Quantitative Models for Decision Makers
MASY1-GC 1210 | 104 | Spring 2023 | 01/25/2024 - 05/02/2024 | 3 Credits
Modality: In-Person
Course Site URL: https://brightspace.nyu.edu

General Course Information
Name/Title: Kapil Khetan, CFA FRM, Adjunct Instructor, He/Him/His
NYU Email: kk76@nyu.edu
Class Meeting Schedule: 01/25/2024 - 05/02/2024 | Thursdays | 06:20pm - 08:55pm
Class Location: TBD
Office Hours: By appointment. Zoom. Please email to schedule an appointment – please give me 24 hours to respond.

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 14 session in this course. The sessions are organized into areas of study with a complementary Group Lab Work the following week. The areas of study include Linear Programming ("LP"), LP Applications, Simulation, Decision Analysis, Regression, and Integer 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 in-person, and you can access 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.

I have the highest expectations from students, and this includes arriving punctually. Please bear in mind we cover a lot of ground in each class and while I will strive to help you catch-up, I would appreciate everyone showing up on time and ready to learn. 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. Emphasis is placed on class participation to reflect more truly the workplace requirements.

Assignments and Deadlines

There will be individual and group assignments and a final exam in the final week.
The purpose of the group assignments is to foster the ability to work with everyone in your team. In the prior classes I have found that the group assignments have generated a lot of good camaraderie, a key ingredient of the future work force needs viz. being able to respectfully work with others and contribute your technical, and creative skills. And have a fun experience all along! Group assignments will be structured on the course material covered but will be made as realistic as possible sometimes using very current data provided by US Government agencies.

Individual assignments will involve a set of problems and projects taken from either the textbook or other sources. The honor principle applies.

The due dates for the group and individual assignments will be midnight of the Saturday immediately following the assignment posting.

Group assignments will involve an MS Excel and MS PowerPoint presentation and will be based on the content covered that week. The students will present their completed group assignment the following week.

The final exam will be based on all the material we have covered.
Homework is to be submitted as follows:
MS Word, Excel, or PowerPoint documents as requested in the relevant assignment instructions.

Please observe the following file naming conventions for your HW submissions:
Individual Assignments: **student last name_week#**
Group Assignments**: group name_week#**

Assignments must be submitted when due, and to the designated site in newclasses.nyu.edu. The site will automatically close at the time the assignment is due. No credit will be given for late homework under any circumstances.

GROUP WORK
Each student will be assigned to a group. Every group will receive assignments that should be completed on a group basis. It is expected that every group member contributes to the group projects.

Missed assignments will lower the student's grade based on the percentage of the grade allocable to it.

Lack of full participation in forum discussions will lower the student's grade based on the percentage of the grade allocable to it.

Course Technology Use
Please bring a computing device to every class – the requirement is that it can run Microsoft Excel, but other than that it could be a PC or a Mac.

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
Required: An Introduction to Management Science, Quantitative Approaches to Decision Making, by David R. Anderson, Dennis J. Sweeny, Thomas A. Williams
Publisher: South-Western College Publishing: 15th edition. Year 2019; ISBN 978-1337406529

(Check out the e-book version that allows you access for one semester and to print out a limited number of pages. The material you need should not exceed that printout quota).

Students can purchase these items through the NYU Bookstore

Grading | Assessment
Evaluation Plan:
The respective weights in determining your final grade will be as follows:

Class Participation	10%
Group Assignments	30%
Individual Assignments	40%
Final	20%
Total	100%

Assignments must be submitted when due, and to the designated site. The site will automatically close at the time the assignment is due. No credit will be given for late homework under any circumstances. Every individual assignment is given the same weight and scaled to account for 40%. Similarly, every group assignment is given the same weight and is scaled to account for 30%

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
Start/End Dates: 01/25/2024 - 05/02/2024 | Thursday
Time: 06:20pm -- 08:55pm

No Class Date(s): Thursday – 03/21/2024
Special Notes: Spring Break 03/18/24 - 03/24/24

Session 1 - 01/25/24
Topic: Introduction to Linear Programming
Scope of management science; inputs, transformation processes, outputs; internal, operating, and general environments.
review of basic economic concepts, break-even analysis; modeling.
introduction to the role of computer software for problem solving techniques
Readings: None

Session 2 – 02/01/24
Topic: Introduction to Linear Programming
Group Lab work

Session 3, 02/08/24
Topic: Linear Programming Applications
Applications of linear programming that have been encountered in practice.
Practice in formulating realistic linear programming models.
Readings: Chapter 4

Session 4, 02/15/24
Topic: Linear Programming Applications
Group Lab work

Session 5, 02/22/24
Topic: Descriptive Statistics and Bayesian Probability
This session will be an introduction / refresher for important concepts in statistics that will provide support for future class work.
No assignment

Session 6, 02/29/24
Topic: Simulation Modeling

Random Variables and Pseudo random numbers
Simulation Applications
Advantages and disadvantages of simulation
Readings: Chapter 12

Session 7, 03/07/24
Simulation
Group Lab work

Session 8, 03/14/24
Topic: Decision Making
Problem Formulation

Decision Making with and without Probabilities
Risk Analysis and Sensitivity Analysis
Computing Branch Probabilities
Readings: Chapter 13

Session 9, 03/28/24
Topic: Decision Making
Group Lab work

Session 10, 04/04/24
Topic: Time Series
Quantitative approaches to forecasting
Time Series Patterns
Forecast Accuracy, and
Moving Averages and Exponential smoothing
Readings: Chapter 15

Session 11, 04/11/24
Topic: Time Series
Group Lab work

Session 12, 04/18/24
Topic: Advanced Linear Programming
Case study conducted in Ohio to serve the Sun Bank group.
No assignment

Session 13, 04/25/24
Topic: Review
Review material covered through the semester and Q&A in preparation for Final Exam

Session 14, 05/02/24
Final Exam
Held in Class (or Remote depending on University Policy)

At the discretion of the faculty, the syllabus may be modified to better meet the needs of the students and to achieve the learning outcomes established in the syllabus.

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. <u>Policies</u> - You are responsible for reading, understanding, and complying with University Policies and Guidelines, NYU SPS Policies and Procedures, and Student Affairs and Reporting.

2. <u>Learning/Academic Accommodations</u> - 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. <u>Health and Wellness</u> - 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. <u>Student Support Resources</u> - 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. <u>Religious Observance</u> - 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. <u>Academic Integrity and Plagiarism</u> - 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. <u>Use of Third-Party Tools</u> - 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.