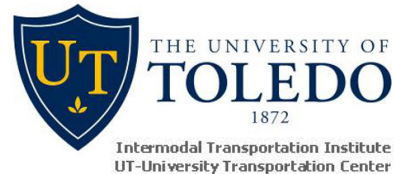




MICHIGAN OHIO UNIVERSITY TRANSPORTATION CENTER  
*Alternate energy and system mobility to stimulate economic development.*

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Report No: MIOH UTC SC1, p2 2007 - Final



# **SUPPLY CHAIN/TRANSPORTATION EFFICIENCY SYSTEMS GRADUATE DEGREE PROGRAM**

## **FINAL REPORT**

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FINAL REPORT

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## **Abstract**

The University of Detroit Mercy and the University of Toledo are developing a collaborative Supply Chain/Transportation Efficiency Systems graduate degree program. This program covers all areas in supply chain and transportation efficiency. Supply chain system integrates global information and processes across all functions including supply management, operations and logistics – for both internal and external partners. Transportation system analysis and planning stress conceptual and quantitative approaches to the analysis of transportation and related systems. Our objective is to prepare students to identify, analyze, and solve complex transportation and supply chain problems, and communicate those solutions towards their successful implementation.

A “Board of Advisors” from industry and universities has been selected to discuss possible curricula for the program. A survey that contains a list of topics to be covered in the program was created and was sent to BOA to obtain their inputs. The survey’s findings and results were discussed with the BOA and their suggestions are taken for the curriculum development. Finally, a curriculum has been designed that could be delivered in 10-months. The program is targeted at students who are working full time. It consists of 5-terms of six to seven weeks length with one to two-week break between terms. Students will take classes on Fridays afternoons and Saturdays.

The University of Toledo UTC has also provided funding to support this effort. It allocated \$16,000 to support efforts by Paul Hong and Subba Rao. This shows that the cooperation between the two UTCs is very important, and this project is supported by MIOH and University of Toledo Transportation Centers.

## Introduction

Professor Robert Gallamore (2006) from Northwestern University has outlined the following observations about academic programs in transportation/logistics and supply chain:

- Student interest in transportation in long decline
- Academics: abstract theory drives out practical knowledge
- Economics of curriculum development and class offerings favor a consortium approach
- Consortium schools would cross-register and divide electives
- Logistics doesn't conform to manufacturing locales
- Globalization is real
- Rapid growth of China, India, Latin America
- Global supply chain management careers
- Supply chain management rising over transportation & logistics studies

The Michigan – Ohio (MIOH) University Transportation Center (UTC) was recently created through a grant from the United States Department of Transportation. The MIOH-UTC mission is to significantly improve transportation efficiency, safety and security in Michigan and Ohio and across the USA by increasing the effective capacity of existing transportation infrastructure, reducing transportation energy dependence through alternative fuels, and enhancing supply chain performance. The MIOH mission are accomplished through [<http://mioh-utc.udmercy.edu/>]

- The development and organization of new knowledge, technology and management systems;
- The effective transfer of new and existing knowledge to commercial enterprises and educational communities;
- The development of a cadre of transportation professionals that is larger, more diverse and better prepared to address the challenges and opportunities of 21<sup>st</sup> century transportation systems.

The development of a graduate degree in Supply Chain and Transportation Efficiency Systems will bring MIOH-UTC closer to above goals. Supply Chain Management professionals are the agents of change for e-business, manufacturing, high tech, service and consulting companies.

The vision is to develop a collaborative (consortium-based) Supply Chain/Transportation Efficiency Systems graduate degree program that covers all areas in supply chain, and transportation efficiency. Therefore, a team of interdisciplinary faculty from Colleges of Business Administration and Engineering from the University of Detroit Mercy and the University of Toledo who have worked on many projects related to transportation efficiency and supply chain will develop the curriculum with direct input from an advisory board consisting of industry leaders and academicians.

This is an interdisciplinary Master of Science degree in Supply Chain/Transportation Systems Efficiency and would be one of only a few truly interdisciplinary transportation/supply chain degrees nationwide. It includes two core fields: Transportation Efficiency (through the Department of Civil and Environmental Engineering and the College of Business Administration), and supply chain design and management (through the College of Business Administration).

The degree program will be a select program that accepts only the most qualified students. The number of students will be limited to ensure all students have an opportunity to work closely with a faculty member on research. The MIOH-UTC could enhance student research opportunities by sponsoring student work on research projects.

# Findings from Project 1

## **The overall demand for programs in this area**

The demand for people in supply chain and transportation is either stable or growing according to Michigan Employment Forecasts by Occupational Groups (2002 – 2012). Demands for logisticians are growing between 9 to 17% in United States from 2004 to 2014 according to U.S. Department of Labor - Bureau of Labor Statistics - Occupational Outlook Handbook. Logisticians practice an occupation that analyzes and coordinates the logistical functions of a firm or organization. They are responsible for the entire life cycle of a product, including acquisition, distribution, internal allocation, delivery, and final disposal of resources. This same definition is now used to describe the supply chain.

## **The Uniqueness of the Proposed Program**

This program would be a collaborative educational and interdisciplinary M.S. degree in Supply Chain/Transportation Systems Efficiency program. This graduate degree program will be one of only a few truly interdisciplinary transportation/supply chain degrees. It includes two core fields: Supply Chain Design and Management (through the College of Business Administration) and Transportation Efficiency (through the Department of Civil and Environmental Engineering).

Students could have varied backgrounds. The students would have bachelor degrees in Business Administration, Science, Engineering, Sociology, Political Science, and Urban Planning. Because transportation is inherently interdisciplinary, the perspective of many disciplines is needed to solve the complex transportation questions facing the next generation of transportation professionals. The diversity of students and faculty participating in the Supply Chain and Transportation Efficiency Systems program enriches the academic experience and allows the student to see the strength of interdisciplinary approaches to planning, operating, managing and maintaining the next generation of transportation and supply chain systems.

## **The Board Of Advisors**

Another uniqueness of this program is the use of an advisory board in the development of the curriculum. The advisory board was selected from among the industry leaders and academicians who are experts in supply chain and transportation systems efficiency.

**Board of Advisor for Supply Chains and Transportation System \Efficiency  
Graduate Program**

|           | <b>NAME</b>               | <b>POSITION</b>  | <b>ORGANIZATION</b>   |
|-----------|---------------------------|--|---|
| <b>1</b>  | Hossein Nivi              | Dean, College of Business<br>Administration                        | University of Detroit Mercy                                 |
| <b>2</b>  | Leo Hanifin               | Dean, College of Engineering and<br>Science                        | University of Detroit Mercy                                 |
| <b>3</b>  | Hokey Min                 | Professor  | Bowling Green State University                              |
| <b>4</b>  | Ed Sprock                 | Executive-in-Residence   | UDM & DaimlerChrysler                                       |
| <b>5</b>  | Louis Lambert             | Senior Associate   | Cambridge Systematics                                       |
| <b>6</b>  | May Leng<br>Yau-Patterson | Director, Advanced Supply<br>Procurement & Supply                  | DaimlerChrysler   |
| <b>7</b>  | Doug Hepfer               | Partner, Deloitte Consulting LLP                                   | Deloitte Consulting   |
| <b>8</b>  | Pamela Stec               | Director Material Planning and<br>Logistics for Ford North America | Ford  |
| <b>9</b>  | Paul Hong                 | Professor  | University of Toledo  |
| <b>10</b> | Christopher Kaiser        | Manager  | TKS Logistics, Thyssen Inc                                  |
| <b>11</b> | Larry Drake               | President and CEO  | KUKA Flexible Production<br>Systems Corp.                   |
| <b>12</b> | Mark Simpson              | Director Business Development                                      | Ryder   |
| <b>13</b> | Dave Nelson               | VP purchasing  | Delphi  |
| <b>14</b> | John Daly                 | Managing Director  | Genesee County Road<br>Commission.                          |
| <b>15</b> | Jim Hartung               | President  | Toledo Lucas County Port<br>Authority                       |
| <b>16</b> | Anthony Reams, of the     | President  | Toledo Metropolitan Area Council<br>of Governments (TMACOG) |



## **Scope of Program**

### Benchmarking Similar Programs in U.S.

We have done benchmarking supply chain and transportation programs at the following universities

- Iowa State University
- Michigan State University
- Massachusetts Institute of Technology
- Ohio State University
- University of Wisconsin

We have identified the following characteristics for these programs:

#### Iowa State University:

“Interdisciplinary Master Degree in Transportation”, 2-year program, three core fields:

1. Transportation engineering (through the Department of Civil, Construction, and Environmental Engineering),
2. Community and regional planning (through that department in the College of Design), and
3. Transportation and logistics (through the Department of Logistics, Operations, and Management Information Systems in the College of Business).

#### Michigan State University:

“The Master of Science in Logistics Degree Program”, 19-month program, highly technical logistics program.

#### Massachusetts Institute of Technology:

“Master of Engineering in Logistics”, Begun in September 1998, the MLOG program is a professional degree program preparing graduates for careers in logistics and supply chain management — in manufacturing, distribution, retail, transportation, consulting, software and/or logistics organizations. The program takes only nine months, start to finish. The program is multidisciplinary with core courses in logistics systems, supply chain context, logistics facilities, operations, system dynamics, and a course in database, internet, & system integration technologies.

#### Ohio State University:

This is an MBA-based program with majors in logistics, operations, and supply chain management.

### University of Wisconsin:

This is also MBA-based program that blends courses in core business functions such as accounting, finance, operations, marketing, and strategy with supply chain management courses such as marketing channels, operations research, procurement and supply management, logistics management, and strategic outsourcing to complete the objective of offering a cross-functional educational experience.

### **Survey Design**

A list of topics to be covered in the program was created using course contents from the following institutions:

- Iowa State University
- Michigan State University
- MIT
- University of Toledo

Topics were then grouped into following modules:

1. Strategic/Organizational - strategic and organizational system issues including design/planning issues
2. Behavioral/Managerial - managerial and behaviors practices including general management issues
3. Technical/Technological - technical/technological issues
4. Operational/Process - operational/manufacturing and business process practices
5. International Issues - international/global issues including global sourcing, cross-border and negotiations
6. Transportation Planning/Modeling –issues shaping traveler and freight transportation systems including transportation planning, investment, operations, and maintenance

The team then designed a survey based on these items and groupings. The surveys were sent to BOA and 12 responses were received. The following Table shows the responses to the topics that have been sorted by their average scores. The surveys used a 5 point Linker-scale for the responses, with 5 as the highest and 1 as the lowest.

**Table 1: Survey for the Curriculum Development on Supply Chain and Transportation**

| <b>CURRICULUM DEVELOPMENT SURVEY ON SUPPLY CHAIN AND TRANSPORTATION</b>            |              |
|--|--------------|
| <b>Strategic and Organizational (1)</b>  |              |
| <b>Items</b>   | <b>Score</b> |
| Distribution and logistics   | 4.73         |
| Global supply chain strategies   | 4.58         |
| Transportation planning  | 4.45         |
| Supply chains and transportation planning  | 4.40         |
| Demand forecasting and planning  | 4.00         |
| Procurement and purchasing   | 3.92         |
| Operating issues in contemporary logistics and integrated supply chain management. | 3.92         |
| Strategies for sustainable competitive advantages of supply chains                 | 3.91         |
| Inventory theory   | 3.64         |
| Customer service   | 3.64         |
| Behavioral issues in supply chain  | 3.50         |
| Supply chain restructuring   | 3.09         |
|  |              |
| <b>Behavioral and Managerial (2)</b>   |              |
| <b>Items</b>   | <b>Score</b> |
| Critical problem solving skills  | 4.25         |
| Leadership skills  | 4.08         |
| Building teams and working in teams  | 3.83         |
| Oral, written and communication skills in business settings                        | 3.67         |
| Six sigma problem solving methodologies  | 3.64         |
| Use of appropriate technology for management presentations                         | 3.27         |
| Effective interpersonal communication skills                                       | 3.17         |
|  |              |
| <b>Technical and Technological (3)</b>   |              |
| <b>Items</b>   | <b>Score</b> |
| Information technology in logistics and supply chain management                    | 4.50         |
| Supply chain management process analysis   | 4.00         |

|  |              |
|--|--------------|
| Implementation of RFID technologies and systems  | 3.33         |
| Value and productivity performance measurement of IT investments, legal, policy and regulatory aspects of auto-identification, and the impact of RFID on business strategy | 3.17         |
| Database modeling, design, and implementation  | 3.08         |
| Geographic Information Systems (hardware, software, data structures, data acquisition)   | 3.00         |
| Geographic data manipulation and analysis  | 3.00         |
| IT benchmarking including performance measures   | 2.83         |
| Internet technologies such as XML and SOAP   | 2.82         |
| IT security  | 2.82         |
| Geo-relational database concept and design   | 2.60         |
| Data networking protocols and technologies   | 2.55         |
|  |              |
| <b>Operational and Processes (4)</b>   |              |
| <b>Items</b>   | <b>Score</b> |
| ERP systems in supply chains   | 4.18         |
| Decision-making in manufacturing and supply chain systems  | 4.09         |
| Models, methods and software tools for logistics network design  | 4.00         |
| Order fulfillment and distribution operations in logistics and transportation  | 3.92         |
| Customer service issues in logistics and transportation  | 3.91         |
| Managing quality across supply chains  | 3.91         |
| ERP systems for transportation and logistics systems   | 3.91         |
| Purchasing and sourcing of transportation services, third-party logistics providers  | 3.83         |
| Models, methods and software tools for capacity planning and flexibility   | 3.82         |
| Operational tools such as MRP, JIT, TOC (theory of constraints)  | 3.75         |
| Internet and e-commerce issues for transportation and supply chains  | 3.64         |
| Models, methods and software tools for make-buy decisions and product development  | 3.64         |
|  |              |
| <b>International Issues (5)</b>  |              |
| <b>Items</b>   | <b>Score</b> |
| Logistics systems for the international movement of goods.   | 4.42         |
| Understanding logistics and supply chain management in a global  | 4.25         |

|  |              |
|--|--------------|
| environment  |              |
| Global purchasing and sourcing of materials and services   | 4.09         |
| Cross-border issues in global supply chains and logistics  | 4.09         |
| Negotiating in an international environment  | 4.09         |
| Impact of international trade agreements and organizations such as the WTO, NAFTA, CAFTA, IMF, the EU and Mercosur | 4.08         |
| Economics of international air, ocean carriers and intermodal operations   | 3.92         |
| Legal framework for the international movement of goods  | 3.82         |
| National and international trade policies and global logistics   | 3.82         |
| Purchasing and materials management in a global context  | 3.82         |
| Economics of international air and ocean carriers  | 3.64         |
| Providers of exporting and importing services such as custom brokers, freight agents                               | 3.58         |
| Outsourcing  | 3.55         |
| International marketing/supply chain interface   | 3.55         |
| Role of ports and airports in international product movements  | 3.55         |
| Global sourcing and product specifications   | 3.55         |
| The effects of government trade policies on global logistics   | 3.45         |
| Advantages of exporting and importing services   | 3.27         |
|  |              |
| <b>Transportation Planning and Modeling (6)</b>  |              |
| <b>Items</b>   | <b>Score</b> |
| Intermodal transportation systems  | 3.92         |
| Transportation system management   | 3.92         |
| Transportation forecasts and analyses  | 3.82         |
| Transportation data sources and cost analysis  | 3.73         |
| Intelligent transportation systems planning  | 3.73         |
| Sustainable transportation concepts  | 3.73         |
| Optimization of transportation systems   | 3.67         |
| Policy issues explored include safety, environmental impact, sustainable communities, and economic development     | 3.64         |
| Focus on Freight Transportation  | 3.60         |
| Carrier management issues involving ownership, mergers, routes, competition and labor                              | 3.58         |
| Analysis of transport users' requirements  | 3.55         |

|   |      |
|---|------|
| Transport legislation and financing   | 3.55 |
| Policy issues for transportation planning and investment in the US and abroad   | 3.50 |
| Travel planning, network modeling, and analysis                                 | 3.45 |
| Safety, environmental impact, sustainable communities, and economic development | 3.27 |
| Statewide, regional, and local transportation system planning                   | 3.18 |
| Travel studies and analysis of data   | 3.00 |
| Public transportation forecasts and analyses                                    | 2.91 |
| Corridor travel planning.   | 2.91 |
| Travel projections.   | 2.73 |

### **Discussion with the Board of Advisors**

The following inputs to curriculum development were received in the discussions with the BOA.

#### **Curriculum:**

- The program should be designed in a way to be helpful (from industry standpoint not academic standpoint) - Great difference between industry and academy - Productive employee - Student might not adapt to the real world
- Be careful in generalizing the program
- Knowledge of manufacturing systems and procurement would be valuable
- Make the students ready with practical attributes
- Technology – Student’s weakness. We need the combination of IT and transportation system
- The focus for this program will be engineering and business with strong knowledge
- It should be different from undergraduate program that many schools offer.
- Some companies are restructuring supply chains
- Six Sigma should rate high – As part of the program we should teach students how to do solving methodology based on data. Six Sigma is a very important tool.
- Demand forecasting and planning can be another important thing, translation of demand forecasting and planning into Logistics.
- How to forecast the transportation system demands as driven by the logistics requirements
- Assets management - Overall management of transportation system? Communicate with the system is very important.

#### **Delivery:**

- Consortium is very important
- We can deliver some of these courses into the existing graduate programs

#### **Market:**

- Who will come to this program . . . people from manufacturing and logistics companies who will create and manage logistics systems
- What is the market demand for this program? We should define the knowledge skills and link them to specific functions
- If we identify our target market then we know what our expectations are and then we can project it and have some different answers

- The curriculum might be different if the student want to work for government or transportation or so on
- We need to spend some time to define WHO IS OUR CUSTOMER? For Auto Industry might be different than UPS. We have to spend more time on this in future to identify this element.

On the Job:

- It takes 5 to 6 years to keep students up to speed
- Auto Industry: bringing in recruits with engineering degrees with interest in supply chain logistics; engineers have the analytical perspective; haven't been recruiting anyone with specific supply chain logistics degrees;

Assessment:

- What is the outcomes of the curriculum right after graduation and 5 years after the graduation
- What is the outcome they are looking for? Then we can go back and start designing it.
- We need to define the specific competencies that graduates possess at graduation
- As we design it then we know what they need to be able to do in case of competency

Survey:

- We need to take this survey in different industry and see how we can target it
- The survey might be a very helpful tools for us to identify the program
- Get more advisor from shipping industry and not just automotive industry so it will be very valuable for us to identify
- Get more feedbacks from Wall Mart or Meijer
- Same survey should be sent to additional people to be consistent
- Ford can get the logistic providers to participate in this; we need at least one or two logistics providers from other companies such as Dell or Procter and Gamble. In addition, we need companies like Motorola



## Activities of Project 2

### Curriculum Development

1. Clearly define the career paths of graduates and the requisite competencies and knowledge that would support those career aspirations

### Transportation:

A degree in transportation can support careers in:

- Transportation Policy Analysis
- Transit Planning and Operations
- Urban and Statewide Transportation Planning
- Carrier and Shipper Transportation Analysis
- Transportation and Development Economic Analysis
- Federal and State Transportation Strategic Planning
- Transportation Planning and Engineering Consulting
- Transportation Systems Management

Many graduates of this program go to work for engineering and planning consulting firms. Some work for state departments of transportation or for other levels of government.

### Supply Chain Management:

A degree in logistics and Supply Chain Management can support careers in:

- Management
- Consulting
- Service-supplier business development and operations
- Logistics software support

The requisite competency and knowledge needed for the above careers would be fully investigated and incorporated in our program offerings. This would be delivered in year one of the project.

2. Development of the Curriculum

The team has approached the curriculum design and development from two angles. The needs of the customer (student) and the time it takes to complete. The students taking this program would be professionals working full time and the program had to be designed around this important consideration. The team came up with a ten course

MS in SCT for those who could invest about one year of part time study (essentially week ends). The details of this program will be presented shortly. The team also proposes a shorter 4 course graduate Certificate program in SCT (comprising of a subset of then ten courses) which may be available in other than the week end format. The details of the certificate program will be worked out in the second year of the project.

### **MS in SCT**

The development of a graduate degree in Supply Chain/Transportation Efficiency Systems will bring MIOH-UTC closer to the mission of MIOH - UTC by effective transfer of new and existing knowledge to educational communities and the development of a cadre of transportation graduates prepared to address the challenges and opportunities of 21<sup>st</sup> century transportation systems.

This is an interdisciplinary M.S. degree in Supply Chain/Transportation Systems Efficiency and would be one of only a few truly interdisciplinary transportation/supply chain degrees nationwide. It includes two core fields: Transportation Efficiency and supply chain design and management

### **3. Identifying the requirements for course development (such as on-line delivery and transferability)**

Many of the courses will be developed using the available class room technologies. These include multi media, video conferencing and distance learning. Some of the team members have gained experience in delivering DL courses and this will come in handy in the development of teaching and learning resources. The curriculum will be structured to make use of these technologies so that some of the courses in the program can be taken at the convenience of the students.

Courses will be delivered using WebCT and at University of Toledo and Blackboard Systems at the University of Detroit Mercy respectively.

One of the outcomes of the curriculum development will be transferability of course and other learning materials. This will be achieved by 1) developing templates for course contents, schedule and other requirements and these templates can then be customized for individual instructor needs, 2) placing materials on pass word secured websites, 3) producing materials in digital format ( CDc, Podcasts? etc.)

WebCT is widely used at the University of Toledo for all Distant Learning courses; Students using WebCT will have accesses for all the lecture materials—all print, audio and video materials. Students will be able to interact

with faculty and other students for needed conferences. The knowledge homepage is at the following address: <http://www.utoledo.edu/dl/>

#### Blackboard

The Knowledge homepage is at the following address:

<http://knowledge.udmercy.edu>

IDS posts the Knowledge account creation and course site enrollment schedule on the Knowledge homepage. This information is updated before each semester, and should be reviewed if you have concerns about your account's availability or course site enrollment.

If you will be doing your online coursework from a home computer, we strongly recommend bookmarking this website (or adding it to your favorites).

#### Introduction to Knowledge

<http://research.udmercy.edu/bb/help/tutorials/knowledge/knowledge.html>

#### 4. Development of some of foundation/elective courses

See Appendix B for detailed syllable of the following courses.

The degree program consists of the following ten courses:

1. Transportation Systems Planning and Management
2. Finance and Managerial Accounting
3. Designing and Managing the Global Supply Chain
4. Optimization and Simulation Modeling for Transportation and Supply Chain
5. Transportation/Supply Chain Economics and Public Policy
6. Current Issue in Supply Chain and Transportation (seminar)
7. Strategic Supplier Relationship
8. Outsourcing Strategies for Global Supply Chains
9. Advances in Supply Chain and Information Technology
10. Systems and Project Management

Total number of credits required for graduation is 30.

\* Students will be allowed to take courses from UDM MPD and MEM program.

## **Course Descriptions**

### **SCT XXX - Transportation Systems Planning and Management**

Attributes of the various modes of transportation, with a special emphasis on freight transportation. Factors that influence system demand, costs, market structures, carrier pricing, and carrier operating and service characteristics and their influence on other supply chain costs and supply chain performance.

### **SCT XXX - Finance and Managerial Accounting (MPD 540)**

This course enables the participants to translate financial statements into meaningful information for use in business decision making. Participants gain an understanding of the company's financial condition and performance and build confidence in analyzing financial reports. They examine the firm's health, strengths, and weaknesses, considering both recent performance and future prospects. Financial concepts and practices are used to explore the acquisition and management of new resources.

### **SCT XXX - Designing and Managing the Global Supply Chain (EMB620)**

This course is about managing the flow of products from origin through transformation (i.e. procurement, production and distribution) to delivery to the ultimate user. The supply chain management process is directly linked to e-commerce, as it is the biggest commercial user of internet services. The course is designed to be strategic in orientation, emphasizing the framework of the supply chain and the context of management decisions. It also emphasizes quantitative methods in supply chain managements. Topics include make or buy decisions, selection and evaluation of suppliers, inventory management, resource planning for production, selection of distribution channels, and managing relationships up and down the supply chain.

### **SCT XXX - Optimization and Simulation Modeling for Transportation and Supply Chain**

Application-oriented introduction to optimization and simulation focuses on understanding system tradeoffs. Introduces modeling methodology (linear, integer and nonlinear programming, genetic algorithms), modeling tools (sensitivity and post-optimality analysis), and discrete-event simulation with their applications in supply chain and transportation.

### **SCT XXX - Transportation/Supply Chain Economics and Public Policy**

Comprehensive overview of key policy issues related to transportation planning and investment in the United States and abroad. Policy issues explored include safety, environmental impact, sustainable communities, and economic development. Tools like policy analysis and planning are studied in conjunction with each policy issue explored.

### **SCT XXX - Current Issue in Supply Chain and Transportation (seminar)**

An integrative course designed to study contemporary problems and issues in supply chain, transportation, and logistics. This is a case course where each week, students will analyze and prepare supply and logistics cases in contemporary settings. Emphasis will be on developing analytical and problem-solving and sound managerial decision making skills. The major objective is to examine and evaluate real business problems. Emphasis is on learning solid theory-based with diagnostic skills to discover underlying causes and on proposing solutions that are workable in the specific case setting.

### **SCT XXX - Strategic Supplier Relationship**

Competition is no longer company versus company; it is supply chain versus supply chain. More and more, companies are counting on their suppliers to lower costs, improve quality, and develop innovations. The success of a firm and its ability to satisfy customer expectations are influenced greatly by the capabilities and performance of its suppliers. The objectives of this course are to understand the relationship between suppliers and customer, determine which elements in the relationship are critical, examine how relationships vary among industries and products, and develop and implement effective supplier relationships. The course should help firms identify ways to categorize and organize suppliers, build and retain good supplier relationships, and ensure that suppliers meet quality and delivery requirements. This should lead to a better understanding of supplier relationships so that better strategic sourcing decisions can be made. Using this approach, companies can reduce enterprise spending, consolidate and prioritize suppliers, reduce supplier risk, and align procurement strategies with corporate goals.

### **SCT XXX - Outsourcing Strategies for Global Supply Chains**

Purchasing and materials management in a global context, Global sourcing, negotiations, product specifications, and global outsourcing, study the impact of international trade agreements and organizations such as the WTO, NAFTA, IMF, the EU and Mercosur.

### **SCT XXX - Advances in Supply Chain and Information Technology**

The intent of this course is to give students a more advanced and comprehensive view of supply chain management, technological issues in supply chain management including the prevalence and impact of B2B e-commerce on supply chains. Information Technology (IT) management will be discussed to understand its increasingly important role in product development and supply chains.

### **SCT XXX - Systems and Project Management (MPD 520)**

Provides understanding of up-to-date project management methods, tools and actual practice in order to effectively plan, organize, and control product development projects. The course design is based on: (a) experiential learning as the course is organized around learning by doing; (b) the learning process is focused and facilitated by projects of interest to the SCT domain; (c) teamwork and creative thinking is practiced during the course; (d) connections with Systems Engineering and Systems Architecture are demonstrated and maintained.

#### Scheduling of Classes

The MS degree program would take 40 weeks or 10 months to complete on a part-time basis. Program starts in September and ends in May and it consists of five terms and students take two classes each term.

A typical 8 week term would look like this:

#### Weeks 1-6

1<sup>st</sup> Course - Fridays 3pm-9pm (1 hour break for Dinner)

2<sup>nd</sup> Course – Saturdays 9am-3pm (1hour break for lunch with breakfast prior to start of the class)

#### Weeks 7 and 8

No class – or could be used for additional activities

#### 5. Modifying of some of existing courses foundation/elective courses to make them suitable for the program

The following two courses

- Finance and Managerial Accounting
- Systems and Project Management

have been developed for the UDM-MPD program and should be modified with emphasis on SCT. The instructors would be contacted for updating the course contents.

We also include materials about Six Sigma in the curriculum.

6. Create an appropriate assessment program for measuring the proposed program

**Curriculum: Master of Science with Supply Chain/Transportation  
Concentration  
MI-OH University Transportation Center Assessment Plan**

**Vision:**

Our proposed Supply chain/Transportation graduate program focuses on design, analysis and effective operation of supply chains and transportation system for diverse organizations. Our program will prepare our students to assume leadership roles as Supply Chain or Transportation managers and Consultants right after graduation. Our graduates will have the skills and knowledge needed to improve organization's performance from operation, revenue and service view points.

**Learning Objectives;**

They will have two bases – the knowledge base and the technology base.

**Knowledge base:**

Our graduates will fully comprehend:

- How Supply chains and Transportation system are designed and evaluated.
- The flow of information, product, people, equipment through an effective process.
- The management and measurement of customer service and its impact on system.
- The technological choices available to facilitate the management of operations.
- The global nature of system

**Technology base:**

Our graduates should demonstrate competence in these skills:

- Written communication skills

- Presentation Skills
- Team approach skills
- Quality and other analytical skills
- Research skills
- Computer skills (must have ability to use Excel, Word, PowerPoint, Access etc.)

### **Research Project Requirement:**

Each graduate must complete a research project on topics related to Supply Chain /Transportation issues. This must be evaluated by a team of two faculties.

### **Assessment tools:**

The following tools will be used to assess our curriculum

- 1st. **Program Curricula Committee:** Assessment is a continuous process. In order to facilitate this process, a curriculum committee will be formed. This committee will play an active role in implementation process such as upgrading of course, etc.
- 2nd. **Course evaluation:** Semester end evaluation of course contents and instructor will also serve as an important assessment tool.
- 3rd. **Exit Interview:** Every year, department chair or associate dean will meet with graduates to examine perceived adequacy of their educational experience by course and instructor. An exit survey form will be prepared in this context to identify both strengths and weaknesses of the curriculum and also courses.
- 4th. **Placement Data:** Placement data will be collected every year to determine the competitiveness of our students in the market place.
- 5th. **Professional Advisory Board:** The program will have an active advisory board. The board will meet once a year to review programs and assess progress on curriculum initiatives. Each instructor will prepare a binder documenting students' performance by including course outline, sample home assignments, exams and projects if any. Board members will grade binder contents in a scale of 1-5 and provide comments for revision or improvement.
- 6th. **Alumni Meetings:** Annually, a faculty will meet alumni to get feedback regarding their adequacy of their preparation to perform in their jobs. As a



part of this effort, both strengths and weakness of the curriculum will be identified.

- 7.1 Investigate how the courses can integrate in the CE Master of Engineering degree's Transportation focal area.
- 7.2 Analyze how sharing courses between programs helps the feasibility of the launch. Master of Engineering degree's Transportation focal area

*Transportation related courses will be considered as electives by senior or graduate students of Civil & Environmental Engineering. Only problem will be with schedule, if we do not offer in regular time.*

## **Delivery Mode of the Program**

8. Define a structure of the curriculum (e.g. digital media) by which it might be transferable to other universities

One of the outcomes of the curriculum development will be transferability of course and other learning materials. This will be achieved by 1) developing templates for course contents, schedule and other requirements and these templates can then be customized for individual instructor needs, 2) placing materials on pass word secured websites, 3) producing materials in digital format ( CDc, Podcasts? etc.)

9. Business plan for implementing program

See appendix A for Business Plan.

## **Administrative Details**

### 10. Identifying administration and coordination needs

There should be two Program Managers from the University of Toledo and the University of Detroit Mercy to co-ordinate the offering of the joint degrees. These managers should be chosen (elected) from the full-time faculty.

Here is a brief description for the position of the program managers

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#### **Program Managers for the Graduate Degree Program in Supply Chain and Transportation Efficiency (SCT)**

Program Managers for the Graduate Degree Program in Supply Chain and Transportation Efficiency (SCT) develop, implement, and manage the SCT program. Managers will provide leadership and direction in the development of SCT programs. The Managers report to their respective Deans at the University of Detroit Mercy and the University of Toledo.

#### **RESPONSIBILITIES:**

- coordinate SCT program student and academic support;
- provide vision and guidance for Consortium's efforts to internationalize the curriculum;
- discuss the affiliation agreements with other Universities and agencies,
- provide expertise in the cultivation of current linkages with institutions abroad and in the development of new linkages;
- oversee and manage CBA's SCT Programs budget;
- advance international dimensions in research, curriculum and instruction;

#### **Requirements:**

- Demonstrated significant experience with global business programs
  - Teaching experience at graduate levels
  - Experience in curricula development
  - The optimal candidate will be familiar with the best practices of study abroad and will have lived abroad and/or led study abroad programs. Higher education teaching experience and proficiency in a second language is desirable.
  - Excellent communication skills
-

11. Identify potential founding sources to support the program especially through scholarship opportunities for those unable to afford the program

Scholarships are for **current** UDM students unless otherwise listed under criteria

| <b>SCHOLARSHIP<br/>NAME</b>                     | <b>CRITERIA</b>  | <b>CONTACT</b>      |
|---|--|---------------------|
| Continental Teves<br>graduate scholarship       | Currently scholarship including housing are available bilingual international student who wants to earn Master of Engineering degree in Mechanical or Electrical engineering.  | Roxann<br>Alonzo    |
| Helene M. Overly<br>Memorial<br>Scholarship     | a. Open to women<br>b. GPA of 3.0 or higher<br>c. Currently enrolled in a graduate degree program in a transportation-related field, such as transportation engineering, planning, finance or logistics<br>d. Plans to pursue a career in a transportation-related field   | Christina<br>Branch |
| Ann Koby Legacy<br>Scholarship for<br>Graduates | a. Open to women<br>b. GPA of 3.0 or higher<br>c. Currently enrolled in a graduate degree program in a transportation-related field, such as transportation engineering, planning, business management, finance or logistics<br>d. Plans to pursue a career in a transportation-related field<br>e. Applicants for the Ann Koby Legacy Scholarship are asked to specifically address in a personal statement of 1,000 words or less; their vision of how their education will give them the tools to better serve their community's needs and transportation issues. | Christina<br>Branch |

## **Conclusion**

We are facing economic downturn and huge job lost in northern Ohio and southeastern Michigan. Improving transportation efficiency and design and managing of robust supply chains will help to revitalize this depressed region and would make it more competitive to attract economic investments in this area. Over the past decade, few topics have received more attention in the business world than supply chain management (SCM). Integrated supply chain management is now recognized as a core competitive strategy. As organizations continuously seek to provide their products and services to customers faster, better and cheaper than the competition, managers have come to realize that they cannot do it alone. Organizations are now taking a broad "systems" view of the entire supply chain required to design, produce, and deliver their products and services. Businesses are working more closely with both their suppliers and customers to meet the needs of the ultimate consumer. This represents a major change for many organizations. By creating information visibility through the innovative use of information technology, developing collaboration and trust among supply chain member organizations, and integrating and improving supply chain process performance, organizations can transform their supply chains into high-performing value systems. These value systems provide a real competitive advantage in the marketplace.

We need to train and educate professional who would bring their expertise and knowledge to address these critical needs, challenges and opportunities in our region.

## **Future Plan and Recommendation**

1. Review of the curriculum by outside reviewers.
2. Development of the 4 course Certificate Program.
3. Fine tuning of the courses developed in year 1.
4. Review of the existing courses to be included and update those courses for to fit the delivery and needs of the program.
5. Organizational arrangement between UDM and UT.
6. Organizational planning for the program including the delivery format.
7. Structure of the curriculum by which it might be transferable to other universities.

## REFERENCES

**Gallamore, Robert E.** *“The Crisis in Freight Transport & Logistics Education”*, Freight Professional Development, June 27, 2006

**Michigan Employment Forecasts by Occupational Groups (2002 – 2012)**,  
<http://www.milmi.org/?PAGEID=67&SUBID=201>

**Taj, S., Dutta, Utpal, Salehabadi, M, Subba Rao, S., Hong, P., and Mark Vonderembse**, “Supply Chain/Transportation Efficiency Systems Graduate Degree Program” Project 1- MIOH-UTC, May 7, 2007

**U.S. Department of Labor - Bureau of Labor Statistics - Occupational Outlook Handbook**”, <http://www.bls.gov/oco/>

## Appendix A

### A Five-Year (2008-2013) Business Plan

- ✓ Statement of the Business Plan
- ✓ Executive Summary
- ✓ Supply Chain/Transportation Efficiency Systems
- ✓ Statement of SCM Purpose
- ✓ Structure
- ✓ Program
- ✓ Courses
- ✓ Future Extension
- ✓ Marketing
- ✓ Financial Information



# **A Five-Year (2008-2013) Business Plan**

**For Supply Chain/Transportation Efficiency Systems**

**Graduate Degree Program**

**At the**

**University of Detroit Mercy**

**And**

**University of Toledo**

**The Michigan – Ohio (MIOH) University Transportation**

**Center (UTC)**

## **STATEMENT OF THE BUSINESS PLAN**

This Business Plan will determine the development of the University for the next five years, during which time a formal update to the Strategic University Plan 2008–2014 is expected.

With the emergence of global operations strategies of transportation systems at various levels of supply chains, analysis of such systems and chains, and of the integration of transportation systems (such as ITS) is necessary for the realization of these, and is also essential for well-operating systems.

## **EXECUTIVE SUMMARY**

This program would be a collaborative educational and interdisciplinary M.S. degree in Supply Chain/Transportation Systems Efficiency program. This graduate degree program will be one of only a few truly interdisciplinary transportation/supply chain degrees nationwide. It includes two core fields: Supply Chain Design and Management (through the College of Business Administration) and Transportation Efficiency (through the Department of Civil and Environmental Engineering).

Students could have backgrounds as varied as the program itself. These students would have bachelor degrees in Business Administration, Science, Engineering, Sociology, Political Science, and Urban Planning. Because transportation is inherently interdisciplinary, the perspective of many disciplines is needed to solve the complex transportation questions facing the next generation of transportation professionals. The diversity of students and faculty participating in the Supply Chain and Transportation Efficiency Systems program enriches the academic experience and allows the student to see the strength of interdisciplinary approaches to planning, operating, managing and maintaining the next generation of transportation and supply chain systems.

## **SUPPLY CHAIN/TRANSPORTATION EFFICIENCY SYSTEMS**

### **STATEMENT OF SCM PURPOSE**

Master of Science in Transportation/Supply Chain integrates global information and processes across all functions including supply management, operations and logistics for both internal and external partners. SCT professionals are the agents of change for e-business, manufacturing, high tech, service and consulting companies. Transportation Systems Analysis and Planning stress conceptual and quantitative approaches to the analysis of transportation and related systems. Our objective is to prepare our students to identify, analyze, and solve complex transportation and supply chain problems, and to communicate those solutions toward their successful implementation.

### **STRUCTURE**

The Michigan – Ohio (MIOH) University Transportation Center (UTC) was recently created through a grant from the United States Department of Transportation. The MIOH-UTC mission is to significantly improve transportation efficiency, safety and security in Michigan and Ohio and across the nation by increasing the effective capacity of existing transportation infrastructure, reducing transportation energy dependence through alternative fuels, and enhancing supply chain performance. The MIOH mission will be accomplished through

- ✓ The development and organization of new knowledge, technology and management systems;
- ✓ The effective transfer of new and existing knowledge to commercial enterprises and educational communities;
- ✓ The development of a cadre of transportation professionals that is larger, more diverse and better prepared to address the challenges and opportunities of 21st century transportation systems.

### **PROGRAM**

A four-course (12 credit hours) structure certification in SCT, and a Ten-Course (30-credit hours) schedule for the MS in SCT are in place.

The development of a graduate degree in Supply Chain/Transportation Efficiency Systems will bring MIOH-UTC closer to above goals by effective transfer

of new and existing knowledge to educational communities and the development of a cadre of transportation graduates prepared to address the challenges and opportunities of 21<sup>st</sup> century transportation systems.

This is an interdisciplinary M.S. degree in Supply Chain/Transportation Systems Efficiency and would be one of only a few truly interdisciplinary transportation/supply chain degrees nationwide. It includes two core fields: Transportation Efficiency (through the Department of Civil and Environmental Engineering and the College of Business Administration), and supply chain design and management (through the College of Business Administration).

The degree program consists of the following ten courses:

## **COURSES**

11. Transportation Systems Planning and Management
12. Finance and Managerial Accounting
13. Designing and Managing the Global Supply Chain
14. Optimization and Simulation Modeling for Transportation and Supply Chain
15. Transportation/Supply Chain Economics and Public Policy
16. Current Issue in Supply Chain and Transportation (seminar)
17. Strategic Supplier Relationship
18. Outsourcing Strategies for Global Supply Chains
19. Advances in Supply Chain and Information Technology
20. Systems and Project Management

Total number of credits required for graduation = 30

**Table 1: Course Chart**

| SCT Courses | Course Title   | Existing Courses<br>D-UDM<br>T-UT     | Faculty           |             |                                     |
|-------------|--|---------------------------------------|-------------------|-------------|-------------------------------------|
|             |  |                                       | UDM Faculty       | UT Faculty  | Industry Experts as Guest Lecturers |
| SCT xxx     | Transportation Systems Planning and Management                           | New Course<br><i>(MIOH-UTC Grant)</i> | Dutta             |             | Louis Lambert?                      |
| SCT xxx     | Finance and Managerial Accounting  | D-MPD540                              | David             |             |                                     |
| SCT xxx     | Designing and Managing the Global Supply Chain                           | D-EMB620<br>T-BUAD6600                | Taj               | ?           |                                     |
| SCT xxx     | Optimization and Simulation Modeling for Supply Chain and Transportation | New Course<br><i>(MIOH-UTC Grant)</i> | Taj               |             |                                     |
| SCT xxx     | Transportation/Supply Chain Economics and Public Policy                  | New Course                            | Brorby?<br>Dutta? |             | Louis Lambert?                      |
| SCT xxx     | Current Issue in Supply Chain and Transportation (seminar)               | New Course<br><i>(MIOH-UTC Grant)</i> |                   | Hong        |                                     |
| SCT xxx     | Strategic Supplier Relationship  | New Course<br><i>(MIOH-UTC Grant)</i> |                   | Vonderembse |                                     |
| SCT xxx     | Outsourcing Strategies for Global Supply Chains                          | T-MKTG6080?                           |                   | ?           |                                     |
| SCT xxx     | Advances in Supply Chain and Information Technology                      |                                       |                   | ?           |                                     |
| SCT xxx     | Systems and Project Management (MPD520)                                  | D-MPD520                              | Nivi & Adjunct    |             |                                     |

## **FUTURE EXTENSION**

We are facing economic downturn and huge job lost in northern Ohio and southeastern Michigan. Improving transportation efficiency and design and managing of robust supply chains will help to revitalize this depressed region and would make it more competitive to attract economic investments in this area. Over the past decade, few topics have received more attention in the business world than supply chain management (SCT). Integrated supply chain management is now recognized as a core competitive strategy. As organizations continuously seek to provide their products and services to customers faster, better and cheaper than the competition, managers have come to realize that they cannot do it alone. Organizations are now taking a broad "systems" view of the entire supply chain required to design, produce, and deliver their products and services. Businesses are working more closely with both their suppliers and customers to meet the needs of the ultimate consumer. This represents a major change for many organizations. By creating information visibility through the innovative use of information technology, developing collaboration and trust among supply chain member organizations, and integrating and improving supply chain process performance, organizations can transform their supply chains into high-performing value systems. These value systems provide a real competitive advantage in the marketplace.

We need to train and educate professional who would bring their expertise and knowledge to address these critical needs, challenges and opportunities in our region.

In the period beyond this Five Year Business Plan:

- ✓ Extension of SCT programs to other universities in some European countries and some Asian countries, such as China, Taiwan, and India.
- ✓ Development of remote campuses
- ✓ Production of a textbook series on Supply Chain/ Transportation Efficiency Systems.
- ✓ Creation of a SCT Incubator to foster careers in this field and businesses that support them.

## **MARKETING**

### Near-term – 1 to 6 months

1. Immediately launch an awareness effort to prospective companies through the Alumni network via personal presentations to select groups.
2. Meet personally with Advisory Board members and similar SCT firms in the area to recruit students
3. Use the MIOH-UTC website to promote the program.
4. Conduct a direct mailing to all students inquiring about Business School graduate programs at UDM and at UT and current graduate students in Business and Engineering.

### Intermediate Term – 6 to 18 months

1. Explore non-conflicting opportunities with TMA and other professional organizations.
2. Develop a web-based campaign for SCT
3. Implement a direct mail recruiting program and target the area from Toledo to Jackson to Flint to London, ONT.
4. Use the University Business office and informal network to get newspaper, radio and TV exposure in the local market

### Long-term – 12 months and beyond

1. Develop the distance-learning curriculum and technology to broaden the potential market.
2. Offer Executive weeklong courses to broaden the exposure to the subject and the students.
3. Conference booth?
4. Audio and video Pod cast?



**FINANCIAL INFORMATION**

**ESTIMATED REVENUES**

**Table 2: ESTIMATED REVENUES**

| SCT Program   | Revenue/Cost Components  | Fiscal Year |           |           |             |             |             |
|---|--|-------------|-----------|-----------|-------------|-------------|-------------|
|   |  | 2008-2009   | 2009-2010 | 2010-2011 | 2011-2012   | 2012-2013   | 2013-2014   |
| <b>Certification<br/>(Minimal<br/>Credit hours:<br/>12)</b> | Number of projected students                                   | 10          | 15        | 15        | 15          | 15          | 15          |
|   | Number of credit hours at 12 credit hours per student per year | 120         | 180       | 180       | 180         | 180         | 180         |
|   | Credit Hour Revenue (Note 1)                                   | \$132,000   | \$207,900 | \$218,295 | \$229,210   | \$240,670   | \$252,704   |
| <b>Masters<br/>(Minimal<br/>Credit hours:<br/>30)</b>       | Number of projected students(First Year)                       | 20          | 25        | 25        | 30          | 30          | 30          |
|   | Number of credit hours at 30 credit hours per student per year | 600         | 750       | 750       | 900         | 900         | 900         |
|   | Credit Hour Revenue (Note 1)                                   | \$660,000   | \$866,250 | \$909,563 | \$1,146,049 | \$1,203,351 | \$1,263,519 |

|                                 |           |             |             |             |             |             |
|---------------------------------|-----------|-------------|-------------|-------------|-------------|-------------|
| <b>Total Revenue</b>            | \$792,000 | \$1,074,150 | \$1,127,858 | \$1,375,259 | \$1,444,021 | \$1,516,222 |
| <b>Total Cumulative Revenue</b> | \$792,000 | \$1,866,150 | \$2,994,008 | \$4,369,266 | \$5,813,287 | \$7,329,510 |

**Note 1: Revenue per credit hour assumed as \$1,100 throughout 2008-2014. escalated at 5% per year.**

## ESTIMATED COSTS

**Table 3: ESTIMATED COSTS**

| SCT Program                                     | Revenue/Cost Components                                  | Fiscal Year |           |           |           |           |           |
|---|--|-------------|-----------|-----------|-----------|-----------|-----------|
|   |  | 2008-2009   | 2009-2010 | 2010-2011 | 2011-2012 | 2012-2013 | 2013-2014 |
| <b>All Programs:<br/>Course<br/>Development</b> | Number of courses to be developed or revised             | 4           | 0         | 0         | 0         | 0         | 0         |
|   | Number of courses offered                                | 10          | 10        | 10        | 10        | 10        | 10        |
|   | Course development (Note 2)                              | \$40,000    | \$0       | \$0       | \$0       | \$0       | \$0       |
|   | Number of Graduate Research Assistants at one per course | 10          | 10        | 10        | 10        | 10        | 10        |
|   | Research Assistant (Note 3)                              | \$28,050    | \$29,453  | \$30,925  | \$32,471  | \$34,095  | \$35,800  |
|   | Library support  | \$3,000     | \$3,300   | \$3,600   | \$3,900   | \$4,200   | \$4,500   |
| <b>Total Course Development cost</b>            |  | \$71,050    | \$32,753  | \$34,525  | \$36,371  | \$38,295  | \$40,300  |

**Note 2: Course development costs assumed to be \$10,000 per course including books.**

**Note 3: Research and Teaching Assistants at 3 credit hours per course.**

**\$935 per credit hour, and escalated at 5% per year.**

| SCT Program                             | Revenue/Cost Components                               | Fiscal Year |           |           |           |           |           |
|---|---|-------------|-----------|-----------|-----------|-----------|-----------|
|   |   | 2008-2009   | 2009-2010 | 2010-2011 | 2011-2012 | 2012-2013 | 2013-2014 |
| <b>Other<br/>Operating<br/>Expenses</b> | Faculty Salaries, benefits, overheads (Note 4)        | \$100,000   | \$280,000 | \$294,000 | \$308,700 | \$324,135 | \$340,342 |
|   | Faculty development: Travel, conferences, seminars    | \$10,000    | \$15,000  | \$20,000  | \$20,000  | \$20,000  | \$20,000  |
|   | Conceptual / empirical research                       | \$0         | \$15,000  | \$15,000  | \$15,000  | \$15,000  | \$15,000  |
|   | IT/Lap tops/other office costs                        | \$5,000     | \$5,500   | \$6,050   | \$6,660   | \$7,330   | \$8,060   |
|   | Advertising   | \$10,000    | \$12,500  | \$15,000  | \$17,500  | \$20,000  | \$20,000  |
|   | Promotions (Brochures, PR, Website development, etc.) | \$10,000    | \$12,500  | \$15,000  | \$17,500  | \$20,000  | \$20,000  |
|   | Program Manager Salary                                | \$35,000    | \$36,750  | \$38,590  | \$40,520  | \$42,550  | \$44,680  |

|                                      |           |           |           |           |           |           |
|--------------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| <b>Total Other Operating Expense</b> | \$170,000 | \$377,250 | \$403,640 | \$425,880 | \$449,015 | \$468,082 |
|--------------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|

**Note 4: For 2008-2009 Courses are paid @ \$10,000 per course to full-time faculty.**

**For 2009-2010 two faculty would be hired at \$100,000 base salary + 40% benefits and escalated at**

**5% per year.**

**Each faculty will teach 6 courses per year.**

|   |           |           |           |           |           |           |
|---|-----------|-----------|-----------|-----------|-----------|-----------|
| <b>Total Operating Expense:</b>                                 |           |           |           |           |           |           |
| <b>Total BTM Programs<br/>Development + Operating<br/>Costs</b> | \$241,050 | \$410,003 | \$438,165 | \$462,251 | \$487,310 | \$508,381 |

## ESTIMATED CAPITAL AND START-UP COSTS

**Table 4:** ESTIMATED CAPITAL AND START-UP COSTS

| SCT Program                       | Revenue/Cost Components   | Fiscal Year |           |           |           |           |           |
|-----------------------------------|---|-------------|-----------|-----------|-----------|-----------|-----------|
|                                   |   | 2008-2009   | 2009-2010 | 2010-2011 | 2011-2012 | 2012-2013 | 2013-2014 |
| <b>Program<br/>Start-up</b>       | Faculty recruiting incentive<br>(e.g., national search, recruit<br>relocation, and housing) |             | \$50,000  |           |           |           |           |
|                                   | Inaugural consultation  | \$10,000    |           |           |           |           |           |
|                                   | Promotion: Printed material,<br>travel in and out, media<br>advertising                     | \$15,000    |           |           |           |           |           |
| <b>Long-distance<br/>Learning</b> | Broadcast and communication<br>equipment for LD learning                                    |             | \$125,000 | \$50,000  |           |           |           |
| <b>Program<br/>Support</b>        | Knowledge Lab   | \$50,000    |           |           |           |           |           |
| <b>Total Capital Expenses</b>     |   | \$75,000    | \$175,000 | \$50,000  | \$0       | \$0       | \$0       |

## ESTIMATED NET INCOME

**Table 5: ESTIMATED NET INCOME**

|  |  | 2008-2009        | 2009-2010        | 2010-2011        | 2011-2012        | 2012-2013          | 2013-2014          |
|--|--|------------------|------------------|------------------|------------------|--------------------|--------------------|
| <b>REVENUE</b>   |  |                  |                  |                  |                  |                    |                    |
| <b>Credit Hour Revenue</b>   | <b>On-site Certificate</b>                                   | \$132,000        | \$207,900        | \$218,295        | \$229,210        | \$240,670          | \$252,704          |
|  | <b>On-site Masters</b>                                       | \$660,000        | \$866,250        | \$909,563        | \$1,146,049      | \$1,203,351        | \$1,263,519        |
|  | <b>Total Revenue</b>   | \$792,000        | \$1,074,150      | \$1,127,858      | \$1,375,259      | \$1,444,021        | \$1,516,222        |
| <b>COSTS</b>   |  |                  |                  |                  |                  |                    |                    |
| <b>Development Costs</b>   | <b>Course development</b>                                    | \$40,000         | \$0              | \$0              | \$0              | \$0                | \$0                |
|  | <b>Research Assistant</b>                                    | \$28,050         | \$29,453         | \$30,925         | \$32,471         | \$34,095           | \$35,800           |
|  | <b>Library support</b>                                       | \$3,000          | \$3,300          | \$3,600          | \$3,900          | \$4,200            | \$4,500            |
|  | <b>Total Development Costs</b>                               | \$71,050         | \$32,753         | \$34,525         | \$36,371         | \$38,295           | \$40,300           |
| <b>Other Costs</b>   | <b>Faculty Salaries, benefits, overheads</b>                 | \$100,000        | \$280,000        | \$294,000        | \$308,700        | \$324,135          | \$340,342          |
|  | <b>Faculty Development</b>                                   | \$10,000         | \$15,000         | \$20,000         | \$20,000         | \$20,000           | \$20,000           |
|  | <b>IT/Lap tops/other office costs</b>                        | \$5,000          | \$5,500          | \$6,050          | \$6,660          | \$7,330            | \$8,060            |
|  | <b>Advertising</b>   | \$10,000         | \$12,500         | \$15,000         | \$17,500         | \$20,000           | \$20,000           |
|  | <b>Promotions (Brochures, PR, Website development, etc.)</b> | \$10,000         | \$12,500         | \$15,000         | \$17,500         | \$20,000           | \$20,000           |
|  | <b>Program Manager Salary</b>                                | \$35,000         | \$36,750         | \$38,590         | \$40,520         | \$42,550           | \$44,680           |
|  | <b>Total Other Costs</b>                                     | \$170,000        | \$362,250        | \$388,640        | \$410,880        | \$434,015          | \$453,082          |
| <b>Total Operating Expense: Total SCT Programs Development + Operating Costs</b> |  | \$241,050        | \$395,003        | \$423,165        | \$447,251        | \$472,310          | \$493,381          |
| <b>Net Program Income</b>  |  | \$622,000        | \$711,900        | \$739,218        | \$964,379        | \$1,010,006        | \$1,063,141        |
| <b>Total Capital Expenses</b>  |  | \$75,000         | \$175,000        | \$50,000         | \$0              | \$0                | \$0                |
| <b>Net cash flow</b>   |  | <b>\$547,000</b> | <b>\$536,900</b> | <b>\$689,218</b> | <b>\$964,379</b> | <b>\$1,010,006</b> | <b>\$1,063,141</b> |
| <b>Percentage Growth</b>   |  |                  | -1.85%           | 28.37%           | 39.92%           | 4.73%              | 5.26%              |
| <b>Compound Annual Growth Rate for 2008-2014</b>                                 |  |                  | 14.21%           |                  |                  |                    |                    |

## Appendix B

The syllables for current courses

### **University of Detroit Mercy**

**SCT xxx: Optimization and Simulation Modeling for Supply Chain and Transportation**

**SCT xxx: Transportation System Planning and Management**

### **University of Toledo**

**SCT xxx: Strategic Supplier Relationships**

**SCT xxx: Current Issues in Supply Chain and Transportation**

**SCT xxx: Advances in Supply Chain and Information Technology Management**

## UNIVERSITY OF DETROIT MERCY

### SCT xxx: Optimization and Simulation Modeling for Supply Chain and Transportation

**Credit Hours: 3**

Pre-requisite: SCT Students

**Course Faculty and Teaching Assistant**

Faculty: Dr. Shahram Taj

Office: Room CF141

Tel & Voice Mail: 313-993-1214

Fax: 313-993-1673

E-mail: shahram.taj@udmercy.edu

Office Hours:

Graduate Assistant:

**Educational objectives**

You should be able to:

- Understand the process of decision-making for SCT
  
- Describe the value of analytical and quantitative methods for strategic, tactical, and operational levels decisions in SCT
  
- Construct various optimization and simulation models as decision support systems for use in SCT
  
- Determine what alternatives are relevant and carry out the analysis in order to make an objective assessment of the most suitable plan of actions
  
- Develop optimization/simulation models to meet the needs of your organization

**COURSE DESCRIPTION**

Application-oriented introduction to optimization and simulation focuses on understanding system tradeoffs. Introduces modeling methodology (linear, integer and nonlinear programming, genetic algorithms), modeling tools (sensitivity and

post-optimality analysis), and discrete-event simulation with their applications in supply chain and transportation.

### **COURSE OBJECTIVES**

The objectives of the course are to introduce SCT students to the process of decision-making and familiarize them with various modeling approaches in decision support systems for use in SCT. Decision-making is an emerging area of considerable importance to practicing managers. These decisions may involve design of production facilities or even a whole supply chain, the allocation of scarce resources such as people, money, equipment, and facilities to competing entities and can affect the success of corporations. The challenge to a good decision maker is to be able to determine what alternatives are relevant and carry out the analysis in order to make an objective assessment of the most suitable plan of actions. Models help the decision maker predict world phenomena with sufficient consistency and accuracy.

Instructional methods are lecture, cases, and team projects.

### **TEXT**

Required:

1. Ragsdale, C.T. **Spreadsheet Modeling and Decision Analysis: A Practical Introduction to Management Science**, 5<sup>th</sup> Edition, Thomson South-Western College Publishing, 2007.
  - a. Chapter 3
  - b. Chapter 5
  - c. Chapter 6 – pages 249-268
  - d. Chapter 8 - pages 344-360
2. Bertsimas, Dimitris, and Robert M. Freund. **“Data, Models, and Decisions: The Fundamentals of Management Science.”** Dynamic Ideas, 2004.
  - a. Chapter 7,8,9
3. Simul8 – Version 12 – Simulation Materials – Web access
4. Cases –
  - a. **Applichem, Janice H. Hammond, Gary P. Pisano**, Harvard Business School



## **TECHNOLOGY**

We will utilize **Microsoft Excel –Solver** and the discrete-event simulation software-**Simul8** in modeling and solution. We will also utilize the **Blackboard Learning System** – [knowledge.udmercy.edu](http://knowledge.udmercy.edu) throughout the course. All lecture notes, solutions, and announcements will be placed on the course web site. You must submit your assignment to the digital drop box at the course web site. The textbook's web site, <http://ragsdale.swlearning.com> is also a good source for students and it has suggestions for the Excel review.

We will use multiple approaches to accomplish these objectives. During the course of the term, you will be asked to:

- Prepare cases, readings and exercises for class discussion.
- Complete problem sets to practice the tools learned.
- Prepare written analyses of selected cases.

## **Group Preparation**

Group work is not only acceptable, but encouraged for purposes of general class preparation and for the written assignments. For written assignments (both cases and problem sets) your group size should be a maximum three students, and discussion of the assignment should be limited to members of your group.

## **Class Discussion**

In a typical live class session, one or more students will be asked to begin the discussion by addressing specific questions. If you have thoroughly prepared the case or reading, you should have no difficulty handling such a lead-off request. After a few minutes of initial analysis and recommendations, discussion will be opened to the rest of the class. As a group, we will build a complete analysis of the situation and address the problems and issues it presents. We will also talk about the implementation of those recommendations. Frequently, the final portion of the class will be a lecture/discussion of concepts and techniques brought out in the case or reading, but useful in a much broader range of situations.

Most managers spend very little time reading and even less time writing reports. Most of their interactions are verbal. This is especially true for managers in SCT-intensive settings. For this reason, the development of verbal skills is given a high priority in this course. The classroom should be considered a laboratory in which you can test your ability to present your analyses and recommendations clearly, to

convince your peers of the correctness of your approach to complex problems, and to illustrate your ability to achieve the desired results through the implementation of that approach.

Some of the criteria that we will use to judge effective class participation for grading purposes include:

1. Is the participant a good listener?
2. Are the points made relevant to the current discussion? Are they linked to the comments of others?
3. Do the comments show clear evidence of appropriate and insightful analysis of the case data?
4. Is there willingness to participate?
5. Is there willingness to test new ideas or are all comments "safe"?
6. Do comments clarify and highlight the important aspects of earlier ideas and lead to a clearer statement of the relevant concepts and issues?

### **Written Assignments**

In preparing the written cases analyses, please adhere to the following guidelines:

1. Work in groups of three students. (Groups of four or more are disallowed.) We discourage individual work on written assignments as we have found that groups develop significantly better solutions, and that you learn from one another in group interactions.
2. Hand in one copy of the case write-up for each group.
3. Written assignments are to be turned in at the beginning of class on the day they are discussed.
4. Please keep a copy for your own use during class discussion if you wish.
5. Written assignments should be at most 1500 words and five pages of exhibits. This is a firm constraint. Exhibits should contain specific types of analyses, such as financial analysis, break-even charts, cost analysis, process-flow analysis, etc. They should contain any relevant supporting information that is too detailed for the body of the paper. Exhibits must not be simply an extension of the text.

We will not distribute written solutions to the write-ups, but rather will rely on the class session associated with the case to bring out the most important issues. The case write-ups will be graded using the following criteria:

### Analysis

1. Does the paper contain analysis of the major issues?
2. Does the analysis incorporate the relevant tools properly?
3. Are assumptions made in the analysis stated explicitly?
4. Does the analysis isolate the fundamental causes of problems in the case?

### Recommended Actions

1. Are the criteria for choosing among alternative recommendations stated?
2. Are the criteria appropriate?
3. Is the plan of action integrated in a logical way and linked to the analysis?
4. Is the action plan specific, complete, and practical?
5. Is it likely that the recommendations will achieve their intended results?

### Exhibits

1. Are the analyses in the exhibits done correctly?
2. Do the exhibits support and add to the text on key points?

### Presentation

1. Is the paper too long?
2. Is the presentation of professional quality?
3. Is the paper logically consistent and effectively structured to sell its recommendations?

### **Grading**

The grading will be weighted as follows:

- 10% on class participation, based on criteria above
- 20% on group case write-ups, based on criteria above
- 20% on other group homework assignments
- 20% on course project
- 30% on exam

### Grade Distribution:

|    |             |    |             |
|----|-------------|----|-------------|
| A  | 93.0 - 100  | B- | 80.0 - 82.9 |
| A- | 90.0 - 92.9 | C+ | 77.1 - 79.9 |
| B+ | 87.1 - 89.9 | C  | 70.0 - 77.0 |
| B  | 83.0 - 87.0 | D  | 60.0 - 69.0 |

**ACADEMIC INTEGRITY** - Please refer to Academic Information and Procedures in the Graduate Catalog.

**Attendance Policy:**

- Attendance is taken at the beginning of each class
- You need my permission to arrive late or leave early
- You will lose 10% with more than two unexcused absences.

**Other Administrative Information**

Please be prepared for every class. Since I frequently call on individuals directly, you should let me know before class if you have not been able to prepare adequately. In these situations I still encourage you to attend. I would rather you attend unprepared than not at all.

To help the faculty and teaching assistant learn your names as quickly as possible, we ask that you use a name card during sessions and to let us know who you are before you speak.

**Course Project**

A term project is expected from every student. Students will work in teams (maximum 3). Each team will work on an actual real-world situation in SCT. Teams will analyze the problem, collect data, propose a model to attack the problem, find alternatives to solve the problem and recommend the suitable course of actions to the real-world problem. The final analysis and recommendation must be understandable by THE TOP MANAGEMENT.

You may select the problem to be studied from your place of employment or any other source that you find appropriate. Each team must submit a proposal (3-5 pages). The proposal should include the problem to be studied, data collection approach, and proposed solution technique. It should also identify group members and each member's assigned responsibility. You are encouraged to talk to me about your ideas before the deadline. Your project's grade will be based on accuracy, creativity, appropriateness, and communication.

**NOTE:**

- Your proposal and final report should be typed double-spaced, on one side of standard 8 1/2 by 11 sheets.
- The Final Report **SHOULD BE 10-12** pages

- Your proposal and Final Report should have **EXPLANATORY TITLES**

**PROPOSAL DEADLINE:**

**PRESENTATION AND PAPER DEADLINE: Session 7**

**COURSE CALENDER/SCHEDULE:**

*(TENTATIVE AND SUBJECT TO CHANGE)*

| Session | Date | Topic   | Reading  |
|---------|------|---|--|
| 1       |      | <p><b>Introduction,</b><br/>Managerial decision making, model building, managerial problems.</p> <p><b>Introduction to Optimization &amp; Linear Programming,</b><br/>Application of Mathematical Optimization, Linear Programming.</p>   | Bertsimas & Freund - Case - New Bedford Steel Coking Coal Supply Problem   |
| 2       |      | <p><b>Modeling and Solving LP Problems in a Spreadsheet</b><br/>Spreadsheet Solvers, Solving LP problems in a spreadsheet.</p> <p><b>More LP Problems and Sensitivity Analysis</b><br/>LP Examples in SCT (make or buy, production planning, Data Envelopment Analysis) Analysis of the solutions, duality, sensitivity (postoptimality) analysis</p> | <p>Ragsdale - Chapter 3 and 4</p> <p>Bertsimas &amp; Freund - Case – Sytech International – Global supply chain and aggregate planning</p> <p>Bertsimas &amp; Freund - Case – Filatoi Riuniti – Optimizing outsourcing and production planning</p> |
| 3       |      | <p><b>Network Modeling</b><br/>The Transportation, Transshipment, and Assignment problems.</p> <p><b>Supply Chain Network Modeling</b></p>  | <p>Ragsdale - Chapter 5</p> <p>Case - Applichem, Harvard Business School</p>   |
| 4       |      | <p><b>Integer Optimization Applications in SCT</b><br/>Capital budgeting, contract award</p>  | <p>Ragsdale - Chapter 6 and 8</p> <p>Bertsimas &amp; Freund - Case –</p>   |

|   |  |   |  |
|---|--|---|--|
|   |  | <p>problem.</p> <p><b>Nonlinear Optimization Applications in SCT</b></p> <p>EOQ model, facility location problems</p> | <p>TRD, Inc - Strategic Relocation Case– Supply Chain Management at Delmar, Inc.</p> <p>Case: Safety Trans Company - Selecting the safest route by maximizing the probability of not having an accident.</p> |
| 5 |  | <b>Simulation with Simul8</b>   | Simul8 Student Workbook  |
| 6 |  | <b>Simulation with Simul8</b>   | Simul8 Student Workbook  |
| 7 |  | Group Presentation  |  |

**University of Detroit Mercy**  
**College of Engineering & Science**

**SCT XXX - Transportation System Planning and Management**

**Catalog description**

3 credit hours. Prereq:

Attributes of the various modes of transportation, with a special emphasis on freight transportation. Factors that influence system demand, costs, market structures, carrier pricing, and carrier operating and service characteristics and their influence on other supply chain costs and supply chain performance.

**Outcome:**

At the end of this class, students should be able to

1. Identify cost and other operating characteristics of various modes of Transportation.
  
2. Determine factors that influence system demand and operations.

**Instructor:**

Dr. Utpal Dutta  
Civil & Environmental Engineering  
E265  
Phone (313)9931040

**Textbook**

John J. Coyle, Edward J. Bardi, and Robert A. Novack, Transportation, Sixth Edition, Thomson: South-Western, 2006.

## Schedule

### Session

#### 1. Theme: The Role and Importance of Transportation

- Transportation, the Supply Chain, and the Economy (Historical, economic, environmental, social and political significance of Transportation. Trends, demand, value of services. Case studies)
- Transportation Regulation and Public Policy (Development of regulations, authorities State, Fed. Deregulation and its impact on services. Case studies)

#### 2. Theme: Overview of Transportation Providers

- Motor Carriers (Brief history, overview, characteristics, cost structure, issues. Case studies)

#### 3. Theme: Overview of Transportation Providers Continued

- Railroads (Brief history, overview, characteristics, cost structure, issues. Case studies)
- Air Carriers (Brief history, overview, characteristics, cost structure, issues Competition, rates. Case studies)

#### 4. Theme: Overview of Transportation Providers Continued

- Water Carriers and Pipelines (Brief history, overview, characteristics, cost structure, issues. Case Studies)
- Intermodal and Special Carriers (Third-party Transportation, development of special carriers, service. Case Studies)
- Midterm

#### 5. Theme: Transportation Management

- Costing and Pricing in Transportation (Cost of service pricing, value of service pricing, regulation, special rates. Case studies)
- Carrier Strategies (Carrier operating conditions, performance measures, safety. Case studies)
- Shipper Strategies/Process (General strategies, buyer/seller relationship, challenges, bidding process. Case studies)



## **6. Theme: Global Transportation**

- Global Transportation (Global commerce, issues, culture, politics, rates. Case Studies)
- Information Management & Technology (Information sources, RFID, Internet and Case studies)

**University of Toledo**  
**Course Outline**  
**SCT xxx - Strategic Supplier Relationships**

Educational objectives:

You should be able to:

- Understand the growing importance of supply chain management for both service and manufacturing businesses
- Explain that supply chain management has a strategic as well as an operating perspective and that it is becoming part of a global phenomenon
- Design supply chains to meet the needs of your organization – supply chain design is not one-size-fits-all
- Describe the value of creating effective supplier relationships
- Develop and follow an approach to managing supply chains
- Construct methods for selecting and evaluating suppliers
- Work with suppliers to design and implement programs that improve performance and lead to integration among the firms
- See the important role that suppliers have in determining quality
- Share the benefits of improvements with suppliers
- Serve as a leader or contributing member on a team to design and/or manage supply chains
- Work directly with suppliers to improve performance

### Course Description:

Competition is no longer company versus company; it is supply chain versus supply chain. More and more, companies are counting on their suppliers to lower costs, improve quality, and develop innovations. The success of a firm and its ability to satisfy customer expectations are influenced greatly by the capabilities and performance of its suppliers. The objectives of this course are to understand the relationship between suppliers and customer, determine which elements in the relationship are critical, examine how relationships vary among industries and products, and develop and implement effective supplier relationships. The course should help firms identify ways to categorize and organize suppliers, build and retain good supplier relationships, and ensure that suppliers meet quality and delivery requirements. This should lead to a better understanding of supplier relationships so that better strategic sourcing decisions can be made. Using this approach, companies can reduce enterprise spending, consolidate and prioritize suppliers, reduce supplier risk, and align procurement strategies with corporate goals.

### Session 1:

#### Topic:

1. Course Overview and Syllabus Review
2. Introductions
3. Overview of Supply Chain Management
4. Supply Chain Management: A Global and Strategic Perspective

#### Readings:

- ✓ Skinner, Wickham, "The Taming of Lions: How Manufacturing Leadership Evolved," *In the Uneasy Alliance: Managing the Productivity – Technology Dilemma*, (Edited by Clark, Hayes, and Lorenz), pp. 63-110. The Harvard School Press, Boston, MA, 1985.
- ✓ Doll, William and Vonderembse, Mark A., "The Evolution of Manufacturing Systems: Towards the Post-Industrial Enterprise," *OMEGA International Journal of Management Science*, Vol. 19, No. 5, pp. 401-411, 1991.
- ✓ Chapter 1, 2, and 4 in: Vonderembse, Mark A. "Building Supplier Relationships that Enhance Manufacturing Performance," Spiro Press, London, 2002.
- ✓ UPS Supply Chain Solutions: Harley-Davidson Motor Company Mini-Case

Session 2:

Topic:

1. Supply Chain Fundamentals: Supplier Relationship Management a Critical Part of the Supply Chain
2. Presentation of Company Supply Chain (Each student to present his/her company's supply chain)
3. Supply Chain Design: A Key to Sustainable Competitive Advantage

Readings:

- ✓ Chapter 3 and 7 in: Vonderembse, Mark A. "Building Supplier Relationships that Enhance Manufacturing Performance," Spiro Press, London, 2002.
- ✓ Vonderembse, Mark A., Uppal, Mohit, Huang, Samuel H., and Dismukes, John P., *International Journal of Production Economics*, Vol. 100, pp. 223-238, 2006.
- ✓ Supply Chain Design Mini-Case
- ✓ Best Buy's Customer Facing Supply Chain (HBS Reprint P0601A)

Session 3:

Topic:

1. Framework for Effective Supply Chain Management
2. Understanding and Assessing Supplier Capabilities
3. Supplier Selection Process

Guest Speaker

Readings:

- ✓ HBR Spotlight: The 21<sup>st</sup> Century Supply Chain Collection (HBS Reprint 8444)

Case/Article Discussion:

- ✓ Strategic Supplier Segmentation: The Next "Big Practice" in Supply Chain Management (California Management Review Reprint CMR102 through HBS)
- ✓ Supply Chain Management at World Co., LTD. (HBS Case 9-601-072)

#### Session 4:

##### Topic:

1. Supplier Performance Measures and Metrics
2. Develop and Implement Plans and Programs
3. Review for Midterm Examination

##### Guest Speaker:

##### Readings:

- ✓ Supply Chain Practices: Benchmarking the Nation's Best Hospitals

##### Case/Article Discussion:

- ✓ Buyer-Supplier Relationships (Center for Asian Business Cases Reprint HKU257 through HBS)
- ✓ Improving Supply Chain Performance: The Case of Modine Manufacturing and DaimlerChrysler

#### Session 5:

##### Topic:

1. Quality and Supply Chain Management
2. Sharing Process Improvements with Suppliers

##### Case Presentation:

- ✓ Excel plc – Supply Chain Management at Haus Mart (HBS Case 9-605-080)
- ✓ Dell: Overcoming Roadblocks to Growth (Asia Case Research Center Reprint HKU575 through HBS)

#### Session 6

##### Topic:

1. The Balance Score Card and Supply Chain Management  
[www.balancedscorecard.org](http://www.balancedscorecard.org)
2. The SCOR Model for evaluating supply chain performance  
[www.supply-chain.org](http://www.supply-chain.org)

Readings:

- ✓ What is the Balanced Score Card?
- ✓ Supply-Chain Operations Reference-Model Version 8.0, Supply-Chain Council

Case Presentation:

- ✓ Boeing Australia Limited: Assessing the Merits of Implementing a Sophisticated e-Procurement System (Center for Asian Business Cases Reprint HKU271 through HBS)
- ✓ Metal Craft Supplier Scorecard (HBS Case 9-102-047)
- ✓ Numico (A): Delivering Innovation Through the Supply Chain and Numico (B): Transforming The Supply Chain to Support New Realities

Session 7:

Project Presentations

**University of Toledo**  
**Course Outline**  
**SCT xxx -Current Issues in Supply Chain and Transportation**

**Educational objectives:**

Students should be able to:

- Understand the current issues of supply chain and transportation management for both service and manufacturing businesses
- Explain that supply chain and transportation management has a strategic as well as an operating perspective in the global business environment
- Design supply chains and transportation networks to meet the needs of your organization
- Familiarize with the methods for evaluating and designing supply chain and transportation systems
- Work with supply chain and transportation managers to design and implement programs that improve value-chain performance
- Understand the strategic roles that supply chain and transportation functions have in creating values
- Serve as a leader or contributing member on a team to design and/or manage supply chains and transportation
- Work directly with supply chain and transportation professionals to improve performance

### **Course Description:**

Business practices in relation to supply chain, transportation and logistics are constantly changing in response to rapid environmental changes occurring in global business reality. This is an integrative course designed to study contemporary problems and issues in supply chain, transportation, and logistics. This is a course that combines case discussion and exploration of current issues where each week, students will be expected to analyze and prepare supply and logistics cases and current issues in contemporary settings. Emphasis will be on developing analytical and problem-solving and sound managerial decision-making skills. The major objective is to examine and evaluate real business problems and current issues of supply chain and transportation management issues. Emphasis is on learning solid theory-based with diagnostic skills to discover underlying causes and on proposing solutions that are workable in the specific case setting.

### **Instructor:**

Paul Hong, Ph.D., CMA

Information Operations and Technology Management

College of Business Administration

University of Toledo

ST 4042

Phone (419)530-2054

<http://homepages.utoledo.edu/phong/>

### **Textbook and Reading Materials**

Supply Chain Management: Strategy, Planning, & Operation. Sunil Chopra and Peter Meindl (C & M). Third Edition, Prentice Hall, 2007.

The articles listed below can be found in: <http://www.ohiolink.edu/> Select E-Journal Finder. You may type the name of Journal in Search Column. Then find the year and issue and look for articles. Most articles are in PDF format

Cases will be separately ordered.



## **TECHNOLOGY**

We will utilize **Microsoft Excel –Solver**. We will also utilize the **WebCT**. WebCT is widely used at the University of Toledo for all Distant Learning courses; Students using WebCT will have accesses for all the lecture materials—all print, audio and video materials. Students will be able to interact with faculty and other students for needed conferences. The knowledge homepage is at the following address: <http://www.utoledo.edu/dl/>.

All lecture notes, solutions, and announcements will be placed on the course web site. Students will submit their assignment to the digital drop box at the course web site.

### **Article/Case Presentations**

For article presentation, explain/discuss the following:

- (1) Key contexts, issues and findings (i.e., understand, organize and clarify)
- (2) Practical Implications and lessons.
- (3) Questions for the class

Case presentation:

- (1) Contexts of the case
- (2) Apply relevant concepts/theories from the chapter
- (3) Answer the questions and discuss lessons/implications of the case.

The length of the above presentations will be about 15 minutes with 10-15 minutes of follow-up questions and discussions.

## **Project**

This is a project that can be done individually or in groups. The expected project outcomes are as follows:

- To analyze an existing transportation process and suggest any improvements that need to be made. Examples include a study of the distribution system for a service operation, design of a logistics system for a manufacturer, and an analysis of intermodal movement for a railroad.
- To study transportation practices in industry from the point of describing risks, benefits, best practices along with industry examples of each.
- To build a business plan with a focus on supply chain issues. The goal is to identify the business opportunity and design the ideal supply chain for it. The project should include implementation details.

### **Session 1:**

#### **Topic:**

1. Course Overview and Syllabus Review
2. Introductions and Project Description
3. Overview of Supply Chain and Transportation Management
4. Supply Chain and Transportation Management in Global Environment

#### **Readings:**

- ✓ *Tailored Logistics: The Next Advantage*, Harvard Business Review, May-June 1993 (#93305).
- ✓ *The Power of Virtual Integration: An Interview with Michael Dell*, Harvard Business Review, March-April 1998 (#98208)
- ✓ Kellogg case *Seven Eleven Japan*
- ✓ Chapters 1-3 C & M

### Session 2

#### **Topic:**

1. Designing a supply chain
2. Demand planning in a supply chain
3. Basic methodologies for forecasting and aggregate planning

#### 4. Aggregate Planning in a Supply Chain

##### Readings:

- ✓ *Chapters 7, 8 C & M*
- ✓ *Distrigas Corporation* (HBS 9-371-280).
- ✓ Understanding DEMAND. By: Mentzer, John T.; Moon, Mark A.. *Supply Chain Management Review*, May/Jun2004, Vol. 8 Issue 4, p38-45.
- ✓ How to EVALUATE A DEMAND PLANNING & FORECASTING PACKAGE.  
By: Tyagi, Rahul. *Supply Chain Management Review*, Sep2002, Vol. 6 Issue 5, p48-56

##### Session 3

##### Topic:

1. Organizational factors of inventories within the distribution system.
2. Accurate response strategies that improve the matching of supply and demand.
3. Strategic and Predictive Sourcing
4. Project Progress Report

##### Readings:

- ✓ *ALKO Incorporated.* (in *C & M 8*)
- ✓ *C & M 12.*
- ✓ Strategic Sourcing: To Make Or Not To Make. By: Venkatesan, Ravi. *Harvard Business Review*, Nov/Dec92, Vol. 70 Issue 6, P98-107.
- ✓ Predictive Sourcing: The Straight \Path To Profitability. By: Bernhard, Frank J.; Vittori, Wendy. *Supply Chain Management Review*, Jul/Aug2004, Vol. 8 Issue 5, P58-64.
- ✓ Emerging Global Logistics Networks: Implications for Transport Systems and Policies. Tavasszy, L.A.; Ruijgrok, .C.J.; Thissen, M.J.P.M. *Growth and Change*, Vol. 34, Issue: 4, September 2003. pp. 456-472.

##### Session 4

##### Topic:

1. A framework for facility location decisions and transportation in supply chain

2. Designing Distribution Networks and Applications of E-Business
3. Network Design in an Uncertain Environment
4. Project Feedback

**Readings:**

- ✓ *Applichem (A)* (HBS# 9-685-051).
- ✓ *C & M 4, 6 & 13.*
- ✓ Farrell D. (2006) “Smarter Offshoring”, *Harvard Business Review*, June, pp. 85-92

**Session 5**

**Topic:**

1. Information Technologies in Supply Chain and Transportation system.
2. Risk Management in IT
3. Collaborative Planning, Forecasting and Replenishment (CPFR)
4. Sourcing Decisions in Supply Chain

**Readings:**

- ✓ *C & M 14, 16 .*
- ✓ *Which e-business is right for your supply chain?* S. Chopra and J. Van Mieghem, *Supply Chain Management Review*, July/August 2000.
- ✓ Getting IT Right. By: Feld, Charlie S.; Stoddard, Donna B.. ***Harvard Business Review***, Feb2004, Vol. 82 Issue 2, p72-79.
- ✓ Mastering the Three Worlds of Information Technology. By: McAfee, Andrew. ***Harvard Business Review***, Nov2006, Vol. 84 Issue 11, p141-149

**Session 6**

**Topic:**

1. Pricing and Revenue Management in a Supply Chain
2. Using Pricing and Revenue Management in Practice
3. Coordination in a Supply Chain
4. Collaborative Planning, Forecasting and Replenishment (CPFR)
5. Achieving Coordination in Practice

**Readings:**

- ✓ *C & M 15, 17* .
- ✓ 7 Imperatives For Successful Collaboration. By: Finley, Foster; Srikanth, Sanjay. *Supply Chain Management Review*, Jan/Feb2005, Vol. 9 Issue 1, p30-37.
- ✓ Lessons From Toyota's Long Drive. (cover story) By: Stewart, Thomas A.; Raman, Anand P.. *Harvard Business Review*, Jul2007, Vol. 85 Issue 7, p74-83
- ✓ Franks, Brian (2006). The Building Blocks of Peak Performance. *Supply Chain Management Review*, Jul/Aug2006, Vol. 10 Issue 5, p18-25.

**Session 7:****Project Presentations**

## **SCT XXX : Advances in Supply Chain and Information Technology Management**

The intent of this course is to give students a more advanced and comprehensive view of supply chain management, technological issues in supply chain management including the prevalence and impact of B2B e-commerce on supply chains. Information Technology (IT) management will be discussed to understand its increasingly important role in product development and supply chains.

### **Potential Topics**

- SCM Design – Location, echelon structure, distribution systems, process configuration (process reversal, postponement), reverse logistics, material, cash and information flow design, 3PL and 4PL issues, analytical methods in SCM design (facilities location, network design, distribution system configuration etc)
- SCM Operation – Transportation, inventory deployment (multi-echelon inventory systems, optimal inventory deployment for meeting service level specifications), DRP, and optimal load planning, Real Options and Contracts
- SCM Control – Performance Metrics (SCORE model), managerial levers for coordination.
- Performance metrics
- Strategic Issues in SCM – Configuration, strategic fit between product and system (effective vs. efficient supply chains)
- Advances in information technology, proliferation of e-commerce and the boundary of the firm: hierarchy vs. market vs. networks
- EM intermediation vs. direct trading arrangements – potentials, key features, underlying technology and system architecture.
- B2B e-commerce applications – seller-side & buyer-side solutions, EM platforms,
- Taxonomy of EMs – transaction content-structure-governance framework.
- Implementation issues – content-community-commerce-collaboration functionalities, system integration.
- Emerging Issues in SCM and E-Business

- A review of empirical studies to date
- Management of information technologies in supply chains
- Planning for technology and infrastructure strategies in manufacturing and procurement - networked organizations and the role of outsourcing
- Implementation of technology and infrastructure strategies in manufacturing and procurement

### **Pedagogy**

The course will use a combination of guest speakers, lectures, cases, games, and student presentations

### **Learning Resources**

#### Books

Douglas M. Lambert, editor (2006) *Supply chain management : processes, partnerships, performance*, Supply Chain Management Institute

Chan C. K. and H.W.J. L (2005), *Successful strategies in supply chain management*, Hershey, PA, Idea Group Pub.

Bowersox, D.J., Closs, D.J., and Stank, T.P. (1999), *21st Century Logistics: Making Supply Chain Integration a Reality*, The Council of Logistics Management, Oak Brook, IL.

William Walker , *Supply Chain Architecture: A Blueprint for Networking the Flow of Material, Information, and Cash*. APICS Publication

#### Cases , Games and Exercises

Lee, H. L. (2004). "The Triple-A Supply Chain." *Harvard Business Review* 82(10): 102-112.

Fast, Global Entrepreneurial: SCM Hong Kong Style by Joan Magretta

The Beer Supply Chain Game

International Sourcing Exercise

## Articles

Gunasekaran, A., Patel, C., and Tirtiroglu, E. (2001) "Performance Measures and Metrics in A Supply Chain Environment" *International Journal of Operations & Production Management* 21(1/2): 71-87.

Lai, K., Ngai, E.W.T., and Cheng, T.C.E. (2002) "Measures for Evaluating Supply Chain Performance in Transport Logistics" *Transportation Research Part E* 38: 439-456

Industry-Sponsored Marketplaces: a Platform for Supply Chain Integration or a Vehicle for Market

Aggregation? By: Le, Thuong T.; Rao, S. Subba; Truong, Dothang. *Electronic Markets*, Dec2004, Vol. 14 Issue 4, p295-307

Information systems in supply chain integration and management. By: Gunasekaran, A.; Ngai, E. W. T. *European Journal of Operational Research*, Dec2004, Vol. 159 Issue 2, p269-295

Li, S., Rao, S. Subba; Ragu-Nathan, and T. S. Ragu-Nathan, B. (2005), "Development and validation of a measurement instrument for studying supply chain management practices" *Journal of Operations Management*, 23(6), pp. 618-641

Li, S. Ragu-Nathan, B.; Ragu-Nathan, T. S.; and Subba Rao, S. (2006), "The impact of supply chain management practices on competitive advantage and organizational performance", *Omega*, 34(2), pp. 107-124

Peter Edwards et al, "The effectiveness of information systems in supporting the extended supply chain", *Journal of Business Logistics*, vol. 22, no. 1 (2001), pp. 1-27.

The role of information technology in Supply-chain relationships: does partner criticality matter? By: Daekwan Kim; Cavusgil, S. Tamer; Calantone, Roger J.. *Journal of Business & Industrial Marketing*, 2005, Vol. 20 Issue 4/5.

Information systems in supply chain integration and management. By: Gunasekaran, A.; Ngai, E. W. T.. *European Journal of Operational Research*, Dec2004, Vol. 159 Issue 2, p269-295,



Information systems development within supply chain management. By: Williamson, Elizabeth A.; Harrison, David K.; Jordan, Mike. International Journal of Information Management, Oct2004, Vol. 24 Issue 5, p375-385.

Firm performance impacts of digitally-enabled supply chain integration capabilities By: Rai, A., Patnayakuni, R., Patnayakuni, N. MIS Quarterly forthcoming.

Information Processing View of Organizations: An Exploratory Examination of Fit in the Context of Interorganizational Relationships. By: Premkumar, G.; Ramamurthy, K.; Saunders, Carol Stoak. *Journal of Management Information Systems*, Summer2005, Vol. 22 Issue 1, p257-294.

Information systems development within supply chain management. By: Williamson, Elizabeth A.; Harrison, David K.; Jordan, Mike. International Journal of *Information Management*, Oct2004, Vol. 24 Issue 5, p375, 11p.

How do suppliers benefit from information technology use in supply chain relationships? By: Subramani, Mani. *MIS Quarterly*, Mar2004, Vol. 28 Issue 1.