem solving and an introduction to some commonly used techniques. HW1 - Chapter 1, Problems 8-16, due 9/20.

### **Session 2, 09/13/22 & Session 3, 09/20/22**

The ability to model, analyze, and solve business problems using graphic and algebraic methods of linear programming. HW2 - Chapter 2, Problems 6, 7, 10, 12, due 10/4.

### **Session 4, 09/27/22 & Session 5, 10/04/22**

Skill in achieving an optimal strategy in situations with several decision alternatives or uncertainty, utilizing different methodologies involving probabilities and mathematical models. HW3 - Chapter 13, Problems 5, 7a, 9, 11, 13, 15, due 10/25.

### **Session 6, 10/18/22**

Group Project Presentations. Group projects due 10/18.

### **Session 7, 10/25/22 & Session 8, 11/01/22**

The ability to recognize and solve different types of network flow problems, using linear programming. HW4 - Chapter 6, Problems 3a-b, 5a-b (formulate only), 9, 13a-b (formulate only), due 11/8.

### **Session 9, 11/08/22**

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. HW5 - Chapter 9, Problems 6, 7, 13, 15, due 11/22.

### **Session 10, 11/15/22 & Session 11, 11/22/22**

A fundamental understanding of the applications of Queuing Theory and the ability to solve basic queuing problems. HW6 - Chapter 11, Problems 1, 2, 3, 4, 9, due 12/6.

### **Session 12, 11/29/22**

Group Project Presentations. Group projects due 11/29.

### **Session 13, 12/06/22**

Final Questions Sampling and Review.

### **Session 14, 12/13/22**

Final Exam.

This class will cover the following content:

Introduction to Management Science – Quantitative Analysis, Modeling, Methods  
Linear Programming – Graphical Solutions, Extreme Points, Sensitivity Analysis, Applications  
Decision Analysis  
Distribution and Network Models  
Project Scheduling – PERT/CPM  
Queuing Theory/Waiting Line Models

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## **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](mailto: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.