Proposed New Graduate Course  
Stevens Institute of Technology  

March 18, 2013  

School: Howe School of Technology Management  

Course Title: Supply Chain Analytics  

Program(s): MS in Business Intelligence & Analytics (BI&A)  

Proposed Course #: BIA 674  

Catalog Description:  
Supply chain analytics is one of the fastest growing business intelligence application areas. Important element in Supply Chain Management is to have timely access to trends and metrics across key performance indicators, while recent advances in information and communication technologies have contributed to the rapid increase of data-driven decision making. The topics covered will be divided into strategic and supply chain design and operations, including among others- supplier analytics, capacity planning, demand-supply matching, sales and operations planning, location analysis and network management, inventory management and sourcing. The primary goal of the course is to familiarize the students with tactical and strategic issues surrounding the design and operation of supply chains, to develop supply chain analytical skills for solving real life problems, and to teach students a wide range of methods and tools -in the areas of predictive, descriptive and prescriptive analytics- to efficiently manage demand and supply networks.  

Course Objectives:  
The objective of this course is to study key decision areas in supply chain design and operation. Students will learn what data is needed and how to use these data to measure supply chain performance, such as inventory levels, product availabilities, vendor performance, warehouse operations efficiency and customer service levels. Subsequently, they will learn how to use data and apply various tool and methods to analyze trends, forecast the customer demand, extract knowledge and business intelligence, and make decisions. Finally, through the analysis and discussion of case studies they get useful insights on how to optimize the value of supply chain processes and operations, to streamline the goals and to design flexible supply chains.  

List of Course Outcomes:  
At the end of the course, students will be able to:  
CO.1. Discuss the goals of a supply chain, explain the impact of supply chain decisions on the success of a company and identify key decision areas.  
CO.2. Identify the major drivers of supply chain performance and define key metrics that track the performance of the supply chain  
CO.3. Extract knowledge and intelligence from the dynamic information about future demand, available production capacity and sources of supply.
CO.4. Mine procurement and vendor data, perform spend analysis and make sourcing decisions
CO.5. Mine sales data, value product availability, perform assortment planning and make inventory decisions
CO.6. Develop models for making network design decisions and use optimization methods for facility location and network design decisions using Excel Solver and Decision Analysis
CO.7. Use decision tree methodologies to evaluate supply chain planning and capacity allocation decisions under uncertainty
CO.8. Apply forecasting methods as well as formulate and solve optimization problems using Excel Spreadsheets

**Prerequisites:** Suggested but not required prerequisites: some knowledge of probability statistics and optimization.

**Grading Percentages:** Homework: 30%; Class Participation: 10%; Mid-term Exam: 20%; Final Project: 40%

**Mid-term Exam:** Written exam that will be based on the readings, lectures and homework assignments of the first six weeks of the course.

**Final Project:** Combine concepts, methods and tools from all over the course to address a selected case and write a report.

**Credits:**
- ☒ 3 credits
- ☐ Other

**For Graduate Credit toward Degree or Certificate**
- ☒ Yes
- ☐ No
- ☐ Not for Dept. Majors
- ☐ Other

**Textbook(s) or References:**

**Recommended Readings:**
Feigin G. (2011). *Supply Chain Planning and Analytics: The right product to the right place at the right time*, Business Expert Press, New York, USA.

A bulk package of selected articles taken from well-known magazines and international scientific journals will be distributed to the students as further reading material. Students will also have access to all lecture slides.
**Mode of Delivery**:  
- ☑ Class  
- □ Online  
- □ Modules  
- □ Other

**Program/Department Ownership**: Howe School of Technology Management

**When first offered**: Fall 2013

**Department Point of Contact and Title**: Panagiotis Repoussis, Assistant Professor

**Date approved by individual school and/or department curriculum committee**: February 28, 2013

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**Proposed Syllabus**

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic(s)</th>
<th>Readings &amp; Cases</th>
<th>Homework</th>
<th>Expected Outcomes</th>
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<tbody>
<tr>
<td>Week 1</td>
<td>Course Orientation; Introduction to Analytics and Big Data as well as their relation to key SCM decision areas:</td>
<td>Ch. 1 &amp; 10 Chopra and Meindl Ch. 4 &amp; 5 Fisher and Raman</td>
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<td>Week 2</td>
<td>Understanding the Supply Chain; Flexible Supply Chains; Coordination in a Supply Chain</td>
<td>Ch. 2 &amp; 3 Chopra and Meindl Ch. 4, 5 &amp; 6 Handfield</td>
<td>Homework 1: KPI Reporting Exercises</td>
<td>CO.1;CO.2</td>
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<td>Week 3</td>
<td>Supply Chain and Supply Market Intelligence; Supply Chain Drivers, Metrics and Key Performance Indicators</td>
<td>Ch. 5 &amp; 6 Chopra and Meindl</td>
<td>Homework 2: Network Design Exercises</td>
<td>CO.6;CO.7</td>
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<td>Week 4</td>
<td>Supply Chain Design; Location Analysis and Network Design I</td>
<td>Case Study 1: Supply chain design at DHL</td>
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<td>CO.6;CO.8</td>
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<tr>
<td>Week 5</td>
<td>Supply Chain Design; Location Analysis and Network Design II</td>
<td>Ch. 7 Chopra and Meindl Ch. 2 Feigin Ch. 2 &amp; 3 Fisher and Raman</td>
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<td>Week 6</td>
<td>Supply and Demand Planning in Supply Chains - Demand Forecasting</td>
<td>Case Study 2: Assortment Planning case taken from the book of Fisher and Raman</td>
<td>Homework 3: Assortment Planning Exercises</td>
<td>CO.5;CO.8</td>
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<td>Week 7</td>
<td>Planning Supply and Demand in a Supply Chain – Assortment Planning</td>
<td>Ch. 9 Chopra and Meindl Ch. 3 Feigin Ch. 6 Fisher and Raman</td>
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<td>CO.5;CO.8</td>
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<td>Week 8</td>
<td><strong>Mid-Term Exam (in class)</strong></td>
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<td>Week 9</td>
<td>Sales and Operations Planning</td>
<td>Ch. 11, 12 &amp; 13 Chopra</td>
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<td>Week 10</td>
<td>Inventory Management,</td>
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<td>Week 11</td>
<td>Inventory Management, Supply Planning and Product Availability II</td>
<td>Case Study 3: Paper and More</td>
<td>Homework 4: Inventory Management Exercises</td>
<td>CO.4;CO.8</td>
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<td>Week 12</td>
<td>Sourcing Decisions; Spend Analysis and Strategic Sourcing I</td>
<td>Ch. 15 Chopra and Meindl Ch. 7, 8, 9 and 11 Handfield</td>
<td>Homework 5: Spend Analysis / Supplier Evaluation and Selection Exercises</td>
<td>CO.3;CO.4</td>
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<td>Week 13</td>
<td>Management and Coordination of Global Supply Chains</td>
<td>Case Study 4: Simulation of a global supply chain to deliver two models of mobile phones</td>
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<td>ALL</td>
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<td>Week 14</td>
<td><strong>Final Project</strong></td>
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