COURSE DESCRIPTION:

This course serves as an introduction to Operations Management. The coverage of the discipline is very selective: We concentrate on a small number of powerful themes that have emerged recently as the central building blocks of world-class operations. We also present a sample of operations management tools and techniques that have been proved extremely useful over the years. The topics are equally relevant in the manufacturing and service sectors.

Instructor: Dr. Mor Armony, Room KMC 8-62, (212) 998-0291 marmony@stern.nyu.edu
Office hours:

Teaching Fellow:
Office hours:

Meetings:

Required Course Materials (available in bookstore):

Cases and Readings: Digital Course-pack (also, some cases will be distributed in class, and some can be downloaded from the course web site)


Computer Software: Excel.

Grading:

Class Attendance & Participation: 10%
Case Assignments: 15%
Homework: 15%
Mid-Term I: 20%
Mid-Term II: 20%
Final exam: 20%

Attendance and Participation: Attendance is required in all class sessions for full credit. Students are also expected to participate in class discussion and other in-class activities. The use of computers and communication devices is not allowed during class sessions (with the exception of a few class sessions, in which we will be specifically using laptops). If you would like to use your laptop for the purpose of note taking, please discuss with the instructor.

Case Assignments: There are 6 case assignments. These may be prepared in groups of up to 4 people. One copy per group per assignment needs to be submitted at the beginning of the class session. Page limit: 2 page, 11pt, double spaced. Cases will be graded based on effort.

Homework Assignments: In addition to case assignments, there will be 3 homework assignments. These need to be prepared individually. Students may discuss the problems with others, but writing the report should be done alone.

Midterm and Final Exams: All exams are open books and open notes. You will need a calculator.
COURSE OVERVIEW AND OBJECTIVES

Operations Management is the design and management of the processes that transform inputs into finished goods or services. Operations is one of the primary functions of a firm. Whereas marketing focuses on the demand for the product, and whereas finance provides the capital for the product, operations actually produces and delivers the product.

This course provides a foundation for understanding the operations of a firm. Our objective by the end of the course is to provide you with the basic skills necessary to critically analyze a firm's operating performance and practices. Such knowledge is important for careers in a variety of areas, including general management, entrepreneurship, investment banking (e.g. business restructurings, mergers and acquisitions), venture capital (e.g. evaluating new business plans) and management consulting (business restructuring improvement).

Unlike many courses in the core, which tend to treat the firm as a "black box", we will be primarily concerned with "opening up" the black box and discovering what makes a firm "tick" - or, for that matter, "stop ticking". In contrast to your management courses, our focus is on the technological rather than human dimension of a firm's internal operations - though there are obvious connections between the two that we will explore. In contrast to the measurement focus of your accounting courses, our concern is understanding what elements of a firm's operations enable it to produce quality outputs at a competitive cost structure. That is, we will focus on how the "physics" of material, work and information flows and the design and management of a firm's processes interact to determine a firm's cost structure and its ability to compete effectively in terms of non-cost measures such as quality, variety and speed.

Because the operations of a firm vary widely from one industry to the next, a course like this cannot cover all topics that are relevant to any given industry. Rather, we have selected a set of topics that are fundamental to understanding operations in a wide range of industries. These concepts are then illustrated using cases from a diverse set of businesses.
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I expect every student to be familiar with the NYU Stern Code of Conduct http://www.stern.nyu.edu/UC/CurrentStudents/CodeofConduct/CON_022122. Some of the ways in which the code applies to this course are discussed below:

- The code of conduct stipulates that a student will “exercise integrity in all aspects of our academic work including, but not limited to, the preparation and completion of exams, papers and all other course requirements by *not engaging in any method or means that provides an unfair advantage.*”
- An individual’s name on a report **should be included** only if they have contributed to the analysis. If an individual has not contributed to the analysis in an intellectual manner, it is a violation of the code of conduct to include his or her name.
- Furthermore, you may not refer to write-ups from classes offered in earlier semesters.
- The premise of the code of conduct is that ideas should be attributed to their source. Therefore, please acknowledge the main source(s) of data, facts, and ideas (other than from the instructor or textbook) in all your written work and when you make a presentation. If you use material from a source other than the lecturer, TA, the textbooks or the lecture notes, you must acknowledge the source. For example, say, “I obtained this from the following website.”
- You may discuss the homework with your classmates, TA or the Professor. However, you must write them down individually (excluding case assignments which are to be prepared in groups of up to 4 students). The discussion is limited to “how to solve” type of questions. Do not be concerned about getting a wrong answer in the case assignments. These will be graded based on effort. The homework assignments will be graded based on effort and correctness.
Session 1: *Introduction to Operations Management*

- **The Goal**: Start reading (Read up to page 264 before Session 27)

Session 2: *Process Strategy*

- **Readings**:
  - Read Chapter 1: Operations and Productivity (H&R)
  - Read Chapter 5: Design of Goods and Services (H&R)

Session 3: *Process Design and Control*

- **Case**: *Benihana of Tokyo*, W. Sasser and J. Klug, Harvard Business School (1998). Read, analyze, and be prepared to discuss the Benihana of Tokyo case. Use the following study questions as an aid in analyzing the case.
  a) Describe Benihana as an operating system. (Draw a process flow diagram.)
  b) How does the operating system support the Benihana concept?
  c) Which parameters of the operating system influence the throughput of a Benihana Restaurant?
  d) How does the cost structure of a Benihana restaurant compare with that of a typical American restaurant? How does Benihana get its competitive advantage?

**Case Assignment #1: (Due at the Beginning of Class)**

*Answer questions c) and d) and submit at the beginning of class. Justify your answers.*

- **Readings**:
  - Read the note “Analysis of an Operation” from the course website.

Session 4: *Process Flow Analysis*

- Flow Diagram
- Capacity, Throughput Time, Cycle Time
- Gantt Chart
- Bottleneck
- Factors that Affect Throughput and the Bottleneck
  - Order Size
  - Resources (Labor, Supplies)
  - Set-up Time

- **Readings**:
  - Read Chapter 7: Process Strategy and Sustainability (H&R)
  - Read Supplement 7: Capacity and Constraint Management (H&R)
• **Case:** Kristen’s Cookie Company, Roger Bohn, Harvard Business School (1990). Read, analyze, and be prepared to discuss the Kristen's Cookie Company case, utilizing the six key questions at the end as guides.

**Case Assignment #2: (Due at the Beginning of Class)**

*Identify all possible bottleneck operations in Kristen’s process. Explain.*

• **Case:** Use the EXCEL spreadsheets Donner.xls and Donner1.xls to analyze and understand the relationships among the number of orders (set-ups) in a month, order size and capacity. The spreadsheets can be found on the course website.

Please bring laptops.

**Session 5: The Effects of Uncertainty—Waiting Lines & Queueing Theory**

- Characteristics of a Waiting-Line System
  - Arrival, Waiting Line, Service Characteristics
  - Measuring the Queue’s Performance
  - Queueing Costs

- Psychology of Queues

**Readings:**

- (Optional) Read *Queueing Management and Models*, Columbia Business School (available on NYU Classes)

**Session 6: Waiting lines**

**Readings:**

- Read Quantitative Module D: Waiting-Line Models (H&R)

**Session 7: Waiting lines**

**Case:** Read, analyze, and be prepared to discuss *First City National Bank case*. The following study questions will help:

- a) Considering the date supplied for arrival and service times, how would you calculate an average arrival rate and service rate?
- b) As Mr. Craig, what characteristics of this queueing system would you be most interested in observing?
- c) What is the best number of tellers to use?

**Session 8: Review session**

Submit Homework #1
Session 9: *First Midterm Exam*

Session 10: *Optimal Resource Allocation*

- **Readings:**
  - Read Quantitative Module B: Linear Programming (H&R)
  - (Optional) Read Introduction to Linear Programming (available on NYU Classes)

Sessions 11: *Optimal Resource Allocation*

- Linear Programming
  - Models and Applications
  - Sensitivity Analysis and Shadow Prices

Please bring laptops.

Sessions 12: *Optimal Resource Allocation*

- Linear Programming in practice

Please bring laptops.

Sessions 13: *Introduction to Quality Management*

- Quality – Its Definition and Basis for Competition
- Six-sigma quality

- **Readings:**
  - Read Chapter 6: Managing Quality (H&R)

Session 14: *Statistical Process Control*

- Quality Analysis, Measurement and Improvement
- Control Charts

- **Readings:**
  - Read Supplement 6: Statistical Process Control (H&R)

Session 15: *Cost of Quality*

- **Case:** Read, analyze and be prepared to discuss the quality control issues in the *South Tree Electronics* case. In analyzing South Tree's quality control problem the following study questions may help:
  - Indicate on the process diagram, all current inspection points and note the accumulated cost and yield of each operation and test in the process.
– How many circuits must you start with to achieve the desired output level?
– At what yield rate would you be indifferent between continuing and discontinuing the first inspection in the process?

**Case Assignment #3: (Due at the Beginning of Class)**
*With respect to South Tree Electronics calculate the cost of a good unit.*

**Session 16:** *Introduction to Simulation*

- **Readings:**
  - Read Quantitative Module F: Simulation (H&R)

**Session 17:** *Simulation*
- Monte Carlo Simulation

**Session 18:** *Review Session*

Submit Homework #2

**Session 19:** *Second Midterm Exam*

**Session 20:** *Introduction to Inventory Management*
- Importance of Inventory
- Inventory Measures
- Economic Order Quantity (EOQ)

- **Readings:**
  - Read Chapter 12: Inventory Management (H&R)

**Session 21:** *Inventory Pooling and Inventory Management under Uncertainty*
- EOQ under Uncertainty

- **Case:** Xenon Drives. Read, analyze and be prepared to discuss the Xenon Drives case.

**Case Assignment #4: (Due at the Beginning of Class)**
*Comment on Allen’s Claim: “I can’t see why it requires any more inventory to keep one month’s supply on hand in four branches than it did to keep a month’s supply on hand back at just the factory’s warehouse. A Month’s supply is a month’s supply no matter how you look at it.”*

**Session 22:** *Inventory Management for Short Lifecycle Products*
Newsvendor Model
JIT Supply Chains

- **Readings:**
  - Read Chapter 16: JIT and Lean Operations (H&R)

- **Case:** Read and be prepared to discuss the *L.L. Bean, Inc* case.

**Case Assignment #5: (Due at the Beginning of Class)**
*With respect to the L.L. Bean case, please answer the following three questions:*

1. **How does L.L. Bean use past demand data and a specific item forecast to determine how many units of that item to stock?**

2. **What item costs and revenues are relevant to the decision of how many units of that item to stock?**

3. **How would you address Mark Fasold's concern that the number of items purchased usually exceeds the number forecast?**

**Session 23: The Beer Game**

- The Beer Game

**Session 24: Supply chain Management**

- Supply Chain Management
- The Bullwhip Effect

- **Readings:**
  - Read Chapter 11: Supply-Chain Management (H&R)
  - (Optional) Read Supplement 11: Outsourcing as a Supply-Chain Strategy (H&R)

**Session 25: Project Management**

- CPM
- Crashing the project

- **Readings:**
  - Read Chapter 3: Project Management (H&R)

**Session 26: Project Management under Uncertainty**

- PERT
Case Assignment #6: (Due at the Beginning of Class): Draw the network describing the projects in FCN/Securities Demo (A) and Crash the project FCN (B).

Session 27: The Goal

- The Goal: Read up to page 264

  Discussion of “The Goal”
  a. How does production control work in Alex’s factory? More specifically, given a set of orders to be produced, what is the scheme by which work is released to the factory? What is the scheme by which work is prioritized at each process step?
  b. What steps did Alex take to improve performance (as measured by the goal) in his factory?
  c. What are the weaknesses in the message of The Goal?

Session 28: Course Review

Submit Homework #3