**MGT 4803**

**Supply Chain Modeling**

**Course Syllabus**

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**Office 452 – College of Management**

**Georgia Institute of Technology**

**Office Hours: Tuesday 11am-12pm or by appointment**

The objective of this course is to provide students with tools/means for matching supply and demand in the most cost effective way, which is a primary challenge for any firm from an operations perspective. A mixture of lectures, case discussions and games will be used to provide a better understanding of modeling supply chain issues. In particular, this course will provide an in-depth examination of several topics important to supply chain management including inventory control, capacity management, contracting and transportation modeling in the contexts of retailing, manufacturing and logistics industries. The course is designed for students who plan to pursue a career in supply chain management and for those interested in understanding effective mechanisms to deal with uncertainty in demand. The course should enable students to

* Understand operational mechanisms that can be used to cope with demand uncertainty,
* Understand the dependencies between time-based competition, inventory control and capacity management,
* Relate these concepts to existing business models in practice within different industries, and
* Enhance their analytical skills to evaluate different business models.

**Course Material**

There is no required textbook for this course. A required class pack containing copyrighted material will be available through [www.study.net](http://www.study.net). Other required reading will be available through T-Square.

Designing and Managing the Supply chain: Concepts, Strategies, and Cases by David Simchi-Levi and Philip Kaminsky, is a recommended reference book.

**Grading Policy**

Written Case Analyses 30% (4@7.5%) -group

Supply Chain Simulation Games 10% -group

Ethics Project: 5% -group

Class Participation (Pop-Quizzes) 30% -individual

Final Project 25% -group

***Your final grade will be determined by a mixture of group and individual assignments as listed above. Note that group grades may be adjusted for individuals based on peer reviews. Each group member is expected to turn in the peer review form below at the beginning of session 32. Details of each assignment are provided below.***

*Written Case Analyses*

You will be assigned five case studies in this course. The four highest grades will determine your case analysis grade. For each selected case, you’re required to provide group case write-ups that will make up 30% of your course grade. Each case write-up is worth 7.5% of your course grade. You should form *groups of five* to work together for the case write-ups, simulation games and the final project. For each case analysis, a detailed course outline in this syllabus provides a list of questions to be answered. Concentrate explicitly on these questions for your write-ups, providing detailed analysis and/or discussion.

All case write-ups are limited to 4 pages. They should be double-spaced, 12 pt. font, 1 inch margins all around. A cover page with names of group members does not count toward this page limit.

*Ethics Project*

An important feature of this course is that it has been supported by the Rich Foundation to provide the students with an ethical business perspective. Accordingly, we will be having a case study session dedicated to supply chain ethics, where you’ll be responsible for finding a real/practical example of supply chain ethics problem and discuss it in class. The example can be positive or negative, in the sense that it provides a good or bad example of the ethics concerns in supply chain practice. You are expected to lay down the fundamental ethical issues associated with the supply chain management example you identify, explain what was right/wrong in the particular example and how you would go about it if you were in position of the decision makers. Your examples should also be exposed in a way that they stimulate active class discussions on the issue. You do not have to deliver a report, PowerPoint presentations are recommended (but not required), and your presentations should be limited to 10 minutes (e.g., 3-4 slides if any).

*Supply Chain Simulation Games*

You will play two supply chain simulation games in this course. Both games are to be played in groups. Each game will make up 5% of your total grade. The start and end times for the games are provided in the course outline. You will be given access to the games 48 hours prior to the game start to view the historical data so that you can forecast demand and develop a game strategy. Make sure you take notes of your strategic actions throughout the game. You’ll be graded based on your overall profitability, as well as the quality of strategic actions you take. Teams without a strategy (e.g., do nothing) will obtain zero points from the games.

*Class Participation*

A brief summary of each session as well as discussion questions for each class are provided in the detailed course outline which is at the end of the syllabus. You are expected to read the relevant case and/or article for each session and think about the discussion questions before each session. Your class participation grade will primarily depend on pop-quizzes based on these discussion questions. The pop-quizzes can take place anytime during the sessions. I plan to have **4** quizzes for your class participation grade, each worth 6 % of your grade. Your 5th quiz grade will be based on your attendance to guest speaker lectures. To attend the quizzes, you must be **on time** and sit behind your name tag. There are no make-ups for the quizzes. Students missing a quiz due to an official Georgia Institute of Technology event **must prearrange an alternate time** to take the quiz. Other excused absences (for health reasons, etc.) must be documented, and the grade missed will be the average of the other quiz scores. All other cases will receive a grade of zero for the missed quiz.

*Final Project*

The final project is to be completed as a group, which is an opportunity to focus on an area of interest or importance to you. Several types of projects are possible:

1. Examine an industry or a firm with respect to its supply chain models over time. Discuss the reasons for change, the process by which restructuring has occurred and the current status of the supply chain structure and viability. Conclude with a vision for the future.
2. Undertake a small “consulting” assignment for a company. This can be an existing company who faces supply chain management challenges, or the design of a supply chain for a startup. In the former case, discuss the industry characteristics, current status, the reasons driving the company to restructure and conclude with recommendations. In the latter case, discuss the operating environment in more detail and make a recommendation on supply chain design. In this type of project, the recommendations and the discussion should constitute approximately half the report.
3. For the entrepreneurs, this might be an opportunity to lay out an operations model for a new supply chain.

The projects are not limited to above topics; the projects could be on anything related to supply chain modeling. If you have difficulty in deciding on a project topic, I can suggest some potentially good project themes. Please come and see me during the first or second week of the course if you need help with your project.

The final project will have three components: the project proposal, the project presentation, and project report. Each group is expected to submit a short project proposal and present it. The project proposal should include a short description of the problem, on which your group will be working. Project presentations will take place on the last two sessions of the course (12/4 and 12/6). The project report is due for the last session. Project reports should be no more than 6 pages (1 inch margins, 12 point font, double spaced), followed by supporting exhibits. Your project grade will be based on four components: (20%) *breadth and depth of research* (the quantity and quality of material you find concerning your topic); (10%) *quality of analysis*; (20%) *quality of writing*(including proper citations);and (50%)*quality of class presentation*.

**Attendance:** Attendance is voluntary.

## Classroom Etiquette:

It’s expected that you are courteous to both your instructor and your fellow classmates. This includes turning off your cell phone. You may not use a laptop in class. Please bring your **name tent** with you to every class. One of the most important things to me about classroom etiquette is **to start on time** with everybody on board.

**Peer Review Form For Group Assignments**

**Name** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**Date** \_\_\_\_\_\_\_\_\_**Group name or #** \_\_\_\_\_\_\_\_\_\_\_\_\_

Rate each member of your group; do not rate yourself. Base your assessments on your group meetings and each individual’s contribution to your group work. Each question is worth 0-10 points. Each member of your group can receive 0-40 points. I will make adjustments to the case/project/game grades based on your comments.

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| --- | --- | --- |
| **Dimensions** | **Points** | **Description of Behavior** |
| Attendance | 0-3  4-7  8-10 | Absent quite often; group had to work around this member  Absent occasionally, but did not inconvenience the group  Routinely present; the group could count on this member to be present |
| Preparation | 0-3  4-7  8-10 | Was not prepared for meetings based on previous agreements  Was prepared for meetings based upon what the group had agreed  Was prepared for group meetings, offered unique insights |
| Cooperation | 0-3  4-7  8-10 | Highly uncooperative  Moderately cooperative  Highly Cooperative |
| Fair Share | 0-3  4-7  8-10 | Frequent free rider; did not do fair share of the work  Ordinary group member; did acceptable amount of work  Did more than fair share of the work |

# Note: Do not include yourself on this form

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **NAME** | **ATTENDANCE** | **PREPARATION** | **COOPERATION** | **FAIR SHARE** | **TOTAL** |
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**Comments (feel free to use the back)**

Did any member(s) make exceptionally strong contributions? Describe.

Did any member(s) fail to make appropriate contributions? Describe.

**Class Outline**

|  |  |  |
| --- | --- | --- |
| Week 1 | 21-Aug | Class Introduction |
|  | 23-Aug | Introduction: Matching Supply and Demand |
| Week 2 | 28-Aug | Review: Forecasting |
|  | 30-Aug | Review: Forecasting |
|  | 30-Aug | **Group lists due before class!** |
| Week 3 | 4-Sep | Review: Inventory Management |
|  | 6-Sep | Review: Inventory Management |
| Week 4 | 11-Sep | Bullwhip Effect: **Case:** Barilla / Beer Game **(Quiz #1)** |
|  | 13-Sep | Newsvendor Model: The options framework |
|  | 13-Sep | **Supply Chain Game Registration due!** |
| Week 5 | 18-Sep | Retail Supply Chains: **Case** - **Marks Spencer and Zara** |
|  | 18-Sep | **Deliver the Zara case before class** |
|  | 20-Sep | Supply Chain Game Introduction- **Project Proposals Due** |
| Week 6 | 25-Sep | **No Lecture** |
|  | 27-Sep | Problem Session |
| Week 7 | 2-Oct | Retail Supply Chains: **Case - Wal-Mart** |
|  | 2-Oct | **The SCM game starts at 11 am !!!** |
|  | 4-Oct | Retail Supply Chains: **Case - Peapod vs. Webvan (Quiz #2)** |
| Week 8 | 9-Oct | The Airplane Game: Push vs. Pull |
|  | 9-Oct | **The SCM game ends at 11 am! Deliver SC Game Write-ups!** |
|  | 11-Oct | Supply Chain Game Debrief, Network Game Intro |
| Week 9 | 16-Oct | **Official School Holiday- No Lecture** |
|  | 18-Oct | Service Supply Chains – Guest Speaker (Prof. Manpreet Hora) |
| Week 10 | 23-Oct | Incentive Alignment in the Supply Chain: **Case - Hamptonshire Express** |
|  | 23-Oct | **Deliver the HE case before class,** |
|  | 25-Oct | Incentive Alignment in the Supply Chain: **Case -** Video Vault **(Quiz #3)** |
|  | 25-Oct | **The Network Game Starts at 11 am !** |

|  |  |  |
| --- | --- | --- |
| Week 11 | 30-Oct | Capacity Management and Operational Hedging: **Case - Seagate** |
|  | 30-Oct | **Deliver the Seagate case before class** |
|  | 1-Nov | Supplier Management: **Case -** Supplier Rationalization at Barclays **(Quiz #4)** |
|  | 1-Nov | **The Network Game ends at 11am! Deliver Network Game Write-ups!** |
| Week 12 | 6-Nov | Supply Chain Network Design: **Case - Merloni SPA** |
|  | 6-Nov | **Deliver the Merloni case before class.** |
|  | 8-Nov | Supply Chain Ethics |
|  | 8-Nov | **Ethics Presentations Due!** |
| Week 13 | 13-Nov | Closed-Loop Supply Chains and Reverse Logistics: **Case - Cycleon** |
|  | 13-Nov | **Deliver the Cycleon case before class** |
|  | 15-Nov | Guest Speaker (Ulas Cakmak - Predictix) |
| Week 14 | 20-Nov | Guest Speaker (Philip Vervloesem - OMPartners) |
|  | 22-Nov | **Official School Holiday- No Lecture** |
| Week 15 | 27-Nov | Guest Speaker (Charles Redding- Medshare) |
|  | 29-Nov | Guest Speaker (Matt Oguz – Istanta Inc.) |
| Week 16 | 4-Dec | Project Presentations |
|  | 6-Dec | Project Presentations- **Deliver Project Write-ups!** |

**Detailed Outline**

***August 21, 2012* --Session 1: Introduction**

***August 23, 2012* -- Session 2: Supply Chain Basics: Matching Supply and Demand**

* Reading: Making Supply Meet Demand in an Uncertain World, Harvard Business Review (HBR)
* Reading: What is the Right Supply Chain for your Product, HBR
* (optional) Reading: The Triple A Supply Chain, HBR

***August 28-30, 2012* -- Sessions 3-4: Forecasting**

Lecture.

***September 4-6, 2012* -- Session 5-6: Inventory Management**

Lecture.

***September 11, 2012* -- Session 7: Supply Chain Basics: The Bullwhip Effect**

* Case: Barilla
* Reading: The Bullwhip Effect in Supply Chains, Sloan Management Review (SMR)

Discussion Questions:

1. Diagnose the underlying causes of the difficulties that the JITD program was created to solve. What are the benefits and drawbacks of this program?
2. What conflicts or barriers internal to Barilla does the JITD program create? What causes these conflicts? How would you deal with these?
3. As one of Barilla’s customers, what would your response to JITD be? Why?

***September 13, 2012* -- Session 8: Newsvendor Model in the Options Framework**

In this session, I will introduce the newsvendor model which is widely used in the procurement of short life cycle products such as apparel, electronics, and perishables. The newsvendor model is used when a firm has to commit to a certain quantity ahead of complete knowledge of demand. Uncertain demand and long lead times are some of the reasons of low profitability despite the high margins in the apparel industry. Our discussion will mainly revolve around the question: What is the right amount to order or produce in the face of uncertain demand? No preparation is needed for this session.

⇒ Make sure you have registered for the supply chain game: You can register your teams at [http://sc.responsive.net/sc/atasu/start.html](http://sc.responsive.net/sc/atasu2/start.html).To register, you need BOTH the code you purchase online and the course code 'tech'. Each s**tudent must purchase an individual code online from a link provided on the registration page.** A link is given on your team registration page. The link takes you to <http://mgr.responsive.net/Manager/ShowClient> . Your institution name is "Georgia Institute of Technology". The product is titled "Supply Chain Code for Prof Atasu".

***September 18, 2012* -- Session 9: Retail Supply Chains: Disruptive Technologies**

* Case: Marks Spencer and Zara, INSEAD case
* Reading: Rapid-Fire Fulfillment, HBR
* (optional) Reading: Disruptive technologies: Catching the wave, HBR
* (optional) Reading: Meeting the Challenge of Disruptive Change, HBR

Case Preparation Questions:

1. What is innovative about Zara? What are the major differences in Zara’s supply chain when compared with that of M&S?
2. Why is it so difficult for M&S to start playing the “fashion” game? What do you think of the programs launched by Peter Salsbury in response to the troubles at M&S?
3. What, if any, guidance would you offer for turning M&S around?
4. Compare M&S’s approach to that of Inditex, Zara’s parent company?

⇒Turn in at the beginning of class: Your M&S and Zara case write-up.

***September 20, 2012* -- Session 10 – The Supply Chain Game Introduction and Project Proposals**

Please take a look at the description of the game at [http://sc.responsive.net/sc/atasu/Assign1](http://sc.responsive.net/sc/atasu2/Assign1) before the session. Once the simulation begins (on September 29), you can access the teams you registered at [http://sc.responsive.net/sc/atasu/entry.html](http://sc.responsive.net/sc/atasu2/entry.html).

⇒Turn in at the beginning of class: Your project proposal. You are also required to present your project proposal (5 minutes per team). PowerPoint presentations are not required, but recommended.

***September 25, 2012* -- Session 11 – NO LECTURE**

***September 27, 2012* -- Session 12 – Problem Session (**on Forecasting, Inventory Control and the Newsvendor Model**)**

***October 2, 2012* -- Session 13 – Retail Supply Chains: Competitive Advantage**

* Case: Wal-Mart Stores in 2003
* Reading: Rocket Science Retailing is Almost Here: Are you ready? HBR

Discussion Questions:

1. What makes it particularly difficult for the retailers to manage their business?
2. What are Wal-Mart’s sources of competitive advantage? Focus on competitive advantages from operations perspective (i.e., procurement, distribution, product assortment, and pricing).

⇒The Supply Chain Game starts at 11 am. You have 1 week to play the game. Make sure you take notes of your strategic actions throughout the game. You’ll be graded based on your overall profitability, as well as the quality of strategic actions you take. Teams without a strategy (e.g., do nothing) will obtain zero points from the game.

***October 4, 2012* -- Session 14: -- Internet Retailing: Shop online, not inline**

We will examine service and operations strategies that home-delivery grocers can choose from and evaluate the “shortest path to profitability” for e-grocers.

Readings:

* Case: Peapod.com: Internet Grocer Strategies, Kellogg case.

Discussion Questions:

1. What are the pros and cons of the different Internet strategies?
2. What drives profit performance in this business? Identify key drivers.
3. What is the “shortest path to profitability”, if one exists? Which key metrics would you watch and benchmark?

***October 9, 2012* -- Session 15: The Airplane Game**

In this session we’ll investigate the major differences between push and pull based production/supply chain settings with the help of an in class simulation called the airplane game.

⇒Turn in at the beginning of class: Your Supply Chain Game write-up.

***October 11, 2012* -- Session 16: Supply Chain Game Debrief, Network Game Intro and Logistic Network Design.**

* Supply Chain Game Debrief
* Introduction to the Network Game ([http://sc.responsive.net/sc/atasu/Assign2](http://sc.responsive.net/sc/atasu2/Assign2))
* Logistics Network Modeling via spreadsheets

***October 16, 2012* -- Session 17: NO CLASS- Official School Holiday**

***October 18, 2012* - Session 18: Service Supply Chains**

Guest Speaker: Prof. Manpreet Hora

***October 23, 2012* -- Session 19: Aligning Incentives in the Supply Chain - Contracts**

In this session, we will extend the newsvendor model to include a supplier in addition to a retailer that faces uncertain demand. We will explore the benefits of supply chain coordination. We will explore different terms of trade in the supply chain and evaluate the pros and cons of different approaches of coordinating the supply chains.

Readings

* Case: Hamptonshire Express, HBS Case
* Aligning Incentives for Supply Chain Efficiency, HBR
* (optional) Turning the Supply Chain into a Revenue Chain, HBR

⇒Turn in at the beginning of class: Your Hamptonshire Express case write-up.

Case Preparation Questions: Answer the first five questions in the case (Problems #1,2,3,4, and 5). The spreadsheets are posted on T-Square.

***October 25, 2012* -- Session 20: Aligning Incentives in the Supply Chain**

In this session, we’ll continue our discussion on supply chain contracts.

Readings

* Case: Video Vault, HBS Case

⇒The Network Game starts at 11 am. You have 1 week to play the game. Make sure you take notes of your strategic actions throughout the game. You’ll be graded based on your overall profitability, as well as the quality of strategic actions you take. Teams without a strategy (e.g., do nothing) will obtain zero points from the game.

***October 30, 2012 –* Session 21: Capacity Management and Operational Hedging**

In this session, I will introduce the idea of operational hedging. We will discuss capacity investment under uncertainty in a multi-product, multi-resource firm. We will illustrate the value of global production planning, coordination and execution in a volatile industry.

Readings

* Case: Seagate Technologies: Operational Hedging, Kellogg case
* “Exploiting Uncertainty,” Business Week, June 7, 1999.

⇒Turn in at the beginning of class: Your Seagate case write-up.

Case Preparation Questions:

1. What is Seagate’s corporate strategy? Describe and evaluate how its operations and processes support the corporate strategy. Critically evaluate Seagate’s product and process development strategy, which calls for development in its respective product/process center in the U.S. and then exporting the developed process to a site in the Far-East for high-volume production.
2. What are Seagate’s major risks? How does it manage those risks?
3. How would you describe the “capacity of the processing network” if the current Capital Appropriation Request capacity proposal was to be implemented? What is the expected profit and ROI under this investment? (Given the short product life, assume the firm is making its decisions for a single time period of length one year, at the end of which manufacturing capacity will have zero salvage value)
4. The case states that the true demand forecast contains uncertainty. Given this forecast, recommend a capacity portfolio that is better than the current Capital Appropriation capacity proposal. (Recall, capacity investment must be performed before you observe actual market demand.) Explain why your recommended portfolio is better than the current capacity plan.

***November 1, 2012* -- Session 22: Supplier Management** (Arm’s Length vs. Strategic Partnership Models)

* Case: Supplier Rationalization at Barclays (A), INSEAD Case
* (optional) Reading: Strategic Sourcing: From Periphery to the Core, HBR
* Reading: Building Deep Supplier Relationships, HBR
* (optional) Reading: How to think strategically about outsourcing, HBR

Discussion Questions:

1. Make a qualitative assessment of Barclays’ print supply chain status and needs.
2. Which of the three options (proposed in the opening) would you recommend? Why? Discuss the pros and cons relative to short and long-term performance needs.
3. What other directions would you recommend exploring to improve the print supply chain?

⇒The Network Game ends at 11 am! Deliver your network game write ups.

***November 6, 2012* – Session 23: Logistics Network Design Cross-docking**

In this session, we will discuss various options to configure a supply chain consisting of manufacturing sites, one central distribution facility and regional warehouses. I will also introduce the concept of cross-docking, a strategy aimed at reducing inventories in the distribution channel while providing reliable customer service.

Readings:

* Case: Merloni Elettrodomestici SpA: The Transit Point Experiment, HBS case
* (optional) What is the Right Supply Chain for your Product, HBR

Case Preparation Questions:

* What is the transit point proposal?
* Who are the stakeholders?
* What are the costs and benefits of the transit point approach?
* What do you think Merloni should do about the transit point experiment?

⇒Turn in at the beginning of class: Your Merloni case write-up.

***November 8, 2012* – Session 24: Supply Chain Ethics**

* Group Mini-Presentations on the Ethics Projects (10 minutes each)

Readings:

* Case: Contract Manufacturing: Dealing with Supply Chain Ethics Challenges
* Reading: Environmental and Sustainability Ethics in Supply Chain Management, Science and Engineering Ethics
* Reading: The Ethical Supply Chain: Is it viable?, Kingfisher Group Report

***November 13, 2012* *--* Session 25: Closed Loop Supply Chains and Reverse Logistics**

Readings:

* So What if Remanufacturing Cannibalizes My New Product Sales? CMR.
* What’s yours is mine: Getting to Grips with Take-Back Laws
* Case: Cycleon: Postal Networks for Reverse Logistics. INSEAD Case.

Case Preparation Questions:

* What are the primary challenges faced by Cycleon?
* What is the target market for Cycleon?
* What are the essential factors for the profitability of Cycleon’s business?
* What critical capabilities should be developed by Cycleon?
* What would you recommend Gerben about the toner cartridge proposal? Critically evaluate whether or not this return segment is a good option to improve the profitability of their business.

⇒Turn in at the beginning of class: Your Cycleon case write-up.

***November 15, 2012* Session 26:** Guest Speaker

***November 20, 2012 --* Session 27:** Guest Speaker

***November 22, 2012*: NO CLASS -OFFICIAL SCHOOL HOLIDAY**

***November 27, 2012:* Session 29:**Guest Speaker

***November 29, 2012:* Session 30:**Guest Speaker

***December 6-8, 2012 --* Sessions 31-32: Project Presentations**

⇒*Deliver Your Project Reports!!*