

**CALIFORNIA STATE POLYTECHNIC UNIVERSITY, POMONA
EXPANDED COURSE OUTLINE**

Technology and Operations Management

**Course Title: Supply Chain Design,
Analysis and Representation**

2002-2003

Course Number: TOM 425

Prepared By: J. Guyse

Expanded Course Outline

Date Prepared: 05/14/03

SECTION A

I. Catalog Description: Examination of how operational models are developed to facilitate supply chain design. Introductory supply chain basics, components, metrics, cost tradeoffs, and principles. Optimization models and decision theory are utilized to face emerging supply chain decisions. Computer software emphasis. 4 lectures/problem-solving. Prerequisite: TOM 301 and microcomputer proficiency.

II. Required Background or Experience:

A. Prerequisites: TOM 301 and microcomputer proficiency.

B. Prerequisites Justification: The course material of TOM 301 provides the foundation for building the techniques and understanding the applications presented in TOM 425. Microcomputer based software is used in the course so students should have the basic skills to operate a computer.

C. General Education Contribution: Students are expected to possess basic mathematical knowledge and problem solving capabilities. These skills are enhanced in the core operations management course (TOM 301). Students are also expected to be able to express themselves orally and in writing. These competencies should have been developed in general education courses prior to taking this course.

III. Expected Outcomes:

Students will be able to:

- a.** ·Formulate, model, and analyze a wide range of supply chain business problems using the mathematical programming techniques of linear programming, integer programming, nonlinear programming, and unified optimization methodology.
- b.** ·Recognize the assumptions and limiting conditions of these techniques.
- c.** ·Demonstrate the use of computer software for performing the appropriate analyses.
- d.** ·Interpret the results obtained from these analyses and make managerial decisions regarding supply chain design and management issues.

IV. Text and References:

The TOM department faculty committee that coordinates this course determines the supply chain text and computer software package.

Shapiro, J. F., Modeling the Supply Chain, First Edition (Pacific Grove, CA: Duxbury Press, 2001)¹

V. Special or Unique Student Materials:

Check any materials, supplies, equipment, etc., which students must provide.

<input type="checkbox"/> Zip Disk	<input checked="" type="checkbox"/> Calculator	<input type="checkbox"/> Camera	<input type="checkbox"/> Laptop
<input checked="" type="checkbox"/> Floppy Disk	<input type="checkbox"/> Graph Paper	<input type="checkbox"/> Video Camera	<input type="checkbox"/> Computer
<input type="checkbox"/> CD-Rom	<input type="checkbox"/> Writing Pad	<input type="checkbox"/> Videotape	<input type="checkbox"/> Other

VI. Special or Unique University Facilities:

List the university facilities/equipment that will be required in order to offer this class, such as gymnastic equipment, special classroom, A-V equipment, laboratories, etc.

<input checked="" type="checkbox"/> Computer Lab	<input type="checkbox"/> Computer Connection	<input type="checkbox"/> "Smart" Classroom (one workstation)
<input type="checkbox"/> File Server	<input checked="" type="checkbox"/> White Board/Markers	<input checked="" type="checkbox"/> Overhead Screen
<input checked="" type="checkbox"/> Computer Projector	<input type="checkbox"/> VCR	<input type="checkbox"/> Microphone
<input type="checkbox"/> Laser Pointer	<input type="checkbox"/> Printer	<input type="checkbox"/> Moveable Classroom Furniture
<input checked="" type="checkbox"/> Internet Connection	<input type="checkbox"/> Laptop Ports	<input checked="" type="checkbox"/> Other: Microsoft Office Suite

VII. Expanded Description of the Course and Instructional Methods:

A. Expanded Description of the Course:

A supply chain is a network of all firms and relationships that get a product to market, including the original acquisition of raw materials; production of the item at a manufacturing facility; distribution to a retailer; sale of the finished item to the customer, and any installation, repair, or service activities that follow the sale. How to effectively manage the supply chain is a central issue for all levels of management, regardless of industry. More demanding customers, the Internet and digital technology, growing competitive pressures, and globalization create new opportunities and challenges on how supply chains should be configured and managed. Many innovations and new business models have emerged, arising from application of information technology and reconfiguration of the supply chain network.

This course examines how operational models can be developed to facilitate smart supply chain design (or redesign). Supply chain basics, components, metrics, primary cost tradeoffs, and principles are introduced. Optimization models and decision theory are utilized to face emerging supply chain decisions. Emphasis will be on computer software applications.

¹ Current selection

B. Instructional Methods:

- | | | |
|--|--|---|
| <input checked="" type="checkbox"/> Lecture | <input checked="" type="checkbox"/> Cases | <input type="checkbox"/> Individualized Instruction |
| <input checked="" type="checkbox"/> Lecture/Discussion | <input type="checkbox"/> Open Lab | <input type="checkbox"/> Cooperative Learning |
| <input type="checkbox"/> Seminar | <input type="checkbox"/> Videotapes | <input type="checkbox"/> Distance Learning |
| <input type="checkbox"/> Simulation | <input checked="" type="checkbox"/> Other: See Below | |

The delivery system will be a combination of lecture, classroom discussion, problem solving, and computer activities.

VIII. Methods of Evaluating Outcomes:

Evaluation Tools: Examinations (multiple midterms and final), computer projects, writing assignments, and class participation.

Recommended Evaluation Tools:

Individual Paper: ___%	Tests & Exams <u>70</u> %	Individual Project ___%
Group Paper: ___%	Quizzes ___%	Team Project ___%
Individual Presentation ___%	Peer Evaluation ___%	Outside/Expert Evaluations ___%
Group Presentation ___%	Participation ___%	Writing Assignments: <u>30</u> %

SECTION B

Week #	Theme/Topic
1	Theme/Topics <ul style="list-style-type: none"> • Orientation/Introduction • Course organization and requirements • Supply Chain Management, Integrated Planning, and Models <ul style="list-style-type: none"> ○ Fundamentals of supply chain management ○ Overview of supply chain models and modeling systems ○ Logistics network configuration ○ Strategic alliances ○
2	Theme/Topics <ul style="list-style-type: none"> • Information technology <ul style="list-style-type: none"> ○ ERP and e-Commerce systems ○ Transactional vs. Analytical IT ○ Communications among supply chain members • Application of linear programming to SCM problems <ul style="list-style-type: none"> ○ Refresher of LP ○ Insights of shadow prices and reduced costs specific to SCM ○ Applications of LP models in SCM
3	Theme/Topics <ul style="list-style-type: none"> • Applications of mixed integer linear programming to SCM problems <ul style="list-style-type: none"> ○ Review and applications of MILP applications in SCM ○ Distribution center location models in SCM ○ Supply chain network optimization models ○ Designing and implementing optimization modeling systems ○
4	Theme/Topics <ul style="list-style-type: none"> • Test #1 • Supply chain decision databases <ul style="list-style-type: none"> ○ Data aggregations ○ Role of forecasting ○ Model output data
5	Theme/Topics <ul style="list-style-type: none"> • Strategic and tactical SC planning <ul style="list-style-type: none"> ○ Strategic analysis of logistic supply chains ○ Strategic analysis of manufacturing supply chains ○ Warehouse location and location theory ○ Tactical planning with applications ○ Integrating supply chain and demand management
6	Theme/Topics <ul style="list-style-type: none"> • Advanced SC modeling applications <ul style="list-style-type: none"> ○ Managing product variety ○ Managing demand uncertainty and variability ○ Planning new product introduction ○ Integrating supply chain and marketing models

7	<p>Theme/Topics</p> <ul style="list-style-type: none"> • Test 2 • Integration of financial and physical supply chains <ul style="list-style-type: none"> ○ Optimization models for corporate financial planning ○ Financial flow models ○ Modeling exchange rate risks, real options and hedging risk
8	<p>Theme/Topics</p> <ul style="list-style-type: none"> • Operational supply chain planning <ul style="list-style-type: none"> ○ Modeling systems for operational planning ○ Vehicle routing systems ○ Production planning systems ○ Simulation models and systems
9	<p>Theme/Topics</p> <ul style="list-style-type: none"> • Inventory management in SCM <ul style="list-style-type: none"> ○ Inventory theory models ○ Inventory theory in strategic supply chains ○ Inventory theory in tactical supply chains ○ Inventory theory in distribution supply chains ○ Inventory theory in manufacturing supply chains
10	<p>Theme/Topics</p> <ul style="list-style-type: none"> • Organizational adaptation of SC modeling systems <ul style="list-style-type: none"> ○ Organizational decision making and culture ○ Role of IT is organizational decision making ○ Legacy systems and incentives for change • Synthesis and final review

SECTION C

Management Science is affected continuously and comprehensively by the AACSB criteria listed in Section C. Concern with these matters permeates all "modules" of TOM 315 and many of the modules involve nearly all of the criteria. Accordingly this section has been completed as shown.

SECTION C: UNDERGRADUATE (AACSB CRITERIA)

General Education Goals*

Goal	% of course
Communication abilities	<u>10</u>
Ethical understanding and reasoning abilities	<u>10</u>
Analytic skills	<u>70</u>
Multicultural understanding	
Reflective thinking skills	<u>10</u>
Total:	<u>100</u>

*sum should be \leq 100%

Management-Specific Learning Goals*

Goal	% of course
Ethical responsibilities in organizations and society	<u>5</u>
Financial theories, analysis, reporting, and markets	<u>20</u>
Creation of value through the integrated production and distribution of goods and services	<u>70</u>
Group and individual dynamics in organizations	
Domestic and global economic environments of organizations	
Other management-specific knowledge and abilities	<u>5</u>
Total:	<u>100</u>

*sum should be \leq 100%

*Explanation of percentages: these percentages are being collected as part of an AACSB requirement. Curriculum committee is evaluating what "Other management specific knowledge and abilities" to include in the ECO. For example, marketing specific knowledge or use of technology may be additional goals we wish to measure.