Introduction

This course will introduce students to a range of models, methods, tools, all dealing with operations management. We will not go into much detail of any, but students are warned that this will be a quantitative course, with strong attention paid on the capability of understanding and correctly using analytical tools.

Some elementary knowledge in using a spreadsheet is a pre-requisite.

Evaluation

<table>
<thead>
<tr>
<th>Evaluation Item</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class attendance</td>
<td>15%</td>
</tr>
<tr>
<td>Midterm open book</td>
<td>30%</td>
</tr>
<tr>
<td>Mini Group Project</td>
<td>20%</td>
</tr>
<tr>
<td>Final open book</td>
<td>35%</td>
</tr>
</tbody>
</table>

Homework

There will be no homework assignments. However students should arrive in class prepared as indicated in the syllabus. Individual study will be checked during each lecture through questions, discussion and exercises.

Exams

There will be two written exams to be taken in class. Both will be individual and open book (i.e., students can take the textbook, lecture notes and other written material with them). The final exam will be mostly on the material presented during the second half of the semester, but some questions will also deal with topics covered during the first half.

Attendance

Attendance is required to all lectures; in case of provable impediment (like an illness), please contact the secretariat in advance.

Office Hours

Before and after each lecture; I will be available also in different time periods, by appointment.
Textbook


Students are required to carry their own copy of the textbook; additional material will be made available during the course, but the book is required. Please take into account that purchasing the book through a local bookstore in Florence might be quite difficult and/or require quite long delay. Students should carry their book from the US.

Syllabus

Lecture titles closely follow chapter names in the textbook. The schedule is based on lectures given in the morning, 10.30–13.15, generally on Mondays, with an exception, given on Friday.

Teaching and studying style: I will give pre-reading assignments for each lecture. Students are expected to come to class after having read the required material. I will explain the material in class, adding insight, new material and examples. During the lecture I will ask selected students to participate to a discussion, to answer some questions, to solve exercises. Thus arriving in class with a good preparation is required. After class you will find all the required material both in the textbook and in my slides: post-class study is required in order to be able to successfully participate to mid-term and final exams.

1. Mon. Sep 6: Introduction: Operations as a competitive weapon; operations strategy and decision making

Prereading: chapter 1, pages 2–24, Supplement A, pages 33-46; the lecture will cover basic facts and definitions. Then we will present some analytical tools (break-even analysis, decision making, decision trees). Selected problems from pages 47–50 will be solved in class.

2. Mon. Sep 13: Linear Programming (LP)

LP is the basis of a large number of fundamental quantitative tools: this is the reason why we present LP at the beginning of this course.

Prereading: Supplement E, pages 582–601; be prepared to answer simple question on formulating and solving 2–dimensional linear programming problems. We will go into more detail on LP in class and show how to solve more significant problems using a spreadsheet.

3. Friday Sep 16: Project management.

Prereading: Chapter 2, pages 52–79. Be prepared to answer questions regarding how to prepare a network diagram of a simple project and how to find start and finish times. Students are encouraged to think about the possibility of using Linear Programming for Project Management.
4. Mon. Sep 20: *Forecasting*
   Prereading: Chapter 13, pages 462–483; be prepared to answer questions on regression, moving averages, trends and seasonal patterns.

5. Mon. Sep 27: *Inventory Management (1: deterministic systems)*
   Prereading: Chapter 12, pages 414–424, Supplement D pages 450–455. Class discussion will require an understanding of the basic EOQ formula and of the concepts of reorder point and optimal lot size. Exercises will be based on problems at the end of the chapters (only those related to deterministic systems).

6. Mon Oct 4: *Inventory Management (2: stochastic systems)*
   We will expand the material of the previous lecture to include uncertainty (in demand, lead times, ...). Prereading: Chapter 12, pages 424-433, Supplement D pages 455–457. Additional material on the "Newsvendor problem" will be distributed. Class discussion will be based on the effect of uncertainty in inventory and lot size decisions.

7. Mon. Oct 11: *Midterm exam, open book.* The exam will cover some of the quantitative tools learned up to now. Typical problems to be solved will be (NB: this list is not exhaustive!) drawing a project network and finding the critical path, choosing and using a forecast model, choosing an optimal decision for a specific inventory problem.

8. Mon. Oct 18: *Waiting line models*
   Prereading: Supplement C, pages 242–255. Be prepared to in class questions on the main characteristics of queueing models. Exercises at the end of the chapter.

9. Mon. Nov 8: *Simulation*
   Prereading: Supplement B, pages 156–166. 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: Chapter 9, pages 322-343. 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 the computer lab. Please be sure to arrive exactly on time. Discussion on the outcome of this game will follow.

    Prereading: Chapter 5, 174–201. Students should be able to understand quality concepts and capable of constructing a control chart.

12. Mon. Nov 29: *Guest Lecture (to be confirmed).* Prof. Rinaldo Rinaldi, Univ. of Florence, will give a lecture on *Luxury Goods Logistics Management.*
   During this lecture, each group will give a presentation of the mini-project results. Every member in the group should take active part in presentation. Five minutes of discussion will be allocated after each presentation – students are required to interact with the presenting group asking questions and commenting.

14. Mon. Dec 13: *Final Exam, open book* The exam will cover some of the quantitative tools learned in the second part of the course and will contain some 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.

**Cases**

For what concern cases, some will be used during specific lectures and distributed to the class. There is a plan for adding some specific case, based on local experience, e.g.:

- Optimal production capacity allocation for fashion accessories
- Optimal order allocation at “Guess? Inc.”
- News vendor problem for production and distribution planning at KME Italy or at COOP Italia
- Using queueing theory to plan a service parking for the “Pitti Immagine” fashion event
- Optimal production scheduling at Manetti & Roberts through Linear Programming

**Mini-project**

There will be a group mini-project to be performed by groups of up to 4 students. Projects will be assigned, following students’ proposals, not later than the sixth class meeting; group composition should be communicated via email not later than Monday September 20th. Projects reports should be completed not later than December 2nd and sent to me via email (as pdf files). Projects will be discussed in class on Monday December 6. Each group should prepare a report of no more than 7 A4 pages describing the case. A typical case report (do not consider the list as a must, some organizations require different items to be analyzed) might contain sections on:

- Overview of the company, mission, market, competitors, customers, suppliers
- Main processes and flows within the organization. Bottlenecks, possibilities for improvement.
Inventories and inventory management within the organization.

Quality related issues and possibility of using quantitative tools towards total quality

Given the short time available and the likely difficulty in obtaining numerical data, it is not expected that groups will perform detailed quantitative analysis on the chosen organization. The report will thus be mainly qualitative, but should use as much as possible concepts learned during the course and contain suggestions for tool adoption oriented towards increase quality and competitiveness. However, if at all possible, use of some quantitative tools will be extremely welcome and groups should try their best in order to obtain at least some data useful to experiment with the methods presented in the course. A critical appraisal of the advantages obtainable from these tools will be appreciated.

A stimulating possibility for this year’s project might be an analysis, from the point of view of Operations Management (OM), of queueing at the Uffizi Gallery. Queueing models will be a subject presented only at the end of October; however students will be able to make observation, collect data, interview local managers during September (when queueing is relevant). They will also be able to look at that system with OM in mind; forecasting and capacity planning might be suitable subjects for the projects. Waiting lines and/or simulation will be quite natural tools. However many other possibilities do exist for dealing with such a peculiar and complex system. What I expect from a project work at Uffizi is not necessarily a study of a queueing model (even if this is a natural possibility); the objective is to suggest strategies to avoid or improve queues or to make queueing less uncomfortable, or to improve the overall performance of the system – projects proposals dealing with any aspect of the operations will be welcome.

On slightly more traditional grounds, another possibility might be that of analyzing operations at one of the many large scale wine and oil producers near Florence (Frescobaldi, Antinori, Ricasoli, many others available), or in high fashion production (Ferragamo, Gucci, Conte of Florence, Braccialini, ...). Somewhat linked to the preceding one, a possibility might be that of analyzing operations for one of the world’s best known fashion events: Pitti Immagine, an exhibition taking place twice a year at Fortezza da Basso (contact: Pitti Immagine and Firenze Fiera).

Finally, there might be many other possibilities, within more technological oriented companies like General Electric, El.En (High tech Laser production), Elyo (Energy management), KME Spa (copper production), or other companies like UniCoop (supermarkets), ATAF Spa (public transport), Mukki (milk production and distribution) – of course these are just examples, many other possibilities do exist.

I am also open (and strongly encourage) original project proposals by students; if students have ideas for projects which can be reasonably carried out during the semester and which include a contact with a local company or group (of any type), they are encouraged to discuss the feasibility of the project with me.

A sample of last year’s projects:
• Scheduling student participation to the “Okkupazione” event at NYU Florence

• Improving queue management at Firenze Santa Maria Novella railway station

• An analysis of GROM, top quality italian ice cream

• The “Oil Shoppe” - analysis of a small sandwich-maker in Florence

• An analysis of queues and ticket validation on the 25 bus to NYU Florence campus

• Supply chain analysis of UniCOOP Firenze supermarkets

• An analysis of olive picking at NYU Florence

Important dates

Monday September 6 : class begins

Monday September 20 : deadline for group formation for mini-projects.

Monday October 4 : deadline for Project proposal by each group

Monday October 11 : Midterm exam, open book

Monday November 29 : guest lecture on fashion logistics

Thursday December 2 : Project reports sent to me via email as pdf files

Monday December 6 : project exposition by each team


Related events

I am trying to organize a presentation by an important local company; this will be in the form of a seminar held at the NYU campus by a representative of the top management of a company located in Tuscany or a guided visit to a local firm or organization. This will take place outside normal lecture hours.

Announcements of both kind of events will be given during the semester.