

**SCM 7397 (26512): Special Topics in SCM: Process Analysis and Design
Fall 2017**

**C. T. Bauer College of Business, University of Houston;
Department of Decision and Information Sciences**

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Class Time: 6:00-9:00 pm, Monday in CBB 310.
Office Hours: Monday, Tuesday 3:00-5:00 pm, immediately after class, and by appointment

Course Description

This course introduces student to the concepts, issues and techniques used to plan, analyze and control business processes, including both production and service organizations. A special emphasis will be placed on quality leadership and management. We will examine business process from a strategic and operational perspective. Organizations without the means to improve their quality and productivity can rarely keep up with competition. Improvement requires a clear understanding of the business in which the firm competes, how to align its delivery processes such that the company excels on its core competencies, an ability to assess performance, and how to continually improve. The essence of process management is to answer the questions, “How is the process doing?” and “How can it do better?”

The course consists of three Modules. Module 1 explores how firms seek to create and capture value for its stakeholders through their choice of business strategy and operating processes. Module 2 utilizes case study to examine alternative process types in order to understand the techniques and analytics that are most useful for process analysis and design. Module 3 explores quality management, which is how firms design processes that meet customer expectations, insure that they continue to operate as designed, and techniques for process improvement.

Course Objectives

Upon completion of the course, the student will:

1. Understand business processes and how they should be designed to support competitive priorities in both manufacturing and service environments.
2. Be able to flow chart a business process in terms of inputs, outputs, activities, and related decisions
3. Recognize opportunities to significantly improve business performance by designing efficient and effective processes.
4. Benefit from further development of critical thinking skills to recognize, formulate, and analyze operational problems.
5. Be able to use analytical tools and methods to effectively model, measure and compare alternative business processes.
6. Be able to analytically determine a process' capability to meet customer specifications and methods for insuring that the process continues to provide an acceptable product.
7. Understand the basics of Six Sigma and its role in continual process improvement.
8. Be able to establish a quality management plan for a firm.

Required Materials:

1. *Operations and Supply Chain Management The Core*, 4th edition, by F. Robert Jacobs and Richard B. Chase, McGraw-Hill Irwin, 2017. (Note the 3rd Edition will also work.)
2. Harvard Business School case studies: There will be a course page created on Harvard Business Online for you, where you can access the cases required for the course. You will register with Harvard Business Online to get pay for and get access to the cases. The link is below:
<http://cb.hbsp.harvard.edu/cbmp/access/66604388>
3. Lecture notes and handouts will be posted on blackboard throughout the semester.
4. Optional but not required: *Quality is Still Free: Making Quality Certain in Uncertain Times*, by Phil Crosby, McGraw-Hill, 1996. ISBN 9 780070 145320. This book can be purchased on Amazon.Com.

Performance Evaluation

Grade components:

- Exam 1 25%
- Exam 2 25%
- Case Analysis 20%
- Assignments 15%
- In class performance 15%

Information about the Exams/Quizzes

1. Exam Content: The exams will cover all material from lectures, readings, cases and study problems. The exam will be closed book and closed notes. Exam formats will be a balance of multiple-choice, short answer and problems. Exam 2 may also include a take-home component. The student should bring a calculator (no cell phones) to exam.
2. Assignments include homework and quizzes: Periodic homework and quizzes promote student learning. Some quizzes will be announced, while others may not be. Hence, the student should be prepared for a quiz over the material assigned for that day or earlier. Preparing notes on the discussion questions and working assigned problems provides a solid foundation for success on the quizzes.
3. Case Analysis: Each student will be assigned to a team of 3-4 students for case analysis and in-class presentation. Each team will provide a case write up with a maximum length of 5 pages plus exhibits. Line spacing should be 1.5. The team will provide the instructor with an electronic copy of the power point presentation before noon on the day of the presentation so they can be made available to all class members prior to class.
4. In-Class Performance: I view each class as a business meeting during which time we will discuss the assigned material and related topics. During these meetings, I look for evidence of your preparation and understanding of the class material, which can only be exhibited by your in-class contributions. Helping to advance the understanding and learning of your classmates is an important component of in-class performance
5. Make-Up Policy: Exams/quizzes may not be missed at the convenience of the student. If you anticipate missing an exam/quiz due to an approved university absence, inform the instructor (prior to class if possible) by email to schedule a make-up. There will be no make-ups for missed exams/quizzes without a university-approved excuse. Except under unusual circumstances, make-up Exams/Quizzes will be held within 10 days of the original scheduled date.

Other Information

1. **Study Groups:** I strongly encourage students to form study groups for the course.
2. **Blackboard:** Course materials, announcements and grades will be posted on blackboard. You should check blackboard for class announcements prior to attending class each week.
3. **Academic Dishonesty:** Scholastic Dishonesty is defined as (1) Acquiring or attempting to acquire information from others (e.g., observing the work of others during an exam), (2) Providing others with information on quizzes/exams; (3) Plagiarism, (4) Conspiracy to commit any of the above, (5) Fabrication of information. The University of Houston honor code applies to all students in this class. For more information, see Bauer Academic Honesty on <http://www.bauer.uh.edu/current/academic-honesty.asp>. Any student caught providing or receiving assistance on an exam/quiz will immediately be given a grade of “F” for the course. ed) within the classrooms.
4. **Students with Disabilities:** Any student who feels s/he may need an accommodation based on the impact of a disability should contact the professor within the first two weeks of classes to discuss his/her specific needs. The student also needs to contact the Center for Students with Disabilities (contact information is below) within the first two weeks for coordinating accommodations.
5. **Counseling and Psychological Services (CAPS)** can help students who are having difficulties managing stress, adjusting to college, or feeling sad and hopeless. You can reach CAPS (www.uh.edu/caps) by calling 713-743-5454 during and after business hours for routine appointments or if you or someone you know is in crisis. Also, there is no appointment necessary for the “Let's Talk” program, which is a drop-in consultation service at convenient locations and hours around campus. http://www.uh.edu/caps/outreach/lets_talk.html.

I HOPE YOU HAVE A PRODUCTIVE AND ENJOYABLE SEMESTER!

Course Schedule

MODULE 1: OPERATIONS AND SCM STRATEGY

Aug 21 Course Overview: Strategy, Product and Process Matching, Process Flowcharting

- Review: Strategy, Core Competency and Process Choice Review
Understand strategic planning, order winners/qualifiers, competitive dimensions, how processes are organized and product life cycle implications for process design.
- Case Analysis: “Great Nuclear Fizzle at Old B&W”, Fortune Magazine, 1969. (handout)
Discussion Questions: (Prepare prior to class)
 1. Prepare a time line of the major events discussed in the reading.
 2. What went wrong? Why?
- Process Flowcharting
 - Read: Process Fundamentals by A. Gray and J. Leonard (#9-696-023 in HBSP packet)
 - Read: Lecture Notes: Process Analysis and Design
- In class exercise: Kristen’s Cookie Company
Discussion Questions (prepare prior to class)
 1. Prepare a flow chart of the operation.
 2. What is the throughput time to produce:
 - a. An order for one dozen cookies?
 - b. An order of two dozen cookies of the same type.
 - c. Two orders of one dozen cookies of different types?
 3. What is the bottleneck operation of the process?

MODULE 2: MATCHING PRODUCT AND PROCESS DESIGN

Aug 28 Process Analysis: Flow Systems

- Read: “Process Analysis, Curriculum Core”, by Roy Shapiro (# 8007 in HBSP reading packet)
- Case Analysis: “National Cranberry Coop” (#9-688-122 in HBSP reading packet)
Discussion Questions: Be prepared to discuss the following questions in class. To simplify your analysis, assume 18,000 barrels arrive each day, 70 % are wet harvested and the berries arrive at a uniform rate over a 12-hour period.
 1. Prepare a process flowchart for the cooperative.
 2. Determine the maximum daily throughput capacity of the coop.
 3. What alternatives are available to meet the wet berry processing requirements?
 4. What evaluation criteria should be used in selecting an alternative?
 5. What time do trucks start waiting to unload because the storage bins are full?
 6. What recommendations do you have for the coop?

Assignment 1 Due: Turn in your process flowchart for National Cranberry at the start of class. Use Word of another software product to prepare the flowchart. Label the process throughput and storage capacity for each process in your flow chart. Identify the process bottleneck. You may work in pairs to complete this assignment and turn in a single report.

- Lecture: Introduction to Assembly Lines
- Read: Assembly Line Design, pages 180-185, suggested problems 15 & 16 on pages 192-193.

Sept 4 Labor Day No Class

Note: Your course preparation time for this week should focus on AIC Networks which has an assignment due on Sept 11th.

Sept 11 Process Analysis: Assembly Lines and Batch Processes

- Case: AIC Networks: Optimizing Product Assembly (# 4245 in HBS reading packet)

Discussion Questions: Be prepared to discuss the following questions in class.

1. How efficient is netbook assembly at the Kaizhi plant?
 - a. What is the monthly output at the plant?
 - b. What is the theoretical efficiency of the planned line, looking only at direct labor on the assembly line?
 - c. What is the actual efficiency of the assembly line?
2. How effective is the current operation?
 - a. What is the right criteria by which to evaluate it?
 - b. Is the operation designed appropriately to meet demand?
3. What is the financial impact of bringing the operation closer to “full potential” and achieving planned production levels?
 - a. What is the planned production level in terms of monthly output?
 - b. What is the financial impact of achieving the target cycle time?
 - c. How important is reducing direct labor as a means to improve financial performance? (assume each assembly line worker costs \$500 per month)

Assignment 2 Due: Prepare a 1-2 page report to your hypothetical boss detailing your analysis of the efficiency of netbook assembly at the Kaizhi plan (see question 1a, b & c above) and the implications for the firm. A possible format is: brief problem definition/issues, evaluation, and recommendation, if any.

- Case Analysis: “Bayonne Packaging, Inc.” (#4420 in HBSP reading packet)

Discussion Questions.

1. What is Bayonne’s industry, type of operation, and therefore its key competitive priorities? What are its main problems?
2. What is the current capacity utilization in the work centers? (exclude finishing where capacity is variable). Construct an excel spreadsheet to perform this analysis.
3. What is the capacity in pieces per day for the Die-cut work center, if it were running orders of 30,000 pieces in the following three cases: (a) none of the orders can be ganged; (b) pairs of orders can be ganged; (c) all of the orders can be ganged. Assume there are 15 available work hours per day and that the average setup takes 2.5 hours.
4. Assume that 40 of the orders partialled in October each broke into a production run in the Royal/Queen work center, resulting in two setups for these orders instead of one.
 - a. What would capacity have been in October without these additional setups? And
 - b. What was capacity with these additional setups?
5. What order size would you route to the Royal/Queen work center? To the Staude work center?
6. What is the yield at each of the work centers sheet, Print, Die-cut, and Royal/Queen? What is the cumulative yield for an order which the sheeter starts with 40,000 sheets?
7. How do you explain Bayonne’s performance problems?
8. What should John Milliken recommend to Dave Rand?

Assignment 3 Due: Prepare a 1-2 page report to your hypothetical boss detailing your analysis of (1) the capacity utilization in the work centers as described in question 2 above, and (2) the impact of order size on capacity in pieces per day output of the Die-cut work center. A possible format would be: brief problem definition, evaluation, and implications. Use Excel to perform your analysis and include as an exhibit. Be sure to label the Exhibit so the boss knows what you are talking about.

Sept 18 Process Analysis: Manufacturing Cells

- Case: “Dore-Dore”, HBS # 9-692-028

Discussion Questions.

1. Evaluate the changes the firm made in its children’s knitwear division. How does the performance of the traditional operation and the cellular manufacturing system differ? For example, how does work-in-process inventory change when cells are implemented?
2. What changes are required to ensure successful implementation of cellular manufacturing? Is worker cross-training necessary?
3. What is the motivation for converting to cells? Which knitwear products should be manufactured in cells?
4. Should cells be implemented in the hosiery production area? If so, do you recommend any changes in the proposed design by M. Enfert? What other approaches could Dore-Dore take to address M. Marguet’s concerns?

- Case: “Shouldice Hospital Limited”

Discussion Questions.

1. How successful is Shouldice Hospital?
2. How do you account for its performance?
3. As Dr. Shouldice, what actions, if any, would you take to expand the hospital’s capacity?
4. How would you implement changes you propose?

Sept 25 Process Analysis: Service Systems

- Case: “Reading Rehabilitation Hospital: Implementing Patient-Focused Care”, HBS # 5-899-139

Discussion Questions.

1. Who are RRH’s stakeholders? What do they want from RRH? How do they define quality?
2. What are the benefits of the new system in which care delivery is organized around diagnoses or “service lines” in comparison to the old system where patient care was organized by function? What are the drawbacks?
3. At 116 therapists, is RRH overstaffed? How many therapists would you hire?
4. Should RRH keep service lines, or return to the earlier way of organizing care around functions?

- Case: “Pharmacy Service Improvement at CVS”, HBS # 9-606-015

Discussion Questions.

1. What changes do you recommend to CVS’s existing pharmacy fulfillment process? What IT changes, if any, are required to implement your changes?”
2. How can you be sure that the new process you propose will be an improvement over the existing one? How can you be sure that it won’t make things worse?
3. What groups, if any, are likely to have problems with your proposed solution? How will you deal with their objections?
4. How will you ensure that there’s no backsliding—that there won’t still be wooden boxes in use six months from now? How can technology be used to prevent or inhibit backsliding?
5. Does PSI represent a significant opportunity for CVS? Would improving customer service be of significant financial benefit to the company?
6. What percent of pharmacy defectors from CVS in 2000 were light versus heavy users?

Assignment 4 Due: Prepare a 1-2 page report to your hypothetical boss detailing your recommendation for improving CVS' service. Format: brief problem definition/issues, alternatives, recommendation and implementation issues, if any.

Oct 2 Process Analysis: Service Systems

- Case Analysis: "ClearEyes Cataracts Clinic," (5-916-504 in HBSP reading packet)

Discussion Questions.

1. Use the process flow diagram exhibit to calculate capacity utilization for each category of staff, and for intake, surgical, and examination rooms. What is the clinic's capacity per year?
2. By what percentage would patient volume and capacity utilization changes if ClearEyes reduced by half the patients who complete intake but fail to show up for surgery? If the clinic could increase customer yield as described above, would it need to add any staff or room capacity? If so, how much?
3. How much would pretax profit change if this increase in yield were accomplished?
4. What actions could ClearEyes take to increase yield? Be careful to recommend actions, rather than results of actions such as "reduce patient anxiety about the operations."
5. What courses of action would you recommend to Connors?

Assignment 5 Due: Prepare a 1-2 page report to Mr. Connors detailing your analysis of the percentage change in patient volume and capacity utilization if ClearEyes reduced by half the patients who complete intake but fail to show up for surgery? Would the clinic need to add any staff or room capacity to accommodate the change? If so, how much? Suggested Format: brief problem definition/issues, analysis, recommendation and managerial implications, if any.

- **Process Analysis: Learning Curves**

1. Read: Learning Curves, Chapter 4A, pp. 116-125.
2. Work problems 1, 3, 5, 8 and 9 on pages 126-127.

Oct 9 Toyota Production System: Quality and Productivity

- **Lean Supply Chains and Toyota Production System**

1. Read: Chapter 12, pp. 400-420.

- Case: "Toyota Motor Manufacturing, U.S.A., Inc.," HBS, 5-693-019

1. As Doug Friesen, what would you do to address the seat problem? Where would you focus your attention and solution efforts?
2. What options exist? What would you recommend? Why?
3. Where, if at all, does the current routine for handling defective seats deviate from the principles of the Toyota Production System?
4. What is the real problem facing Doug Friesen?

NOTE: The glossary of the case defines several important terms for understanding the case.

Assignment 6 Due: Prepare a 1-2 page report to Mr. Friesen describing where you would focus your attention and solution efforts to address the seat problem. Possible Format: brief problem definition, impact, solution approach and implications.

- Case: "Virginia Mason Medical Center (Abridged)" HBS, 5-606-124

1. What is Gary Kaplan trying to achieve at Virginia Mason?
2. How does the Toyota Production System fit into his strategy?
3. What is your view of the "people are not cars" debate?
4. Is Kaplan's approach transferable to other U.S. hospitals?

Oct 16 Midterm Examination

Covers all material since start of class.

MODULE 3: QUALITY MANAGEMENT AND LEAN SYSTEMS

Oct 23 Quality Management and Process Capability

- Read: Chapter 10, pp. 302-317, 4th Edition of textbook.
Lecture Notes: Quality Management
- Mini-Case: “Hank Kolb, Director of Quality Assurance”
Discussion Questions
 1. What are the causes of the quality problems on the Greasex line? Display your answer on a fishbone diagram.
 2. What general steps should Hank follow in setting up a continuous improvement program for the company? What problems will he have to overcome to make it work?
 3. Are there any opportunities for Hank to use process capability or statistical process control on the Greasex line?

Oct 30 Process Capability and Statistical Process Control

- **Process Capability**
 1. Read: Chapter 10, pages. 317-325
Problems: Chapter 10, 17-22, pages 345-346
- **Statistical Process Control**
 1. Read: Chapter 10, pages 325-333
Problems: Chapter 10, 23-26, pages 345-346

Nov 6 Statistical Process Control (continued) and Quality Management Planning

- Read: to be assigned

Nov 13 Quality Management Planning

- Read: to be assigned

Nov 20 Thanksgiving week, no class

- Work in teams on Quality Management Plan

Nov 27 Quality Management Planning

Dec 4 No Class: Assignment Due: Quality Management Plan due by 10:00 pm. You can submit electronically.

Dec 8, Friday: Final Examination, 6:00-9:00pm, covers all material since midterm exam.

In Class Handouts

- The Great Nuclear Fizzle at Old B&W
- Kristen's Cookie Company (A)
- Shouldice Hospital Limited
- Hank Kolb, Director of Quality Assurance
- Quality Management Planning

HBS Packet Purchase from HBS

- Read: Process Fundamentals by A. Gray and J. Leonard (#9-696-023 in HBSP packet)
- Read: "Process Analysis, Curriculum Core", by Roy Shapiro (# 8007 in HBSP packet)
- Case: "National Cranberry Coop" (#9-688-122 in HBSP packet)
- Case: AIC Networks: Optimizing Product Assembly (# 4245 in HBSP packet)
- Case: "Bayonne Packaging, Inc." (#4420 in HBSP packet)
- Case: "Dore-Dore" (# 9-692-028 in HBSP packet)
- Case: "Reading Rehabilitation Hospital" (#5-899-139 in HBSP packet)
- Case: "Pharmacy Service Improvement at CVS", HBS # 9-606-015
- Case: "ClearEyes Cataracts Clinic," (5-916-504 in HBSP reading packet)
- Case: "Toyota Motor Manufacturing, U.S.A., Inc.," HBS, 5-693-019
- Case: "Virginia Mason Medical Center Abridged, (# 5-606-124 in HBSP packet)