

Microeconomics 1
Module 2, 2023-2024

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Course description

In this course we will focus on the *operational* decisions of a firm—the ones directly related to manufacturing of products and provision of services. We will see how such decisions should be made optimally, how they affect the financial performance and how they align with the strategic goals of the firm. The objective of this course is to provide you with both qualitative insights and quantitative modeling tools that are helpful in analyzing operational decisions.

Among the way, we will take a closer look at how companies such as Zara, Dell, and Barilla used the ideas from operations management to their advantage. We will start by exploring how a company should allocate its resources to ensure productive efficiency. Next, we will consider uncertainty: how it can be estimated and how it affects optimal decision-making. Finally, we will consider the issues of decision sequencing and supply chain coordination.

Course contents

We will have seven meetings and the tentative plan follows below:

1. Introduction. Basic notions of operations. Fundamentals of process analysis.
2. Process analysis. Variability. Queueing.
3. Batching and EOQ model. The link between finance and operations. ROIC Trees.
4. Forecasting. Time series. Expert polls. Prediction markets.
5. Inventory decisions under uncertainty. Newsvendor model. Basic revenue management.
6. Reactive capacity. Quick response. Make-to-order vs. make-to-stock.
7. Supply chains: bullwhip effect and coordination with contracts

Course requirements, grading, and attendance policies

This course requires knowledge of basic concepts from probability, statistics, and calculus. The grade will be based on:

- A case assignment (10%)
 - In this assignment, you will estimate the value of an ironmaking plant by analyzing its production processes and linking those to financials.
- Mini-case on batching (10%)

- In this mini-case, you will solve a sequence of analytical problems on process design and analysis
- Data analysis assignment (10%)
 - In this assignment, you will learn how to apply basic forecasting techniques to data—and evaluate their performance.
- A simulation exercise (10%)
 - In this simulation exercise, you will play as a COO of a mobile phone making company, deciding on its production plans and adapting to changing conditions.
- A final exam (60%)

If a student's grade for the course is **failing**, the student has the right to retake the final exam **two** times.

Sample task for course evaluation

Microfluidics Inc. (MI) provides fast blood tests to local hospitals. Each blood sample requires 1 minute to test, but the equipment must be recalibrated after 540 samples. Recalibration take 1 hour, and while the equipment is being recalibrated, no samples can be tested. What is the maximum number of samples that MI can test per hour?

Course materials

Required textbooks and materials

The lectures aggregate multiple sources and because of that we do not have a required textbook.

Additional materials

The following books might be helpful to augment the lectures (but not required):

1. Terwiesch, C., Cachon, G. (2013). Matching Supply with Demand: An Introduction to Operations Management. United Kingdom: McGraw-Hill Education.
2. Goldratt, E. M., Cox, J. (2016). The Goal: A Process of Ongoing Improvement. United Kingdom: Taylor & Francis.
3. Anupindi, R. (2012). Managing Business Process Flows: Principles of Operations Management. United Kingdom: Prentice Hall.
4. Lai, R. (2013). Operations Forensics: Business Performance Analysis Using Operations Measures and Tools. (n.p.): MIT Press.

Academic integrity policy

Cheating, plagiarism, and any other violations of academic ethics at NES are not tolerated.