Overview
Operations management is the design and management of the processes that transform inputs into finished goods or services. Operations management is one of the primary functions of a firm. While marketing induces the demand for products and finance provides the capital, operations *produces and delivers* the product (goods and services). It is responsible for matching supply with demand.

This course introduces basic concepts of operations management and application of the same in business practice today. We will examine theoretical foundations of operations management and how these principles or models can be employed in both tactical and strategic decision making in firms. Our aim is to (1) familiarize you with the problems and issues confronting operations managers, and (2) provide you with the language, concepts, insights and tools to deal with these issues in order to gain competitive advantage through operations.

This course is highly recommended for students:

- Interested in operations management and who plan to consult in service industries.
- Majoring in other areas and curious about perspective of operations management in marketing, accounting, health care, sports industries and financial services.
- Interested in applying some broad operational ideas when consulting on current business problems.
- Interested in learning how businesses plan their supply chains for a variety of products. For instance, how firms deal with obsolescence due to new emerging technological innovations in the marketplace.
- Majoring in engineering disciplines and want to understand the operational issues involved in designing or producing new products and services.
This is an introductory course for students interested in operations. This course can be highly useful to you primarily because it provides an overview of theory and practice that provides a different perspective on intriguing business challenges and opportunities of the day. The underlying theory we learn in this course can be applied to various business contexts that first seem unrelated to operations management. The course will be built on theoretical models, but we will analyze a significant number of business cases and applications and play a number of simulations. These cases, articles and simulations will provide a supportive structure to the theory developed in the course. The cases will demonstrate how real world operations problems can be approached, modeled and solved in a knowledgeable fashion.

Course Materials
There are two required texts for the course:


In addition, the course reader includes the cases and a few other readings. It is available in an electronic form at Study.Net. All other readings will be handed out in class and/or posted to bSpace.

Instructor Office Hours
As a faculty interested in undergraduate knowledge development, I follow an open door policy. This implies that you are welcome to visit my office anytime when I am in my office. Preferably, you could email me before coming to make sure that I am in my office.

Grading:
The course grade will be determined as follows:

- Class contribution (15%)
- 5 homework assignments (25%)
- 2 group case write-ups (10%)
- Midterm exam (25%)
- Final exam (25%)

Preparation and Participation
The course is structured to require reading before class for a minimum number of sessions. For 18 of the sessions, no pre-reading is required. To compensate for this, in the 8 remaining sessions you will be required to thoroughly prepare a case for class discussion. I am hoping for lively class discussions during these sessions. You should expect to be “cold called”. This practice is not meant to be adversarial. Instead, its purpose is to encourage you to develop the business-relevant skill of being able to think on your feet and be articulate and to prepare in advance for class and be engaged in class discussion. If exceptional circumstances leave you unprepared for a case discussion, let me know before class begins.
You are encouraged to form study groups to prepare for case discussions. You will likely learn the most if your group is three or lower. In the past, students—especially those who said they entered the course not being fully comfortable with quantitative material—reported benefitting from forming study groups at the very start of the course. The “class contribution” portion of your grade will be based on the extent to which you demonstrate that you are prepared, the relevance and depth of your comments and the degree to which you listen carefully and respond to your peers. Use of laptop computer for anything unrelated to the course during class time will adversely affect the “class contribution” portion of your grade. Failure to attend class will have the same effect.

**Written Assignments**
The written assignments will focus on ensuring that students understand both the basic and advanced concepts taught in the class. It is primarily a way of learning the concepts well and also preparing oneself for the midterm and final exams. All students are encouraged to make ample use of the office hours and contact me or the GSI to resolve any doubts or to make sure that the concepts are clear. There will be 5 assignments adding up to 25% of the course grade. All individually solved assignments are due on the assignment due date *before* the class begins. Late submissions will not be accepted.

**Group Case Write-ups**
Case write-ups are required for two of the cases (National Cranberry case and Sport Obermeyer case). For these cases, students should form teams of 2-3 and submit a case write up on the day of the case discussion. This is to facilitate interaction between the students and create ample preparation for the case discussion in the classroom.

**Midterm and Final Exams**
The exams will be closed notes. You are allowed to bring one page of formulas for each exam. The only electronic devise you may use is a calculator. The midterm will cover the material of the first part of the course (Parts I and II) and the final will cover the material of the second part of the course (Part III). The exams will be both quantitative and qualitative and they will draw on the cases, lectures, readings, and in-class discussions. In preparing for the exam, you should anticipate that the level of difficulty would be on par with the homework assignments. You will be responsible for details in the cases that point to and illustrate the course concepts (the purpose here is to have the exams reflect the class discussion, and to reward those who prepared for and participated in those discussions).

**Friday Discussion Sessions**
The optional Friday discussion sessions will be held in C125 9-10am. The goal of these sessions is to summarize material that we have covered in class, go over practice problems and give you the opportunity to ask questions. The discussion sessions will not be held on every Friday. For each session, an outline of the topics and problems that will be covered will be posted to bSpace by Thursday night.
Laptop Policy
A mutually supportive learning environment depends on active attention and engagement. For this reason, no laptop use is allowed during classroom sessions, unless stated otherwise. Violating this policy will result in a substantial penalization in the class participation portion of your grade.
UGBA 141: Introduction to Operations Management
Course Outline and Assignments
(Subject to Change)

Part I: Process Analysis

Class 1  Wednesday, January 19
Introduction

Read: Administrative Notes
Cachon and Terwiesch, Chapter 1, Sections 2.2-2.3, Sections 3.1-3.3

Class 2  Monday, January 24
Process Analysis and Improvement in Pizza Pazza

Read: Pizza Pazza

Discussion Questions:

1. Be prepared to answer questions (1) through (8) at the end of the case.

Class 3  Wednesday, January 26
Process Analysis with Multiple Types of Flow Units

Read: Cachon and Terwiesch, Section 3.6

Class 4  Monday, January 31
Process Improvement – Setup Times

Read: Cachon and Terwiesch, Sections 6.1-6.3

Class 5  Wednesday, February 2
Process Analysis with Predictable variability

Read: National Cranberry Cooperative (Abridged)

Discussion Questions:
1. Be prepared to replicate the cannery calculations in Predictable Variability: Inventory Buildup Analysis.
2. What are the problems facing receiving plant No. 1 (RP1)?
3. Develop a process flow diagram, showing the capacities of the various stages in barrels per hour.
4. For the remaining questions, assume that a peak harvest-season day involves 18,000 barrels of berries, 70% of them wet harvested, arriving over a twelve-hour period from 7 am to 7 pm. Compute the capacity utilization for each stage of the process. What is the bottleneck operation?
5. Would trucks have to wait to unload? When during the day would trucks be waiting? How much truck waiting time would you expect? (Hint: you should use an inventory buildup diagram to aid you in this question and the next question. In constructing this diagram, assume that berry processing begins at 7 am. Although the vertical axis should be in units of barrels of berries, you should think hard about precisely which berries (i.e., their location) need to be tracked.)
6. How would the various actions contemplated by Hugo Schaeffer affect peak day performance? Suppose the cost of renting cranberry trucks with drivers is $15.00 per hour. What would you recommend? Provide calculations to support your recommendation.

Class 6
Queueing Theory
Monday, February 7

Read: Cachon and Terwiesch, Sections 7.1-7.6

Class 7
Pooling in Queues
Loss Systems
Wednesday, February 9

Read: Cachon and Terwiesch, Section 7.9, Chapter 8

Class 8
Managing Bottlenecks
The Economic Order Quantity Model
Monday, February 14

Read: The Goal, through page 224.
Cachon and Terwiesch, Sections 6.1-6.5

Be prepared to summarize the wisdom of Jonah, as revealed through page 224, and to critically evaluate this wisdom. In particular, be prepared to address the following questions.
Discussion Questions:

1. How does production control work in Alex's factory? That is, given a set of customer orders to be produced, what is the scheme by which work is released to the factory, and what is the scheme by which work is prioritized at each factory work center?
2. What steps did he take to improve the performance (as measured by The Goal) of his factory?
3. What did Alex learn on the hike?
4. What weakness(es) do you see in this book’s message?

Since the first edition of The Goal appeared in 1984 it has become an "underground classic" in manufacturing circles. It consists of three major segments, the second of which ends on page 224. The first edition of The Goal ended at what is now page 260, but some material on the evils of conventional cost accounting was later added.
Part II: Process Improvement and Quality Management

Class 9
Wednesday, February 16
House Building Simulation

Class 10
Wednesday, February 23
Toyota Production System
HOMEWORK # 2 DUE

Read: Toyota Motor Manufacturing, USA
Cachon and Terwiesch, Chapter 10

Discussion Questions:

1. What are the major elements of the Toyota Production System?
2. What are the potential disadvantages of a Kanban system?
3. Where, if at all, does the current routine for handling defective seats deviate from the principles of the Toyota Production System?
4. What are the underlying causes of the problems facing Doug Friesen?
5. As Doug Friesen, what would you do to address the seat problem? Where would you focus your attention and solution efforts? What options exist? What would you recommend? Why?
6. In light of the massive recall of Toyota vehicles due to braking and unintended acceleration problems in 2009 and 2010, what do you think of the Toyota Production System? Where do you think Toyota went wrong in handling their recent problems?

Class 11
Monday, February 28
Quality Management Tools

Read: Cachon and Terwiesch, Sections 9.1-9.3 and 9.5-9.6

Class 12
Wednesday, March 2
Summary and Review

This session reviews the course material up to this point. Come prepared with questions.

Class 13
Monday, March 7
In Class Midterm Exam
Part III: Supply Chain Management

Class 14 Wednesday, March 9
The Newsvendor Model

Read:  Cachon and Terwiesch, Sections 11.2 and 11.4

Class 15 Monday, March 14
Mass Customization and Make-to-Order

Read:  Where in the World is Timbuk2?
       Cachon and Terwiesch, Sections 12.0-12.3

Discussion Questions:

1. What channels does Timbuk2 sell through and which one is the most profitable?
2. How should Timbuk2 go about deciding which mass-customization options to offer customers? Brennan talks about a very vague process based on management intuition. For instance, discuss the analysis for a decision by Timbuk2 on whether to allow customers to choose a different buckle? Timbuk2 currently offers a choice of colors for the three panels – how do you think costs would change if customers also were allowed to choose the dimensions of the panels?
3. What are the costs and benefits of moving production to China? Should Timbuk2 produce in more than one location (e.g., San Francisco and China at the same time)? If so, what are the issues? In particular, think about utilization of San Francisco factory before and after outsourcing as well as about inventory needs.

Class 16 Wednesday, March 16
Order Up To Model

Read:  Cachon and Terwiesch, Chapter 13

Read the chapter carefully. Today’s class will be primarily a lecture on the mechanics of the model and its qualitative implications.

Class 17 Monday, March 28
Guest speaker

HOMEWORK #3 DUE
Supply Chain Inventory Management

Read: Hewlett-Packard Company DeskJet Printer Supply Chain (A)
       Cachon and Terwiesch, pages 341-343

Discussion Questions:

1. What has caused the so-called “crisis” with inventory and service?
2. What are the important “drivers” of safety stock?
3. Assess quantitatively the air freight option relative to current operations. Just consider the products for the European market. Do not forget to consider pipeline inventory (since HP owns the pipeline inventory from Vancouver to Europe). In answering this question, use the following assumptions:
   a. HP wants to minimize inventory while still achieving at least 98% fill rate.
   b. The lead-time from Vancouver to Europe is 5 weeks by the current method (ocean) but 1 week by air.
   c. HP orders and receives inventory on a weekly basis.
   d. There are 4.33 weeks per month and demand is independent across time.
   e. The product sells for $450 and marginal production cost is $300.
   f. Inventory carrying costs are 24% per year.
   g. Shipping via sea (the current operation) costs $10 per printer, whereas airfreight costs $25 per printer.
4. How can Brent Cartier mitigate the crisis with inventory and service?

Managing Risk in Operations

Read: Cachon and Terwiesch, Chapter 14

Today’s class explores several operations strategies for reducing and hedging uncertainty.

Revenue Management Game

Revenue Management

Read: Cachon and Terwiesch, Chapter 15
Today’s class studies several revenue management tools to increase revenue in the presence of fixed capacity and variable demand.

Class 22  Wednesday, April 13
Supply Chain Experimental Exercise

Read: Supply Chain Game Description

Today’s class will be devoted to a participatory simulation exercise in which students play the role of links in a supply chain: producer, distributor, wholesaler, or retailer. The class will be randomly divided into groups of four, and then the game will begin.

Class 23  Monday, April 18
Supply Chain Coordination

Read: Barilla Spa (Abridged)
Cachon and Terwiesch, Sections 16.0-16.2

Discussion Questions:

1. Is there any evidence that Barilla faces the bullwhip effect? If so, what causes of the bullwhip effect are present?
2. Who resisted JITD and why? How would you respond to their concerns (i.e., how would you modify the JITD proposal to make it more acceptable)?
3. Would you adopt JITD?

Class 24  Wednesday, April 20
Supply Chain Demand Management  WRITTEN CASE ANALYSIS DUE

Read: Sport Obermeyer, Ltd.

Discussion Questions:

1. Using the sample data given in Exhibit 10, make a recommendation for how many units of each style Wally should make during the initial phase of production. Assume that all of the ten styles in the sample problem are made in Hong Kong, and that Wally’s initial production commitment must be at least 10,000 units.
2. What operational changes would you recommend to Wally to improve performance?
3. How should Wally think in the long term (i.e., next year and beyond) about sourcing in Hong Kong vs. China?
Class 25  
Monday, April 25  

Retail Operations  
Contracting  

Read:  Rapid-Fire Fulfillment (HBS article)  
Cachon and Terwiesch, Sections 16.3-16.5  

Discussion Questions:  

1. Try to think of all the things that Zara does that go against the “conventional operations wisdom” discussed in this course. What are the consequences (positive and negative) of Zara’s differences?

Class 26  
Wednesday, April 27  

Course Summary and Review  
HOMEWORK # 5 DUE  

The last class will be devoted to course wrap-up and review of course material.
## UGBA 141: Operations At-a-Glance
(Subject to Change)

Spring 2011, Prof. Feldman

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<tr>
<th>Class</th>
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| 2     | 1/24 | **Process Analysis and Improvement in Pizza Pazza**  
*Case Study*: Pizza Pazza |
| 3     | 1/26 | **Process Analysis with Multiple Types of Flow Units**  
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| 4     | 1/31 | **Process Improvement – Setup Times**  
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| 6     | 2/7  | **Queueing Theory**  
*Textbook*: Sections 7.1-7.6 |
| 7     | 2/9  | **Pooling & Loss Systems**  
*Textbook*: Section 7.9, Chapter 8 |
| 8     | 2/14 | **Managing Bottlenecks & The Economic Order Quantity Model**  
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| 9     | 2/16 | **House Building Simulation** |
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Key Dates

“The Goal”

The first 224 pages of “The Goal” are to be read by class 8 (February 14th). This is a lot to read— you should be reading this in the background during the first few weeks of the course (i.e., don’t wait until the night before).

Graded Assignments

There will be five individual homework assignments and two group write-ups in UGBA 141. Assignments are due on the following days:

Homework 1 (Process Analysis) – Monday, February 7th
Homework 2 (Queueing Theory) – Wednesday, February 23rd
Homework 3 (Newsvendor Model) – Wednesday, March 28th
Homework 4 (Order-Up-To Model) – Monday, April 4th
Homework 5 (Special Issues) – Wednesday, April 27th
National Cranberry Cooperative Group Case Write-up – Wednesday, February 2nd
Sport Obermeyer Group Case Write-up – Monday, April 20th

In-class Midterm Exam – Monday, March 7, 2011
Final Exam – Wednesday, May 11, 2011, 3 pm – 6 pm