

# Business 351

## Operations Management

### Course Syllabus

### Spring, 2002

**Course Instructor:** Steve Walton, Ph.D.

**Course Times:** 8:15 AM – 9:30 AM, MW  
1:00 PM – 2:15 PM, MW

#### **Required Course Text:**

Markland, Vickery and Davis, *Operations Management: Concepts in Manufacturing and Services*, 2<sup>nd</sup> ed., South-Western Publishing, 1998.

Goldratt and Cox, *The Goal: A Process of Ongoing Improvement*, Second Revised Edition, North River Press, 1992.

#### **Course Description**

It doesn't matter if you are an e-entrepreneur, an accountant, an analyst on Wall Street, a lawyer, a partner at McKinsey or a manager at IBM, how you do your work is an important issue. This class examines the issues of managing operations, both in services and manufacturing. We will study the topics of adding value from a customer's perspective, managing the quality of the work done, forecasting demand for services and products, all within the framework of supporting the organization's corporate strategy. The course will also introduce a set of general-purpose analytical tools that can be used in almost any context. Many of the relationships highlighted in *The Goal* will be emphasized in the class.

#### **Course Objectives**

This course has several objectives. These are:

1. To help the student explore the significant role of operations in any type of organization and job.
2. To provide the student with a working knowledge of the operations function.
3. To allow the student to examine and explore the relationship between operations and the other functional areas of the firm.
4. To give the student a working knowledge of the tools and techniques of operations management.
5. To provide a basic set of information for the student who is interested in a career in operations as a foundation for future coursework.

#### **Homework**

Homework sets are assigned frequently. These are intended to help you become more familiar with the application of the concepts covered in this course, and prepare you for the exams. The homework assignments may be discussed with classmates, and answers will be posted.

I will not collect the homework sets. On the day the homework is "due", I will give a short quiz to assess your understanding of the material.

#### **Office Hours**

My office is GBS 416. I will hold office hours on Monday and Wednesday from 3:00 PM to 4:00 PM. Other times are available by appointment. You can call the office, come by or send me email to set up a time to get together. I am usually in the office. Feel free to stop by if you have a question. If I can, I will

work with you when you come by. Otherwise we will set up a time convenient to both of us. Please do not call me at home unless it is an emergency.

### **Pre-requisites**

Everyone in the class should have completed the pre-requisites of the degree program. A working understanding of a PC and spreadsheet application is required.

### **Class Procedure**

The procedures followed in this class will be similar to those followed in other Business courses. The primary method of instruction is lecture with student participation, including in-class group work. We will use class time to further develop the material from the chapters, not review it. Hence, it is to your advantage to read the chapters before class.

FirstClass will be the main method of communication of assignments and other course-related material.

### **Examinations**

There will be one midterm and a final exam. The midterm will cover about half of the material and is scheduled to take 75 minutes. The final will be given at the time set by the Registrar's office. It will be cumulative.

Exceptions to the policy of taking the final at the time scheduled are rare. One common reason I hear every semester that I will not accept to move the final for a student is a plane ticket home.

### **Final Course Grades**

I will not email final grades to students individually when the semester ends. If you want your grade before the registrar sends them, you can leave a self-addressed stamped envelope with me the week of the final exam.

### **Group Projects**

The group assignment will be to select a company in the area and analyze the role of its operations in supporting the company's competitive strategy. Groups, in consultation with me, will select a manufacturing or service company to study. The groups are responsible for securing the participation of the company. Further details of this project will be given in class in early February. In the mean time, there are some comments about the projects included in the syllabus after the details on course topics.

Groups will be six members. Because your grade on this assignment depends on the quality of the whole group, I encourage you to start planning early on who you want in your group. In about three week, I will ask for a list of the group members. I will assign anyone not in a group at that time to a group.

Group project presentations will take place on April 23 - 26 in the evening. *Plan now for these dates.*

### **MBA Leadweek**

The MBA Leadweek runs for the first full week of this semester. I am facilitating a module on Supply Chain Management that has significant corporate support that requires my presence. This quirk of scheduling means that we will not meet on Jan 22 and Jan 24. The makeup time for these sessions is the evening sessions.

*Plan now for these dates.*

### **Attendance**

Attendance is expected, and will be tracked daily using a sign-in sheet. Since this class meets fewer than 30 times, missing more than 5 sessions is considered excessive and will adversely affect your final course grade. In addition, poor attendance explicitly affects your class participation score.

If you miss class, I expect you to get the notes and be familiar with the material by the next class. You are responsible for all material covered in class during your absence, including new assignments. Additionally, material not in the text will be presented in class. This material will be included in the exams.

## **Class Participation**

Class participation will be monitored throughout the semester. Attendance is one portion of class participation, as is contribution during class meetings. However, perfect attendance will earn you no more than a “C” for participation. You must contribute to the class.

Positive participation is any action that advances the in-class discussion, including asking questions, answering questions, offering examples from your personal experience, etc. Negative participation is any activity that disrupts class discussion, including chatting with a friend during class time, interrupting a classmate, etc. Failure to positively contribute in the class will definitely lower your final grade.

## **Extra Credit**

There are four opportunities of extra credit throughout the semester. No other extra credit aside from these opportunities will be offered. The extra credit points will be added to a homework assignment; the point value for each extra credit will vary.

## **Grading**

Midterm Exam	20%
Final Exam	30%
Group Projects	20%
Homework	10%
<u>The Goal</u> Report	10%
Class Participation	10%
	<hr/>
	100%

## **Other Issues**

As you are about to enter the professional world, your work should be of professional quality. Hence, presentation matters. The following guidelines will help you understand my expectations as prepare your assignments.

1. Use a word processor for writing assignments.
2. Use a pencil or pen for problems, but make sure the work is legible.
3. Staple multiple pages together. *Please do not dog-ear them, paper clip them, binder clip them or put them in plastic covers.*
4. Proofread your work carefully. Three language errors incurs a letter grade penalty.

All assignments are due at the *beginning of the class* (i.e., when I start lecturing). Late work will be penalized one letter grade if turned in the same day it is due. Assignments will not be accepted after the day they are due.

Finally, there is one thing that I think represents the antithesis of why we are here, academic dishonesty. For most of you this need not be said, but I want to make sure everyone understands my position. I take the issue of cheating on quizzes, tests, case analyses or any other work very seriously and will pursue any violation of the honor code according to the University’s policies. If you are unsure of this policy or need clarification on it please take the time to talk to me.

### Tentative Schedule

<b>Topic</b>	<b>Date</b>	<b>Topic</b>	<b>Chapter</b>	<b>Homework</b>
1	Jan 17	Course Introduction	--	
--	Jan 22	<i>No Class.</i>	--	
--	Jan 24	<i>No Class.</i>	--	
2	Jan 29	Operations Strategy	1	
2	Jan 31	Operations Strategy (cont.)	2, 3	
2	Feb 5	Operations Strategy (cont.)	2, 3	
2	Feb 7	Operations Strategy (cont.)	3	
3	Feb 12	Forecasting, AM and PM Section 0: 4:00 – 5:15 Section 1: 6:00 – 7:15	4	
3	Feb 14	Process Planning and Design	5	<i>Set A due</i>
4	Feb 19	Quality Management	7	
5	Feb 21	Quality Management (cont.)	7	
5	Feb 26	Quality Control	19	
6	Feb 28	Quality Control (cont.) <i>Exam Review Session, 6:30 PM, Auditorium</i>	19	<i>Set B due</i>
6	Mar 5	Quality Control (cont.)	19	
--	Mar 7	<b>Exam #1</b>	--	
--	Mar 12	<b>Spring Break</b>	--	
--	Mar 14	<b>Spring Break</b>	--	
7	Mar 19	Long-term Capacity	6	<i>The Goal report due</i>
8	Mar 21	Short-term Capacity	NA	
9	Mar 26	Supply Chain Management	10	
10	Mar 28	Operations Planning	11	
10	Apr 2	Operations Planning (cont.)	11	
10/11	Apr 4	Operations Planning, comments on <i>The Goal</i>	11	<i>Set C due</i>
11	Apr 9	Independent Demand (cont.)	12	
11	Apr 11	Independent Demand (cont.)	12	
12	Apr 16	Dependent Demand	13	
12	Apr 18	Dependent Demand (cont.)	13	<i>Set D due</i>
13	Apr 23	Just-in-Time Section 0 presentations, 4:00 – 5:15 and 5:30 – 6:45	16	<i>Projects due at the start of class</i>
--	Apr 24 (Tuesday)	Section 1 presentations, 4:00 – 5:15 and 5:30 – 6:45	--	
14	Apr 25	Project Management Section 1 presentations, 4:00 – 5:15 and 5:30 – 6:45	18	
--	Apr 26 (Thursday)	Section 0 presentations, 4:00 – 5:15 and 5:30 – 6:45	--	
--	Apr 30	Conclusion and Review	--	
--	May 9	<b>Final Exams, TBA</b>		



## Details on Topics

### Topic 1 - Introduction

We will talk about the structure of the course, including expectations and evaluations. We will then briefly discuss some of the initiatives companies are executing and issues they face. For example, the implications of poor operations to eToys over Christmas and how Dell manages to successfully sell, and deliver, computers online.

### Topic 2 - Operations Strategy, Four Lectures

There are several ways to classify companies' operations, including size of the market served, the customization of the product required by the customer, whether it's a service or manufacturing company, the trajectory of sales and profitability. These sessions provide the overarching strategic framework and basic definitions that will be used throughout the semester.

### Learning Objectives:

#### Know the pieces:

1. Define Operations Management (OM). Show graphically how a series of companies form an integrated supply chain. Be able to list inputs, processes, outputs and customers for an example manufacturer and an example service.
2. Explain the importance of the customer to business. Describe the role of the Japanese automakers in demonstrating the importance of customer focus to American business.
3. List the five trends that have made OM more important now than in the past.
4. List at least six characteristics that make service companies different from manufacturing companies.
5. Explain each of the components of Corporate Strategy (i.e., mission, external environmental scanning, distinctive competencies, generic strategies).
6. Draw the product lifecycle. Identify characteristics, such as price, margins and cost structure, for companies in each stage of the lifecycle.
7. Explain the importance of new product development to a company and the relevance of compressed lifecycles to the importance of new product development. Explain concurrent design and its relevance to product cost, manufacturability and environmental impact.
8. Describe the entry and exit strategies of an organization based on their generic strategy.
9. Draw the Service Process Matrix. Explain each axis. List services in each of the four cells.
10. Draw and explain the product/process matrix. Be able to describe in detail characteristics of each process (e.g., labor skill level, equipment type, placement of inventory, lotsize, etc.).
11. Conduct a lifecycle analysis.
12. Explain the use of breakeven analysis and preference matrix analysis. Include issues such as precision of the estimates, nature of the data and the type of decisions you might use each tool for.
13. Explain the competitive priorities. Include the idea of order winners and order qualifiers. Be able to give examples from both manufacturing and services. As well, be able to integrate the other dimensions of quality into your discussion (e.g., empathy and tangibles).
14. Explain value from the customer's perspective. Explain why it is external, while competitive priorities are internal. Describe the relationship between value and competitive priorities.
15. Use the product/process matrix to demonstrate what a mismatch looks like.
16. Be able to describe how a mismatch arises, how to use product profiling to detect the mismatch and what to do about a mismatch.
17. Apply the product/process matrix to a manufacturing company and a service company.
18. Apply the service/process matrix to a manufacturing company and a service company. The issue of total product experience is key here.
19. Apply the product lifecycle to a manufacturing company and a service company.

#### Do the math:

1. Be able to calculate breakeven quantities for any two functions (i.e., revenue versus cost, or cost of option one versus cost of option two).
2. Demonstrate that the equation of  $F/(p-c)$  is equivalent to setting the revenue function equal to the total cost function.
3. Be able to calculate total weighted scores for a preference matrix. Be able to explain the analogy of probabilities to the weights. Be able to explain where the weights come from.

#### Put the pieces together:

1. Describe the "big picture" of why operations management decisions must be consistent with corporate strategy. Describe the role of operations in achieving strategy.

2. Show how the product/process matrix, the service process matrix and the product lifecycle fit together. Be able to integrate all of the issues together (e.g., prices, margins, equipment, customization, etc.). Include the discussion of appropriate competitive priorities in your answer.
3. Use the Service Process Matrix along with the differences between manufacturers and services to show how companies in different cells of the Service Process Matrix approach their operations differently.
4. Use the Service Process Matrix to show how a company might select its generic strategy.
5. Show how the stage of the product lifecycle might provide insight into which generic strategy a company might choose.
6. Use the tools from this module to explain the relevance of operations to Amazon.com, Dell, McKinsey Consultancy, Delta Airlines and the GM Plant in Doraville. *Be specific.*

### Topic 3 - Forecasting, Two Lectures

From the beginning of a business concept to mass marketing of the product or service, forecasting is a critical task. One might forecast technological change (ask Barnes and Noble about this one), political change, interest rates, cash flows or even something so mundane as demand for a product next year or next month. These sessions look at the difference between qualitative and quantitative forecasts. We will develop several forecasting tools of both types.

#### Learning Objectives:

##### Know the pieces:

1. Explain why forecasting is important. Refer to the costs and benefits of forecasting versus not forecasting.
2. Explain the differences between qualitative and quantitative forecasts, including when each is more appropriate. Be able to give at least three examples of each type.
3. Explain the difference between time-series and causal forecasts.
4. Graph the five components of demand, including appropriate axis labels. For each forecast method, be able to say which components the method deals with.
5. Explain why you always round up when forecasting.
6. Demonstrate that the simple moving average is a special case of the weighted moving average. Also explain the similarities between the weights and  $\alpha$ .
7. Demonstrate that exponential smoothing really does maintain all old data.
8. Discuss the trade-offs associated with stable versus responsive forecasts. Explain what would cause a manager to prefer stable versus responsive. Be able to graph stable versus responsive and be able to explain how to make each time series method stable or responsive (e.g.,  $\alpha < .5$  is stable).
9. Explain why measures of forecast error are important. This discussion should include descriptions of the three measures of forecast error we talked about, including the strengths of each. Also explain how you might use them.
10. Distinguish causal regression from time-series regression. In both instances, be able to take the output from an Excel spreadsheet regression analysis and interpret it. This includes, p values,  $R^2$ , F tests, coefficients, equations of the line, and forecast for some level of the independent variable.

##### Do the math:

1. Calculate a simple and weighted moving average of length  $n$ .
2. Calculate an exponentially smoothed forecast with  $\alpha = n$ .
3. Calculate MAD, MSE and RSFE.

##### Put the pieces together:

1. Explain how the different types of forecasting techniques (i.e., qualitative and quantitative) should be used together in an organization. The discussion should focus on the need for long-term, non-numeric forecasts and the need for short-term operational forecasts.
2. Explain the importance of the stage of the lifecycle in choosing a stable versus responsive forecasting technique.

### Topic 4 - Process Planning and Design, One Lecture

Four key characteristics drive the decision of process design. This session provides an overview of process planning and a quick tour of business process reengineering, with appropriate warnings for what BPR is not and how to be sure to fail at it.

#### Learning Objectives:

##### Know the pieces:

1. Explain the four process design decisions and the relationship between the four of them.



2. Define business process reengineering and why it has become a major business trend. Include in this discussion the main characteristics of BPR. Contrast this with “how to fail” at reengineering.

**Do the math:**

1. Be able to do a breakeven analysis with up to four functions.

**Put the pieces together:**

2. Explain the interaction between the four process design decisions and the product/process matrix.
3. Explain the interaction between the four process design decisions and the service/process matrix.
4. Explain the interaction between the four process design decisions and the product lifecycle.
5. Explain the interaction between the four process design decisions and product profiling.
6. Explain the relationship between success in BPR and competitive priorities, and between success in BPR and value from the customer’s perspective.

**Topic 5- Quality Management, Two Lectures**

In the mid-1980s Japanese automakers dramatically demonstrated the importance of product quality to American business. Since then, companies have been trying to understand Deming’s 14 points, TQM, The Baldrige Award, ISO 9000, Six Sigma and many other quality initiatives. These sessions describe these initiatives and how they work in practice.

**Learning Objectives:**

**Know the pieces:**

1. Give at least two definitions of quality.
2. Know the underlying philosophies of Deming, Juran, Crosby and Ishikawa. Explain similarities and differences between the four of them. The discussion should include a list of Ishikawa’s seven statistical tools and how they fit together.
3. Graph the two competing views of the cost of quality. Locate AQL on the graphs. Describe the actions that each graph leads to, from a quality management perspective. You should be able to give examples of both types of failure costs, prevention costs and appraisal costs.
4. Explain how “yield loss” supports Crosby’s view of it is cheaper to do it right the first time.
5. Explain the relevance of the Baldrige Award, ISO 9000, ISO 14000 and supplier certification. Include a discussion of the pros and cons of each.
6. Explain the main characteristics of TQM, including its main weakness.
7. Describe how Six Sigma, as a philosophy, extends TQM. Explain the relevance of top level indicators and how they relate to process improvement.

**Do the math:**

1. Be able to conduct a Pareto analysis, construct a scatterplot, a frequency histogram, a fishbone diagram, a check sheet and a process map.
2. Be able to calculate yield loss.

**Put the pieces together:**

1. Explain how the topics from Quality Management fit with my assertion that conformance is an order qualifier for every process.
2. Discuss whether any of the recent quality initiatives (Baldrige, ISO 9000, ISO 14000, etc.) are more appropriate for firms in maturity or in introduction. Include competitive priorities in your discussion.

**Topic 6 - Quality Control, Three Lectures**

Whether you are monitoring calls to a credit card company, tracking the variability in a stock or measuring the thickness of a piece of titanium being used on the wing of a Boeing 747, determining when something has changed is critical. This requires being able to discern random noise from a real shift in how a thing works. These sessions examine how to monitor the three main types of process data so you can spot these shifts.

**Learning Objectives:**

**Know the pieces:**

1. Define the two types of variation a company faces. Give an example of both from a manufacturing and service business.
2. Distinguish between variable, attribute and counting data. Give an example of each from a manufacturing and service business.
3. Describe the costs and benefits of complete inspection versus random sampling.
4. Identify the 4 ways to determine out of control. Relate these to the appearance of a normal curve.
5. Explain why “in control” is a different concept than “capable” and how  $C_p$  can be used to determine capability.

6. Demonstrate how Six Sigma as a mathematical approach changes the structure of an X-bar chart.
7. Describe how Six Sigma as a mathematical approach adapts to the inevitable drift of process means in the long term.

**Do the math:**

1. Be able to construct each of the four control charts discussed in class.
2. Be able to calculate  $C_p$  and  $C_{pk}$ .

**Put the pieces together:**

1. Explain how driving toward Six Sigma supports the competitive priorities of an organization.
2. Relate the concept of Six Sigma to the law of diminishing marginal returns.
3. Create a 2x2 matrix of capability and control. Explain each cell.

**Topics 7 and 8 - Long- and Short-term Capacity Planning, Two Lectures**

Because capacity, broadly speaking, is a company's ability to do work, managing capacity in large measure can determine the profitability of an organization (ask General Motors about what the early-1990s were like). Once long-term capacity plans are developed, short-term plans must be devised that allow an organization to meet its demand, while hopefully minimizing cost. It turns out that short-term capacity planning has the added advantage of helping a company locate probable bottlenecks. These lectures explain how to measure and manage capacity in both the long- and short-term.

**Learning Objectives:**

**Know the pieces:**

1. Define capacity and explain the importance of capacity management. This should include a discussion of how a company can change capacity in the short, medium and long term, as well as a discussion of the relevance of the conservative and aggressive capacity strategies.
2. Explain utilization rate and capacity cushions. Be able to tell me the best capacity utilization rate for a company.
3. Explain the differences between preference matrix analysis, breakeven analysis and decision tree analysis. Give an example of the kind of problem you would solve with each technique.
4. Explain how the allowance rate works with the sum of cycle time to get standard time. Be able to define each of these concepts.
5. Explain the relevance of the short-term capacity analysis.

**Do the math:**

1. Calculate a utilization rate, and a capacity cushion.
2. Apply decision trees, preference matrix and breakeven analysis to a capacity decision. Resolve any conflicts between the three analyses.
3. Calculate standard time, and conduct a short term capacity analysis.

**Put the pieces together:**

1. Relate our discussion of capacity to Goldratt's conception of a bottleneck. For example, how does statistical fluctuations coupled with dependent events lead to varying utilization rates over time?

**Topic 9 - Supply Chain Management, One Lecture**

Supply chain management is what has made Dell so successful. By creating links with critical suppliers and actively managing their suppliers, Dell changed the way computers were made and sold. And Michael Dell made a lot of money. Ford and GM both just announced their supply chain e-commerce businesses, which have projected combined sales of as high as \$1 trillion. Given what happened with Amazon and Yahoo, analysts suggest that were GM to spin off its supply chain e-commerce business, it could achieve a significantly higher valuation than the carmaker itself. Supply chain management, for services or manufacturing companies, requires understanding and managing where you get things, what you do with them when you have them and how you get them out of your company. Much of the rest of the semester can be seen as variations on this theme.

**Learning Objectives:**

**Know the pieces:**

1. Explain the three tasks of supply chain management. Describe how supply chain complexity increases as you move beyond first tier suppliers to second and third tier suppliers (i.e., a network view of the supply chain).
2. Describe appropriate criteria for supplier selection and evaluation. Which criterion is most important?
3. Explain how vendor managed inventory systems work and their advantage. Explain how this fits in with other supplier relationship methods.
4. Explain the relevance of a bill of materials and how they help in supply chain management.

**Do the math:**

1. Calculate materials usage based on a bill of materials.
2. Apply Pareto analysis to determine what items require significant management attention.

**Put the pieces together:**

1. Find Grainger's website and evaluate it as a potential portal for supply chain e-commerce. What is Grainger's core business? How will e-commerce help Grainger? Should they feel threatened by Ford and GM?
2. Describe the supply chain issues Amazon.com faces as it tries to expand into new markets (i.e., beyond books and CDs).

**Topic 10 - Operations and Service Planning, Two-and-a-half Lectures**

One major challenge in any business (manufacturing, service or e-biz) is translating the strategic statements of value propositions and product plans into day-to-day actions. The first step is to devise a high-level planning document that looks at demand and capacity over a year-long cycle (usually a year). This "aggregate plan" is then refined until a precise statement of day-to-day activities emerges.

**Learning Objectives:**

**Know the pieces:**

1. Explain how an aggregate plan, whether in manufacturing or services, links corporate strategy to day-to-day operations.
2. Discuss the two extremes of aggregate planning and the costs avoided by each case.
3. Explain how a master schedule relates to an aggregate plan.
4. Explain the importance of available to promise, and the costs associated with changing a master schedule in different time fences.

**Do the math:**

1. Use the tableau approach to set up and solve a simple aggregate plan.
2. Calculate a master schedule, including available to promise.

**Put the pieces together:**

1. Use the results of the tableau approach to provide a detailed description of the aggregate plan, inventory levels, staffing levels and total cost of the plan.
2. Describe the flow of information from corporate strategy down to available to promise.

**Topics 11 and 12 - *The Goal*, Independent and Dependent Demand Inventory, Four-and-a-half Lectures**

Goldratt's book is considered one of the most influential process-oriented books ever written. It is consistently on the "must read" list of business books. Goldratt's focus on constraints represents a very different way to look at the world. It also suggests that the way companies manage their inventory represents an area to save money and achieve new business opportunities. Independent demand items (i.e., end items) have to be dealt with differently from dependent demand items (i.e., components, raw materials and sub-assemblies).

**Learning Objectives:**

**Know the pieces:**

1. Describe the three main themes of *The Goal*. Be able to summarize the material from the report you turned in.
2. Explain how the costs of inventory can be used to determine the optimal ordering quantity (EOQ). This would include both the graph of inventory usage over time and the costs associated with different order sizes.
3. List the four assumptions of EOQ. Show them on the graph of inventory usage over time.
4. Explain how ERL relaxes assumptions of EOQ.
5. Explain how Safety Stock can be used to relax assumptions of EOQ.
6. Explain the underlying logic of MRP.

**Do the math:**

1. Calculate EOQ, ERL, ROP and the cost associated with this policy.
2. Demonstrate that at the optimal order quantity, the total cost of ordering must equal the total cost of inventory.
3. Explode a bill of materials into an MRP record, including projected on-hand and planned order release.

**Put the pieces together:**

1. Relate managing around a constraint to developing corporate strategy.
2. Use lotsizing techniques to determine appropriate lotsizes for MRP.

**Topic 13 - Just-in-Time Management, One Lectures**

Now that you understand how supply chains, aggregate plans and inventory management systems make traditional businesses work, the rules change. Just-in-Time is not simply an inventory management system; it is a larger

philosophy of eliminating waste and uncertainty through continuous improvement. Inventory just happens to be one visible waste. The focus on waste instead of inventory means JIT applies to services and e-biz as well as manufacturing.

### **Learning Objectives:**

#### **Know the pieces:**

1. Explain why JIT is more than an inventory system by using the definition of JIT.
2. Demonstrate the effect this definition has on lotsizes. Be able to do this both in words and graphically.
3. Describe other examples of waste in a company and how these are addressed by JIT.
4. Explain the risks and disadvantages associated with using JIT as a management philosophy.

#### **Do the math:**

There are no new calculations for JIT.

#### **Put the pieces together:**

1. Discuss how JIT enhances competitiveness by relating JIT to the competitive priorities of an organization.
2. Discuss the importance of quality management to the successful application of JIT.
3. Discuss how JIT would be applied to a business like Amazon.com. To a business like Goizueta. To a business like Delta.

### **Topic 14 - Project Management, One Lecture**

Whether it's for a business plan for the next VA Linux (700% pop on its IPO price in December), an implementation plan for the consulting client's project or the plans for your graduation party, you can better control the flow of the interrelated things that have to happen to get the work done. Project management is a tool to decide which set of tasks is most likely to cause the project to be late, with all the financial implications of that.

### **Learning Objectives:**

#### **Know the pieces:**

1. Translate a problem description into a precedence table, and the precedence table into a network diagram.
2. Explain how "dummy" activities can be used to maintain precedence structures.
3. Determine the critical path for a project and explain how one might shorten the duration of a project.

#### **Do the math:**

1. Calculate the early start and early finish for each activity in the network.
2. Calculate the late start and late finish for each activity in the network.
3. Calculate slack for each activity in the network.
4. Determine which activities to crash and how much it will cost to crash a network.

#### **Put the pieces together:**

1. Explain how project management is related to short-term and long-term capacity management.
2. What kinds of organizations would use project management as its production planning mechanism?
3. Explain how project management would make planning a new web business more predictable.

## Informal comments on the readings

1. There is a section in Chapter 1 on “types of manufacturing operations.” This is important stuff.
2. The value chain model presented in Chapter 1 represents one link in a supply chain.
3. I won’t test you on the history stuff in Chapter 1, but as a business student it is something you should know.
4. The trends **IN** Operations Management (pp. 27 – 33) are not the same thing as the trends that **make operations management more important** (what we talked about in class). Both are important issues, but answer very different questions.
5. The list of service characteristics presented in Chapter 2 is more inclusive than what we did in class. Be sure to include the ones in the book that we didn’t talk about in class.
6. Pay attention to the “service-sector trends” section. We didn’t talk about it in class, but it is important.
7. The book only describes 2 generic strategies. I think it is more useful for us to think of four.
8. The book talks about a bunch of competitive priorities on p. 91. You should be able to map these onto the five we talked about in class.
9. The diagram on p. 95. I drew mine slightly differently in class and the difference is critical. Be sure to use the one I did in class.
10. Figure 4.4 might help answer the learning objective about the cost and benefit of forecasting.
11. We didn’t do double exponential smoothing, so skip this section.
12. We didn’t do Quality Functions Deployment, so skip this section.
13. Read carefully and understand the section on “Design for Manufacturability.” We talked around some of these issues in class, but be sure you understand this section. Given what you learned in the section, what is “Design for the Environment”?
14. Notice that the graphs of the costs of quality don’t look quite like the ones we did in class. Look at the horizontal axis; they have scaled it backwards from what we did in class. In other words, in class, the left most part of the graph was 100% defective. In the book, the left most part of the graph is 0% defective.
15. The 8-step process improvement model in chapter 19 should make sense, but I won’t ask you to reproduce the model.
16. Chapter 19 presents a different formula for  $C_p$  on p. 768. It is equivalent to what we did in class.
17. Understand economies of scale and diseconomies of scale. How would each likely relate to flexibility?
18. Look at Table 6.1 (Factors for Location Decisions). Can you see how those might be criteria for a preference matrix analysis? If not, look at Table 6.4. Or could you use breakeven analysis like on p. 237.
19. Read the last half of Chapter 10 in detail (pp. 390-409).
20. Notice that in Figure 11.2, they add corporate strategy. Don’t worry about the mathematical methods to solve a production plan, except the “transportation method” like we did in class. Also, skip the section on Hierarchical Production Planning.
21. Read Chapter 12 up to p. 479.
22. We didn’t do Chapters 14 and 15.

23. Read the section on the “total business cycle” carefully. Particularly, remember that inventory, etc. are just examples of waste and methods to buffer against uncertainty. Don’t make the mistake of assuming that JIT is strictly an inventory control system.
24. When reading Chapter 18, ignore any reference to activity on arc. It is just another representation of a network diagram.
25. Skim the section on uncertain time estimates starting on p. 719.

## *Project requirements*

1. Overall Assignment: Select a company with operations in the Atlanta area. Meet with managers at the company to determine what “opportunities for operations improvement” exist. Use at least three analytic tools from this class to study the problem and make recommendations for improvement.
2. Deliverables: An executive summary of the project (no more than 2 pages), a research report (no more than 10 pages) and a presentation (no more than 10 minutes). The executive summary should clearly tell the manager at the company what you studied and what your recommendations are. The research report should give more detail about how you analyzed the problem. The presentation should be done like a pitch to a management team. In other words assume general knowledge.
3. Issues to make the project easier for you:
  - There will be peer evaluations at the end of the project. They should be turned in with your report. The format of the evaluations is *one* evaluation per team that represents the consensus of the team.
  - Stay away from restaurants and car repair shops. These generally end up being staffing questions.
  - Be sure your project is an operations project and not a marketing or HR project.
  - Be sure you use at least three tools from the class. The problem you study will determine which tools you use, but I would think everyone would use a cause-effect analysis to make sure you are addressing root cause.
  - I don't require that groups meet with me about their projects, but I am available if your group chooses.
  - There are three deadlines, 2/21 - tell me who is in your group. 3/21 - tell me what company you will work with, and an overview of the project. 4/23 - turn in your reports at the beginning of your scheduled class time.
  - There are two main purposes to the presentation, to tell your classmates and me about your project, and to give you the experience of making a pitch. I will ask questions as if I was the manager who hired you as consultants. Think strategically about how you design your pitch.
  - When you design your pitch, use graphics, clip art, sound, whirling things and the like only as they make your pitch better. If you look at a McKinsey pitch, it is done in a simple font, with a plain background, with no clip art, subtle slide transition effects, and relatively few moving parts.
  - I don't require each team member stand up and talk. The allocation of work for this project is a group decision.
  - Please don't use binders or plastic covers for your project report, just a staple.
  - The 10-page requirement is a MAXIMUM. You don't have to turn in 10 pages. Just make sure your project is clear (I'd imagine 6 pages is a practical minimum) The page count does not include appendices.
  - Use bulleted lists, tables and diagrams to increase clarity.
  - I will contact your company representative to evaluate the quality of your work from their perspective.
  - I don't *a priori* assign weights to the three deliverables. I look at the project as a whole; this usually works in the students' best interest.
  - Be very sure that your recommendations follow from your assumptions and analysis. For example, if you analyze the capacity of a company, recommending the company change forecasting methods probably does not follow from your analysis.