OM 335 OPERATIONS MANAGEMENT, Fall 2012
Unique Numbers: 04170

MEETINGS

MW 2:00 PM – 3:30 PM CBA 4.304

INSTRUCTOR

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Or by appointment

TEACHING FELLOW:

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COURSE DESCRIPTION

Operations Management is the discipline of designing, managing and controlling business processes to achieve the performance targets of the firm, as well as, sustain its competitive edge. Every successful firm has superior operations in at least one dimension. Customers seek the goods and services of these firms for that element of superiority. The firm attempts to maintain its edge so that it can obtain higher profits, increase market share, and attract resources to enable its continued competitive operations.

In this course we first learn how Operations Management provides competitive advantage to firms. Then, we proceed to understanding how processes influence cost and time. In the third part of the course we learn how to design processes when there is variability either in demand or in supply. In this part of the course we study operations that span multiple enterprises or supply chains and examine how world class firms manage their operations. In the fourth module we study quality management and how firms achieve world class quality.

COURSE OBJECTIVES

To provide you with the framework and concepts necessary to understand how Operations Management enables firms to obtain competitive advantage.

To provide you with the tools necessary to carry out basic process analysis including process flow charting, capacity, cost and time calculations, and identify and evaluate opportunities for process improvement.

To provide you with the tools necessary to model and evaluate the impact of demand and supply uncertainty on operations and supply chains.

PRE-REQUISITES

Credit or registration for BA 324 (or credit for MIS 324) and credit or registration for STA 309.

REQUIRED COURSE MATERIALS

1. TEXT BOOK: Operations & Supply Management, F. Robert Jacobs, Richard B. Chase and Nicholas J. Aquilano, 13th edition, Mc Graw Hill. This is called JCA in the syllabus.

2. THE GOAL, second revised edition (buy in bookstore), Eliyahu Goldratt, North River Press, Inc. 1992. (third edition is also acceptable)

3. COURSE PACKET: Available from the GSB Copy Center. This is called CB in detailed syllabus.

4. Other cases and handouts will be posted on Blackboard.

SCHOLASTIC HONESTY

I take scholastic honesty very seriously. I shall observe all the faculty responsibilities with regard to the Honor Code. By enrolling in this class you have agreed to observe all the student responsibilities with regard to the Honor Code.

Some of the ways in which the code applies to this course are discussed below:

• No student will lie, cheat, copy or otherwise behave in an unfair manner to obtain academic advantage over other students.

• You may not refer to case write-ups or solutions to homework from classes offered in earlier semesters.

• The premise of *the honor code* is that ideas should be attributed to their source.

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, the textbooks or the lecture notes, you must attribute the source. For example, say, "I discussed this with the TA." Or "I obtained this from the following website."

• You may discuss homework with your classmates, TA or me. However, you must do them individually. The discussion should be limited to "how to solve" type of questions. The actual solution must be done individually. Do not be worried of getting the answer incorrect in the homework. Most of the points will be given for using the correct approach.

How to read the text book: Read the assigned pages carefully. Skim where it says skim. Do the super quiz at the end of chapter after completing the reading. Make sure to solve the sample problems.

GRADING

Class Contribution and Quizzes	10%
Homework	15%
Mid-Term Examination I	20%
Mid-Term Examination II	25%
Final Examination	30%

HOMEWORK

There are eight (8) homework assignments. The best seven assignment grades will count for credit. The homework is due beginning of class on the dates (sessions) where the assignments appear in the syllabus. Only homeworks that are specifically designated as **homework,** are to be handed-in. Keep a copy of all homework submitted for reference and discussion during class. Homework will be graded, and will not be accepted late. Homework must be prepared individually in order to receive credit. Submission by email will be accepted only under exceptional circumstances or prior arrangement.

One group assignment will be given after we discuss the book The Goal. More information will be provided at that time. The group assignment will carry five (5) points. Homework assignments are worth 10 points.

QUIZZES

Quizzes might be given in any class. It might involve an in-class exercise or question based on the material covered in class or the case assigned for the day.

HOW TO PREPARE FOR CLASS DISCUSSIONS

Please read the cases carefully. Use the study questions on the case supplied in the syllabus as a guide. Be prepared to be called-upon to present the facts of the case, or to carryout the analysis indicated by the study questions. *Please view the recommended video from student CD* ***prior*** *to class. Please take the interactive quiz for the chapter discussed after class. Please prepare to make your points especially where I have marked question for discussion.*

I will assess **class contribution** by keeping track of the questions and comments made by students during the semester. Good contribution means asking clarification questions about the material, providing examples to illustrate points made in the class, helping bring a new or different viewpoint during discussion, etc. Attendance in general (80% or better gets 5 points) and of the beer game (2 points) specifically (see below) will count towards class contribution.

BLACKBOARD

I will use Blackboard (see http://courses.utexas.edu).to post lectures, cases and technical notes, extra problems, solutions to assignments, sample exams, and discuss frequently asked questions. Grades will be posted on gradebook. If you need help with logging into Blackboard please contact the ITS Help Desk.

ELECTRONIC CONTENT

This course will use Blackboard. You are expected to post your comments, responses to other postings, questions and response to specific questions in the outline. I will be regularly posting news articles and comments upon them. I expect you to read and contribute.

The TA and I will be reading these discussions. Please keep the discussions strictly relevant to the course and the language professional.

EXAMS

All exams will be closed book and closed notes. You should bring a calculator to the exams. You can bring two sheets (8.5" x 11") of notes with writing on both sides. I will summarize the necessary formulae and provide the summary for use during the exam. The final exam will be cumulative. The second midterm exam is not cumulative. The exam grade will be final one week after you receive the exam grade.

ATTENDANCE AND THE BEER GAME

I expect students to make every effort to attend every class on time. No laptops or cell phone usage will be allowed. Please do not eat or drink in class, sleep in class or disturb the class. Please come on time. Late arrival disturbs the class. Two (2) points for class contribution will count towards attending the beer game and 80% or better attendance will count towards five (5) class contribution points.

A special evening class has been scheduled to play the beer game on 11/06/2012 between 5 and 7 PM. Please let me know immediately (before 15th of September) if you cannot make it to the class due to a schedule conflict.

STUDENTS WITH SPECIAL NEEDS

"Any student with a documented disability who requires academic accommodations should contact Services for Students with Disabilities at 471-6259 (voice) or 1-866-329-3986 (Video Phone) as soon as possible to request an official letter outlining authorized accommodations." [1]

RELIGIOUS HOLIDAYS

"By UT Austin policy, you must notify me of your pending absence at least fourteen days prior to the date of observance of a religious holy day. If you must miss a class, an examination, a work assignment, or a project in order to observe a religious holy day, you will be given an opportunity to complete the missed work within a reasonable time after the absence." [2]

[1] http://www.utexas.edu/diversity/ddce/ssd/providing.php#SYLLABUS

[2] Gretchen Ritter, Vice Provost for Undergraduate Education and Faculty Governance, Memo dated May 10 2010 to faculty

Course Schedule

Sessions	Dates	Important Events
1. Introduction to Operations Management: Operations & Supply Strategy	8/29/2012 W	
2. Production Processes	9/05/2012 W	
3. Benihana of Tokyo	9/10/2012 M	
Process Analysis Fundamentals		
4. Kristen's Cookies Co. 1	9/12/2012 W	
5. Kristen's Cookies Co. 2	9/17/2012 M	**HW 1 Due**
6. Donner Co. Case	9/19/2012W	**HW 2 Due**
7. Project Management I	9/24/2012 M	
8. Project Management II	9/26/2012 W	**HW 3 Due**
9. Project Management III	10/01/2012 M	**HW 4 Due**
10. Review Session	10/03/2012 W	
11. First Midterm Exam	10/08/2012 M	**Exam**
12. Service Processes	10/10/2012 W	
Managing Demand Uncertainty		
13. Waiting Lines	10/15/2012 M	
14. First City National Bank Case	10/17/2012 W	**HW 5 Due**
15. Supply Chain Strategy (case TBA)	10/22/2012 M	
16. Inventory & Logistics 1: Single Period Model	10/24/2012 W	
17. Inventory & Logistics 2: Multiperiod FOQ Model (Xenon Case)	10/29/2012 M	**HW 6 Due**
18. Inventory & Logistics 3: Multiperiod FOQ Model & Safety Stock	10/31/2012 W	
19. Discussion of the book The Goal	11/05/2012 M	
20. Playing the Beer Game[3]	**11/06/2012 T**	
21. Beer Game discussion	11/07/2012 W	**HW 7 Due**
22. Review Session	11/12/2012 M	
23. Second Midterm Exam	11/14/2012W	**Exam**
Managing Process Capability		
24. Quality Management 1	11/19/2012 M	
25. Quality Management 2	11/26/2012 M	
26. Quality Management 3	11/28/2012 W	
27. Quality Management Wrap Up and Debrief of Game	12/03/2012 M	**Group assignment due**
28.Wrap Up & Final Exam Review	12/05/2012 W	**HW 8 due**
Final Exam	**TBA**	**Exam**

[3] **The beer game will be played during a special evening session on Tuesday** 11/06/2012 from 5 PM to 7 PM. **If you are unable to make it due to a schedule conflict please let me know before September 15.**

MODULE 1: Introduction to Operating Systems: Process Design and Analysis

SESSION 1: INTRODUCTION - OPERATIONS AS A SOURCE OF COMPETITIVE ADVANTAGE

Concepts: The link between business and operations strategy, operating decisions and profitability.

Class Plan:

In this session we discuss the course contents and other details. The main themes in this session are: What are business processes, how operations management involves the design, planning, and management of business processes, and how operations are a source of competitive advantage for a firm.

1. Read Chapter 1 of JCA
2. Begin reading "The Goal" by E.M. Goldratt (Read the first 110 pages before first midterm examination. Rest should be completed before Session 19.)

SESSION 2: PRODUCTION PROCESSES

Class Plan:

In this session we discuss different types of production processes and how volume and variety dictate the choice of these processes.

1. Read Chapter 6 of the JCA textbook up to p. 167 skim through rest. Skim Chapter 6A up to page 196.
2. View the Product-Process Matrix video in the student CD prior to class.
3. **Plant Tours**
   In this class, we will study different types of operating processes and discuss their suitability for manufacturing various products. Some of these processes and products are illustrated in virtual PLANT TOURS accessible by visiting: http://www.mhhe.com/omc/tours-frames.htm

   You may browse a few of these to further understand the types of operating processes.

   Recommended tours are:
   Job shop:
   Stickley furniture http://www.stickley.com/

   Continuous flow process:
   Hershey's http://www.hersheys.com/discover/tour_video.asp

   Assembly line process:
   Toyota Motor Company http://www.toyotageorgetown.com/vtour/vtour.asp
   BMW http://www.bmwusfactory.com/#/manufacturing/

4. **a)** What would you expect to be the key elements of each company's business strategy?
   b) What is your assessment of the fit between each company's business strategy and its operations strategy?
   c) What are the major differences between the operations of the firms?

Question for Discussion: Provide an example of your favorite manufacturing process and explain why you like it!

SESSION 3: Operations Strategy

Prepare the **Benihana of Tokyo case (CB)** (No submission)
Use the following study questions as an aid in analyzing the case.

1. How does the cost structure of a Benihana restaurant compare with that of a typical American restaurant? How does Benihana get its competitive advantage?
2. Describe Benihana as an operating system.
3. How does the operating system support the Benihana concept?
4. Which parameters of the operating system influence the profitability of a Benihana Restaurant?
5. What is the proper relationship between the number of tables in the dining room and number of seats in the bar? Assume they want the average customer to stay 24 minutes in the bar. Explain.

Read Chapter 2 of JCA. *We will not be assigning or testing productivity calculations but only discussing the concept.*

Question for Discussion: Do firms have to be concerned about productivity in determining their Operations Strategy? Explain.

SESSION 4: PROCESS ANALYSIS: PROCESS CAPACITY AND PROCESS COST, FLOW TIME

Concepts and techniques: Process charting, capacity calculations, bottleneck, throughput time calculations, work assignment, Gantt charts, product costing, and process improvement.

Class Plan:
In this and the next session, we learn to analyze a business process in detail. The objectives of the analysis are: identify the process capacity, process cost, and time to serve customers. Additionally, understand how to execute orders, schedule labor, and identify bottlenecks.

1. Read Chapter 5 and skim through Chapter 5A this and next session.
2. Read, analyze and be prepared to discuss the **Kristen's Cookie Company case (p. 135 JCA)** utilizing the six key questions at the end as guides. In particular prepare question 3 below.

3. What are the cycle time, throughput time (flowtime), and capacity of each operation and the whole production system?
4. Review bread making example on p. 121 and solved problem on p. 122 after class. (*Omit the material on Little' Law, we shall cover it in depth later in the course*)

SESSION 5: PROCESS ANALYSIS: PROCESS CAPACITY AND PROCESS COST, FLOW TIME

1. *We shall continue continue our discussion of Kristen's case.*
2. *Please read about Little's law starting p. 118.*
3. *Read the Shouldice Hospital Case (A), page 87 in JCA. Prepare all four questions.*

Homework 1: Draw a Gantt chart for Kristen's operation assuming orders are for two-dozen cookies, orders come every 20 minutes and Kristen's roommate is absent.

SESSION 6: PROCESS ANALYSIS -- THE EFFECTS OF SET-UP TIME ON CAPACITY

Concepts: Set up time, external and internal set up, batch size, effect of product-mix on capacity, order size - cost - due dates. Matching process and firm strategy. Typical problems include problems 2, 3, 4 and 6 on p. 131-132.

Class Plan:

In this class, we study the effect of set-up time on capacity. The **Donner Company (CB)** case will also serve as another example for analyzing processes. The process in this case is quite complex, but we will see that the simple but powerful ideas of capacity management that we have learnt so far, such as, identifying and managing the bottleneck, will prove to be adequate even for managing the most complex processes. I urge you to explore the spreadsheets before class.

1. Read the **Donner Company case (CB)**. Use the EXCEL spreadsheets discussed in the previous class (Donner.xls and Donner1.xls) to analyze and understand the relationships between number of orders (set-ups) in a month, order size, and capacity
2. Use the following study questions as guides in analyzing the case:
    a) Describe Donner as an operating process. To simplify this task, consider only the flow of the most important output.
    b) Assume Donner has to process 60 orders in a certain month. What is the capacity (in terms of the number of boards) of each operation and of the entire system?
    c) What factors influence the capacity of the entire system? What is the current utilization of the machines?
    d) What was the efficiency of Donner?

What are the causes of the major problems described at the end of the case? How would you propose to resolve them?

e) Read Chapter 4 up to p. 78. Skim through Chapter 4A.
f) View the "Louisville Slugger Aluminum Bats – Plant Tour" video in the Student CD to get an idea of a batch process which is similar to Donner

Homework 2: Use the Donner and Donner 1 spreadsheets in Blackboard. Submit three things: (a) A graph showing how capacity varies with the order size and how the bottleneck resource changes with the order size. (b)) A graph showing how capacity varies with the number of orders and how the bottleneck resource changes with the number of orders. (c) Comment on your finding (max 1 page).

Question for Discussion: Would learning curve concept apply to Donner Co.? Explain.

SESSION 7: TIME BASED COMPETITION: PROJECT MANAGEMENT I

Concepts: Critical time, planning and control issues for projects, work breakdown structure (WBS), drawing project networks, cost-time analysis.

Class Plan:

Competing based on time means being able to execute large projects on time and within cost. In this session we first discuss the value of time-based competition.

Then, in this and the next two sessions, we learn about network techniques for planning and managing large projects. Successful project management involves planning and managing the time to complete the project, monitoring the use of resources during project execution, and increasing the probability of successful completion. Network planning and control techniques provide the tools necessary for undertaking these tasks.

1. Read Chapter 10 JCA up to p. 351. Typical problems are 3 and 4 end of chapter.
2. Skim through chapter 3 of JCA in the next week.
3. View the Project Management at Six Flags video in the student CD.

Question for Discussion: When is a project said to be successful? What are the critical factors for successful project management? Give examples. You may like to look back on the Internet boom as well as some successful (non-military) projects in recent years (conversion from tokens to metro cards in NY City, introduction of the IPad, the Volt). Would you say these metrics depend on the nature of the project? What are common to them?

SESSION 8: PROJECT MANAGEMENT II

Class Plan:
We will discuss project crashing. We will learn why it is sometimes beneficial to reduce the duration of a project, even though it may increase the cost of the project. We will discuss project crashing techniques that optimally reduce the duration of a project by selectively reducing the duration of only certain activities.

1. Read Chapter 10 p. 354-357 JCA. Typical problems are 5, 9 and 11.
2. Read, analyze and be prepared to discuss the project management network cases (exercises): FCN (B), FCN (C), **Specialty Contractors**, and **Aerospace Components** (all under Blackboard).

Related Links:
Please visit the website of Microsoft to see examples of the state-of-art network planning tools called Microsoft Project Manager.

Homework 3: **Submit**: The network for the **Campus Wedding (A)** case on p. 371. Make suitable assumptions to draw the network. Use activity on node representation. CPM calculations are not necessary.

SESSION 9: PROJECT MANAGEMENT III

Class Plan:
We will discuss project planning when activity durations are uncertain (read p. 351-354 JCA). We will briefly discuss project control issues. Typical problems are 6 and 7.

If time permits, we will briefly touch upon product design issues. Skim through Chapter 3.

Homework 4: **Submit** an analysis and solution to the Specialty Contractors (Blackboard) case.

SESSION 10: REVIEW FOR EXAM

SESSION 11: FIRST MIDTERM EXAMINATION COVERING MATERIAL FROM SESSIONS 1 TO 10

MODULE 2: Managing Demand Uncertainty

SESSION 12: SERVICE PROCESSES

Read chapter 7 JCA. What is a typical service process? Examine one you know and decide what type of process it is. Does its type determine different aspects of its operating systems? Which ones? Do you see an example of service guarantee, poka-yoke (failsafing), service blueprinting and line of vision application in it?

1. Read the caselet and view the interviews of Meru Cab located at ….
2. View the Service System Design Matrix featuring Noodles & Co in the student CD.
3. *Skim through the two short caselets at the end of the chapter (page 235-236 JCA).*

SESSION 13: THE EFFECTS OF DEMAND UNCERTAINTY- WAITING LINES

Concepts: Matching demand and supply, service level in service systems, cost-service tradeoff in waiting lines, queueing formulae -- averages and distribution of number of customers in system and time spent in the system, revisit Little' Law (I = RT law).

Class Plan:
Recall Pete's people who were trying to beat the robot? Demand and supply often do not match. The mismatch creates special problems for managers. To understand these problems it is important to understand the time-scale at which these uncertainties happen. Very long and gradual changes in demand can be dealt with using techniques for managing seasonal demand. Medium term uncertainties, such as day-to-day fluctuations in demand levels, can be dealt with using staffing solutions and overtime. Demand uncertainties on the *same* time scale as operational variables such as processing time or set-up time need special techniques. These techniques are called waiting line or queueuing techniques. We learn a bit about the other two and lot more about the waiting line techniques in this and the next session.

Regarding waiting lines, we learn: why uncertainties in processing times as well as arrival patterns create delays? These delays result in to queues. We learn why queues form? How to estimate the queueing delays? How to plan for extra capacity to reduce unwanted delays? And how to reduce uncertainty?

1. Read chapter 7A JCA. We shall cover models 1 and 3. See examples, 7A1 and 7A3. We will be using a different but equivalent queueing table in class notes.
2. View the Queueing video featuring Disney World in the student CD.

Question for Discussion: What happens when demand and supply do not equal one another? What do firms do? What do customers expect? Give examples.

SESSION 14: THE EFFECT OF DEMAND UNCERTAINTY -- WAITING LINE THEORY IN ACTION

Concepts: Design of services -- queueing systems, staffing, scheduling, psychology of queues.

Class Plan:
We apply service process design and waiting line techniques to analyze the **First City National Bank** case (Blackboard). In particular, we discuss whether (single) S-line is better than one line per server, whether and when specialization using

dedicated servers is preferred, as well as, several psychological factors that affect the perception of "waiting" in lines.

1. Read, analyze, and be prepared to discuss the **First City National Bank case (blackboard).** The following study questions will help:
   a) Considering the data 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?
   d) Calculate the waiting time for a customer (time spent in the queue before service) and determine which of the two line configurations you would recommend. Support your result with the appropriate quantitative queuing analysis.
   e) What qualitative factors will you consider in making the final decision?

Homework 5: This homework has two parts. (i) **Submit** the solutions to problems assigned in class. (ii) Answer question 1 a) above for the First City National Bank case.

SESSION 15: INTRODUCTION TO SUPPLY CHAIN MANAGEMENT

In this and the next three sessions, we discuss inventory management and more broadly *supply chain management*. Material, information and funds flow through *supply chains*. Demand is matched with supply, orders with fulfillment, and products are planned to fill customer needs and to compete against other products in the market. The integrated management of the three flows, material, information, and funds, is called supply chain management. We learn how firms compete using new principles of supply chains. We also learn how inventory, one of the fundamental levers for managing supply chains, can be analyzed and managed.

Case**:** Read the note on Retail Operations in India located at …
Consider the following questions for discussion especially the italicized question:

1. What policy measures should India enact for allowing retailers such as Walmart to enter and operate in India?
2. Skim Chapter 11 in JCA.
3. View either the Fedex or the DHL video in the student CD.

Question for Discussion: Does it make sense to source products from the Far East from a Supply Chain Management perspective? Give examples to establish your point.

SESSION 16: INVENTORY AND LOGISTICS 1: SINGLE PERIOD MODEL

Concepts: Inventory metrics for the single period model. Newsvendor model.

Class Plan:

In this session we explore how to order seasonal products.

Class Plan:

1. Read Chapter 17 in JCA up to p. 565 and also pages 575 to 581. Sample problem solved problem 1, end of chapter problems 1 and 2.
2. View the "Service Processing at BuyCostumes.com" video in the student CD

Question for Discussion: What are the operational challenges and opportunities faced by Walmart or HEB? How do these relate to supply chain management? Are these different for a retailer such as Gap or Circuit City?

SESSION 17: INVENTORY AND LOGISTICS 2: MULTI-PERIOD MODEL FIXED ORDER QUANTITY MODEL

Concepts: Inventory metrics for multi-period. Economic Order Quantity. Impact of scale on inventory performance.

1. Read p. 565-569. Example, solved problem 2.
2. View the "Ford – Total Supply Chain management" **video in the student CD**

Class Plan:

In this session we discuss the economic order quantity model and quantity discounts.

Homework 6: **Submit** the solutions to inventory problem set assigned in class.

SESSION 18: INVENTORY AND LOGISTICS 3: MULTI-PERIOD MODEL – SAFETY STOCK FOR THE FIXED ORDER QUANTITY MODEL

Concepts: Understand safety stock calculations. Understand the service level metrics for inventory systems.

1. Read p. 569- 573. Typical problem – solved problem 3.

Class Plan:

1. In this class we will continue to discuss the fixed order quantity model when there is demand uncertainty.

SESSION 19: DISCUSS THE BOOK "THE GOAL"

We will discuss the learning points from the book "The Goal" in this session. Please review your notes on the book and come to class with your questions and comments.

I plan to assign the group assignment in this class. Please take note!

SESSION 20: INVENTORY & LOGISTICS IN ACTION: THE BEER GAME
Venue to be announced. *Evening session 5-7 pm*. Out side regular class schedule!!

PLEASE BE A FEW MINUTES BEFORE TIME!!

Related Links:
What is systems dynamics? http://www.albany.edu/cpr/sds/

SESSION 21: DEBRIEFING THE BEER GAME.

Class Plan:

We will discuss the beer game results and how firms manage to play the game in practice. We will briefly review the material for the midterm examination.

Please read chapter 11 of JCA again.

Homework 7: **Submit** the solutions to inventory problem set 2 assigned in class.

SESSION 22: REVIEW SESSION

SESSION 23: SECOND MIDTERM EXAMINATION COVERING MATERIAL FROM SESSIONS 12 TO 21

MODULE 3 Managing Process Capability

SESSION 24: QUALITY MANAGEMENT - DEFINITION

Concepts: Quality its definition, analysis, planning and control. Type I and Type II errors, process control and process capability, Six Sigma quality.

Class Plan:
In this session we discuss quality management in the context of the **Ford-Firestone case**. The objectives of the session are to understand what is quality,

what are the costs associated with it, and raise questions about managing quality in the age of mass production. These questions will be answered in the next three sessions.

1. Read the **Ford-Firestone case** (Blackboard) as well as the recent Toyota Recall issues. Be prepared to discuss it. In particular attempt question 2 below to determine what was the true cause of the problem in the Ford-Firestone case?
2. Prepare a *Fishbone Diagram* of the problem.
3. Read Chapter 9 of JCA.
4. View the "Ford – Supplier Relationships" video in the student CD

Question for discussion: What are your views on the Toyota Brake Pedal Recall. How does it compare with other product recalls? Are product recalls inevitable? Can the society do something about them?

SESSION 25 & 26: QUALITY MANAGEMENT -Introduction to Statistical Process Control

Class Plan: In these sessions we learn about statistical process control. We discuss how statistical process control techniques are used in many different industries.

1. Read Chapter 9A in JCA. Carefully up to p. 321. Skim 322-324.
2. View Six Sigma at Caterpillar in the student CD.

Question for discussion: What service industries will most benefit from the use of statistical process control? ISO 9000? Give examples.

Related Links:
Visit the American Quality Control Society's website: http://www.asq.org

SESSION 27: Quality Management Conclusions & Debrief of OPT Exercise

SESSION 28: FINAL EXAM REVIEW