Operations Management

OPMG-UB 9001 F01

Instruction Mode: In-Person

Brightspace course site [https://brightspace.nyu.edu/d2l/home/92072](https://brightspace.nyu.edu/d2l/home/92072)

Fall 2021

If you are enrolled in this course 100% remotely and are not a Go Local/Study Away student for NYU Florence, please make sure that you’ve completed the online academic orientation via Brightspace so you are aware of site specific support structure, policies and procedures. Please contact florence.academicsupport@nyu.edu if you have trouble accessing the Brightspace site.

Syllabus last updated on: [01-September-2021]

Lecturer Contact Information
Fabio Schoen

Office Hours:
Tuesday 12:15 – 13:15 and, during the week, by appointment through zoom or Gmeet

Prerequisites
STAT-UB 103 Statistics for Business Control and Regression/Forecasting Analysis (or BOTH STAT-UB 1 and STAT-UB 3) OR equivalent.

Units earned
4

Course Details
● Meeting Days and Times: Tu 9:30AM-12:15PM
● All times are Central European Summer Time (CEST) (Daylight Saving Time ends Sunday, 31 October 2021 - 1 hour backward).

● Location: Limonaia Colletta

● Remote Participants: Your instructor will provide you with the Zoom link via NYU Brightspace.

● COVID-related details: In the interest of protecting the NYU Florence community, we are closely following CDC guidance around COVID-19 and adjusting our
recommendations and policies accordingly. Your health and well-being is our top priority.

Course Description
This course will introduce students to a range of models, methods, tools, all dealing with operations management. This is a quantitative course, with strong attention paid on the capability of understanding and correctly using analytical and mathematical tools.

Course Objectives
On completion of this course, students should:

- Have improved their mastery of the role of operations management in modern organizations;
- Have performed quantitative treatment of the theories
- Have made relevant connections between theory and real world examples, through references to media material, readings or case studies
- Have made a simplified, but direct on-field application of operations management to a real case chosen by themselves
- Find an increased interest to go deeper in understanding how the use of quantitative tools and analytics can improve the quality of managerial decisions

Assessment Components
- Class attendance and participation 5%
- Homework Assignments 20%
- Midterm open book 30%
- Group Project 15%
- Final open book 30%

Failure to submit or fulfill any required course component results in failure of the class. **Assessment Expectations:**

- **Grade A:** The student makes excellent use of empirical and theoretical material and offers structured arguments in their work. The student writes comprehensive essays/exam questions and their work shows strong evidence of critical thought and extensive reading.
- **Grade B:** The candidate shows a good understanding of the problem and has demonstrated the ability to formulate and execute a coherent research strategy ● **Grade C:** The work is acceptable and shows a basic grasp of the research problem. However, the work fails to organize findings coherently and is in need of improvement ● **Grade D:** The work passes because some relevant points are made. However, there may be a problem of poor definition, lack of critical awareness, poor research ● **Grade F:** The work shows that the research problem is not understood; there is little or no critical awareness and the research is clearly negligible

*Please note, Stern Business courses will adhere to the Stern Grading
Grading Guidelines

**Required Grading Language for Core Courses**

At NYU Stern, we strive to create courses that challenge students intellectually and that meet the Stern standards of academic excellence. To ensure fairness and clarity of grading, the Stern faculty have adopted a grading guideline for core courses with enrollments of more than 25 students in which approximately 35% of students will receive an “A” or “A-” grade. In core classes of less than 25 students, the instructor is at liberty to give whatever grades they think the students deserve, while maintaining rigorous academic standards.

**Teaching & Learning Philosophy**

The course will be based on front teaching for the theoretical and methodological parts, as well as in class problem-solving exercises. We will be using both traditional tools as well as modern interaction software. A project will be done by students in groups and presented to the class.

**Required Text(s)**

All readings are available online on the NYU Brightspace course site. Hard copies of some textbooks are available for consultation and semester-long loans in the Villa Ulivi Library. Please email florence.library@nyu.edu to reserve a copy. To request scans from books on reserve please fill out the Ulivi Library Book Scan Form.

The official textbook is:

Also feasible are previous editions:


**Supplemental Text(s) (not required to purchase)**

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**Additional Required Equipment**

(Enter additional required equipment (if applicable))
Session 1 - Tue Sep 7th, 2021
Basic tools for decision making

Introduction: Operations as a competitive weapon; operations strategy and decision making; the lecture will cover basic facts and definitions. Then we will present some basic analytical tools for decision making and decision trees. Selected problems will be solved in class.


Session 2- Tue Sep 14th, 2021
Introduction to Linear Programming (LP)

Linear Optimization (LP) is the basis of a large number of fundamental quantitative tools: this is the reason why we present it very early, at the beginning of this course and in sufficient detail to give the students the possibility of using this powerful tool; be prepared to answer simple question on formulating and solving linear programming problems. We will go into more detail on LP in class and show how to solve more significant problems using a spreadsheet.

Part of the lecture will be based on using a spreadsheet to solve optimal decision problems. If you like, take your own laptop in class. The lecture will be based on Google Spreadsheets.


Assignment 1: decision making must be returned today

Session 3 - Tue Sep 21st, 2021
Linear Programming (modeling).

In this lecture we will go deeper into modeling relevant operations management
problems as linear optimization ones and in solving them using a spreadsheet (the solver available in Google Calc). The lecture will cover, in an interactive way with the class, basic modeling frameworks for optimal blending, product mix optimization, production planning, shortest path finding, maximum flow computation, matching resources with requests, packing, … This lecture will enable students to master the tools they will be using in their final semester project work.

Session 4 – Tue Sep 28th, 2021
Project management

Basics of Project Management: WBS, activities on nodes, project graph, CPM method. Preparing a network diagram of a simple project, how to find start and finish times, how to crash a project network. Students are encouraged to think about the possibility of using Linear Programming for Project Management.


Session 5 - Tue Oct 5th, 2021
Inventory Management (Part 1: deterministic systems)

Basic EOQ and POQ models and formulae; reorder points, optimal lot size. Exercises will be based on problems at the end of the chapters (only those related to deterministic systems)


Assignment 2: Project management must be returned by today

Tue Oct 12th, 2021: No Class (Legislative day)

Session 6 - Tue Oct 19th, 2021
Inventory Management (part 2: stochastic systems)

We will expand the material of the previous lecture to include uncertainty (in demand, lead times, ...). Class discussion will be based on the effect of uncertainty in inventory and lot size decisions. We will introduce and analyze the newsvendor model.

Assignment 3: Inventory (deterministic) must be returned today

Session 7 - Tue Oct 26th, 2021
Forecasting

Basic forecasting tools: causal (regression), time series: moving averages, exponential smoothing, trends and seasonal patterns.

Prereading: Chapter 8, pages 313-337 (307-328 in 12th, 295-320 in 11th, 483-507 in 10th)

No assignment will be required on forecasting; the topic however will go directly into the midterm. Students are encouraged to try the published midterm samples as well as the exercises from the course web site, where they will find exercises on forecasting methods.

Assignment 4: Inventory (stochastic) must be returned today

Session 8 - Tue Nov 2nd
Midterm exam, open book

The exam will cover the quantitative tools learned up to the two lectures on Inventory Management, included. Linear Optimization and modeling will NOT be part of the midterm, as they will go into the final project.

Typical problems to be solved will be (NB: this list is not exhaustive!) drawing and analyzing a decision tree, drawing a project network and finding the critical path, choosing and using a forecast model, choosing an optimal decision for a specific inventory problem.

Session 9 – Tue Nov 9th, 2021
Waiting line models

Characteristics of queueing models and their analysis. The role of the exponential distribution; M/M/1, M/M/c, M/M/∞ queueing systems. Exercises at the end of the chapter.

Prereading: Supplement B, pages 221-234 (185-196 in 12th, 179-193 in the 11th, 245-260 in the 10th)

Session 10 - Tue Nov 16th, 2021
Quality Management and Statistical Process Control.
Statistical quality concepts, choosing, constructing and interpreting a suitable control chart. Evaluating process capability.

Prereading: Chapter 3, pages 123-146 (121-142 in the 12th, 115-140 on the 11th, 177-202 on the 10th)

Assignment 5: Waiting Line models must be returned today

Session 11 - Tue Nov 23rd, 2021
Operations Planning and Scheduling

Staffing, scheduling, resources, costs. Exercises at the end of the chapter.

Prereading: Chapter 10, pages 415-436 (409-430 on the 12th, 393-402 on the 11th, 527-548 on the 10th)

Assignment 6: Statistical Quality Control must be returned today

Session 12 - Tue Nov 30th, 2021
Simulation

How to build and understand micro-simulation models. Some simulation examples will be developed in class using a spreadsheet and applied to non deterministic versions of models analyzed during the course (e.g., simulation of a non deterministic project management case)

Prereading: this material is no more in the current edition of the textbook: relevant material to be read before class will be posted on NYU LMS

Assignment 7: Operations planning and scheduling must be returned today

Session 13 - Tue Dec 7th 2021
Supply chain management

Some of the main concepts in supply chains will be presented and discussed. Most of the lecture will be devoted to an on-line management simulation game to be played in class with your own laptop or with your smartphone.

Be sure to arrive exactly on time (even more than usual) in order to have the on line game
correctly performed. Discussion on the outcome of this game will follow.

Prereading: Chapter 12, pages 529-546 (only a quick overview) (521-539 on the 12th, 379-396 on the 11th, 381-395 on the 10th)

Assignment 8: Simulation homework must be returned today

Session 14 - Tue Dec 14th, 2021
Project reports

During this lecture, each group will give a presentation of their projects. Every member in the group should take active part in this presentation. Five minutes of discussion will be allocated after each presentation – students are required to interact with the presenting group asking questions and commenting.

Facultative Assignment 9 (Personnel shift planning) should be returned today - if returned, feedback will be provided

Session 15 - Tue Dec 21st, 2021
Final Exam, open book

The exam will cover the quantitative tools learned in the second part of the course and will contain only sporadic references to subjects covered during the first half. Typical problems to be solved will be (NB: this list is not exhaustive!) choosing the correct queueing model to analyze a specific situation and using the appropriate formulae, drawing a control chart, showing how to perform a numerical simulation of a simple management situation, planning personnel shifts.

Additional Notes

Assignments: there will be a total of 8 written assignments consisting in exercises to be solved individually and posted through the NYU LMS system as PDF files (you can use any scan facility to transform even a hand written doc into pdf). Any other format (jpg, docx, …) should be avoided - failure to satisfy this requirement might influence the class participation score. Assignments will be posted after a selection of the lectures and they will be due before the beginning of the following one, unless otherwise specified on the syllabus or in class (and confirmed on NYU LMS).

Some details on the Mini-project

There will be a group mini-project to be performed by groups of 2 or 3 students; I will choose and communicate via NYU LMS each group’s composition -- I will try to form groups with students with different backgrounds in order to promote team working. Projects will be proposed by each group not later than the seventh (Tue Oct 26th) class meeting. Projects reports should be completed not later than Friday Dec 10th and uploaded through NYU LMS (as pdf files and Google worksheets). Projects will be discussed in class on Tue Dec 14th. Each group should prepare a short report, typically between 2 and 4 A4 pages, describing the case and the proposed solution, and submit one or more
spreadsheets implementing the model. The project should be based on linear optimization. Each group will propose a problem to be analyzed and solved, whose data they might find themselves from real situations or on Internet. Each group should decide a problem, find the relevant data, formulate an optimization model, solve it, on a spreadsheet or with a more advanced system, present and discuss the results obtained. Advanced material on modeling linear optimization problems might be found in a draft of my recent web textbook. Please notice: this material is still experimental and in any case its reading might require too advanced mathematical skills.

Suggested Co-Curricular Activities

[Enter suggested voluntary co-curricular activities]

Your Lecturer

Fabio Schoen. Full professor of Operations Research at the University of Florence, School of Engineering, where he teaches “Optimization Methods”, “Optimization and Data Science for Management”. His research activity deals with optimization, in particular large scale non convex, and its applications to various fields ranging from health care, scheduling, logistics, forecasting, machine learning, data mining, analytics, sports. He founded a startup, KKT srl, devoted to Vehicle Routing, which was acquired in 2014 by Fleetmatics, a worldwide leader in fleet intelligence, which in turn has been acquired by Verizon, and now is part of Verizon Connect. In 2017 he founded a new startup, Intuendi, focused on demand forecasting and inventory management.

He is the Scientific Director of the PhD program in Information Engineering at the University of Florence. He is the delegate for the Industry 4.0 programme at the Department of Information Sciences.


Attendance Policy

Studying at Global Academic Centers is an academically intensive and immersive experience, in which students from a wide range of backgrounds exchange ideas in discussion-based seminars. Learning in such an environment depends on the active participation of all students. And since classes typically meet once or twice a week, even a single absence can cause a student to miss a significant portion of a course. To ensure the integrity of this academic experience, class attendance at the centers, or online through NYU Brightspaces if the course is remote synchronous/blended, is expected promptly when class begins. Attendance will be checked at each class meeting. If you have scheduled a remote course immediately preceding/following an in-person class, you may want to write to florence.academiciansupport@nyu.edu to see if you can take your remote class at the Academic Center.

As soon as it becomes clear that you cannot attend a class, you must inform your professor and/or the Academics team by e-mail immediately (i.e. before the start of your class). Absences are only excused if they are due to illness, Moses Center accommodations, religious observance or emergencies. Your professor or site staff may ask you to present a doctor's note or an exceptional permission from an NYU Staff member as proof. Emergencies or other exceptional circumstances that you wish to be treated confidentially must be
presented to staff. Doctor's notes must be submitted in person or by e-mail to the Academics team, who will inform your professors.

Unexcused absences may be penalized with a two percent deduction from the student's final course grade for every week's worth of classes missed, and may negatively affect your class participation grade. Four unexcused absences in one course may lead to a Fail in that course. Being more than 15 minutes late counts as an unexcused absence. Furthermore, your professor is entitled to deduct points for frequently joining the class late.

Exams, tests and quizzes, deadlines, and oral presentations that are missed due to illness always require a doctor's note as documentation. It is the student's responsibility to produce this doctor's note and submit it to site staff; until this doctor's note is produced the missed assessment is graded with an F and no make-up assessment is scheduled. In content classes, an F in one assignment may lead to failure of the entire class.

Regardless of whether an absence is excused or not, it is the student's responsibility to catch up with the work that was missed.

Final exams
Final exams must be taken at their designated times. Should there be a conflict between your final exams, please bring this to the attention of the Academics team. Final exams may not be taken early, and students should not plan to leave the site before the end of the finals period.

Late Submission of Work
(1) Work submitted late receives a penalty of 2 points on the 100 point scale for each day it is late (including weekends and public holidays), unless an extension has been approved (with a doctor's note or by approval of NYU Florence Staff), in which case the 2 points per day deductions start counting from the day the extended deadline has passed.

(2) Without an approved extension, written work submitted more than 5 days (including weekends and public holidays) following the submission date receives an F.

(3) Assignments due during finals week that are submitted more than 3 days late (including weekends and public holidays) without previously arranged extensions will not be accepted and will receive a zero. Any exceptions or extensions for work during finals week must be discussed with the Assistant Director of Academic Affairs, Lisa Cesarani (lisa.cesarani@nyu.edu).

(4) Students who are late for a written exam have no automatic right to take extra time or to write the exam on another day.

(5) Please remember that university computers do not keep your essays - you must save them elsewhere. Having lost parts of your essay on the university computer is no excuse for a late submission.

Academic Honesty & Plagiarism
As the University's policy on "Academic Integrity for Students at NYU" states: "At NYU, a commitment to excellence, fairness, honesty, and respect within and outside the classroom is essential to maintaining the integrity of our community. By accepting membership in this community, students take responsibility for demonstrating these values in their own conduct and for recognizing and supporting these values in others." Students at Global Academic Centers must follow the University and school policies.

NYU takes plagiarism very seriously; penalties follow and may exceed those set out by your home school. Your lecturer may ask you to sign a declaration of authorship form, and may check your assignments by using TurnItIn or another software designed to detect offences against academic integrity.

The presentation of another person's words, ideas, judgment, images, or data as though they were your own, whether intentionally or unintentionally, constitutes an act of plagiarism. It is also an offense to submit work for assignments from two different courses that is substantially the same (be it oral presentations or written work). If there is an overlap of the subject of your assignment with one that you produced for another course (either in the current or any previous semester), you MUST inform your professor.

For guidelines on academic honesty, clarification of the definition of plagiarism, 10 examples of procedures and sanctions, and resources to support proper citation, please see:

   NYU Academic Integrity Policies and Guidelines
   NYU Library Guides

Inclusivity Policies and Priorities

NYU's Office of Global Programs and NYU's global sites are committed to equity, diversity, and inclusion. In order to nurture a more inclusive global university, NYU affirms the value of sharing differing perspectives and encourages open dialogue through a variety of pedagogical approaches. Our goal is to make all students feel included and welcome in all aspects of academic life, including our syllabi, classrooms, and educational activities/spaces.

Attendance Rules on Religious Holidays

Members of any religious group may, without penalty, excuse themselves from classes when required in compliance with their religious obligations. Students who anticipate being absent due to religious observance should notify their lecturer and Office of Academic Support in writing via e-mail one week in advance. If examinations or assignment deadlines are scheduled on the day the student will be absent, the Academics Office will schedule a make-up examination or extend the deadline for assignments. Please note that an absence is only excused for the holiday but not for any days of travel that may come before and/or after the holiday. See also University Calendar Policy on Religious Holidays

Pronouns and Name Pronunciation (Albert and Zoom)

Students, staff, and faculty 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, advisors, and administrators in Albert, NYU Brightspace, the NYU Home internal directory, as well as other NYU systems. Students can also opt out of having their pronouns viewed by their instructors, in case they feel more comfortable sharing their pronouns outside of the classroom. For more information on how to change this information for your Albert account, please see the Pronouns and Name Pronunciation website.

Students, staff, and faculty are also encouraged, though not required, to list their pronouns, and update their names in the name display for Zoom. For more information on how to make this change, please see the Personalizing Zoom Display Names website.

Moses Accommodations Statement
Academic accommodations are available for students with documented and registered disabilities. Please contact the Moses Center for Student Accessibility (+1 212-998-4980 or mosescsd@nyu.edu) for further information. Students who are requesting academic accommodations are advised to reach out to the Moses Center as early as possible in the semester for assistance. Accommodations for this course are managed through NYU Florence.

Bias Response

The New York University Bias Response Line provides a mechanism through which members of our community can share or report experiences and concerns of bias, discrimination, or harassing behavior that may occur within our community.

Experienced administrators in the Office of Equal Opportunity (OEO) receive and assess reports, and then help facilitate responses, which may include referral to another University school or unit, or investigation if warranted according to the University’s existing Non-Discrimination and Anti-Harassment Policy.

The Bias Response Line is designed to enable the University to provide an open forum that helps to ensure that our community is equitable and inclusive.

To report an incident, you may do so in one of three ways:

- Online using the Web Form (link)
- Email: bias.response@nyu.edu
- Phone: 212-998-2277
- Local Telephone: 055 5007277