Introduction to Business Analytics: Concepts, Models & Technologies

SCMS 7110
Fall 2018
3.0 Credit Hours

Instructor: Dr. Mehdi Amini, Ph.D.
Phone 1: 901/678-2470
Phone 2: 901/678-2667
Email: mamini@memphis.edu
Office: FCBE 229
Office Hours: T 11:30 – 1:00 PM & R 1:30 – 3:00 PM

**COURSE DESCRIPTION:**

Sustainable competitive advantage requires model- and data-driven decision making at the strategic, tactical and operations levels, referred to as *Business Analytics (BA).* *Business Analytics,* a set of knowledge, practices, models, tools and technologies utilized in the real world by all industries for effective managerial decision-making. The major objective of this course is to provide students with a broad theoretical as well as practical knowledge about business analytics, including a host of decision modeling tools and technologies to support and improve managerial decision making in a variety of industries.

The course provides basic knowledge and skills for model- and data-assisted decision-making based on hands-on experience with relevant tools and technologies adopted from the areas of descriptive analytics, predictive analytics and prescriptive analytics. The course introduces and examines the critical role of business analytics in approaching a host of strategic, tactical and operational issues and problems. Applying case study- and real-world project-based approaches, we focus on problem framing, model building, and decision-making approaches and technologies. Extensive use is made of MS Excel 2010 and its add-ins to support a host of topics. Extensive use is made of *Analytics Solver Platform for Education (ASPE)* software system. ASPE is an Excel-based and free-to-use software platform for the duration of the semester.
- COURSE OBJECTIVES:
  - Developing a knowledge base required for business analytics.
  - Enhancing understanding of tools and skills sets required for application of business analytics approaches to real-world managerial decision making.
  - Providing opportunities for applying various business analytics technologies to managerial decision-making.
  - Improving the critical-thinking process.

- TEXTBOOK & LECTURE NOTES:

- ADDITIONAL READINGS/VIDEOS:
  To further support our discussions, you will be asked to review some articles/videos and be prepared to discuss them during the class sessions. Please check the course website for the readings assignments.

- COPYRIGHTED LECTURE POWERPOINT SLIDES & NOTES:
  My lectures’ PP slides will be available on the course website for your download. You might make a single copy of the slides for your use, but please note that the material within the lecture notes are copyrighted and are prohibited for copying and distribution. The material within the lecture PP slides are copyrighted due to my publisher’s request.

- LOCATION OF THE COURSE MATERIAL:
  - The Main TEXTBOOK:
    - Website: http://www.pearsonhighered.com/evans/
    - To access the textbook website, you need a unique access code, listed on the back of the yellow note within the CD pocket of your textbook. The website includes material related to each chapter is organized in a related chapter file. Each chapter material includes online dataset files, ASPE software platform download instructions, which is integrated throughout the textbook chapters.
  - The U of M COURSE WEBSITE: eCourseware
    - Website: https://elearn.memphis.edu/
    - The website is organized into a number of modules, including:
● Getting started
● Group assignments
● Lecture PP slides and exercises
● Relevant excel datasets

■ BUSINESS ANALYTICS PROFESSIONAL ORGANIZATIONS WEBSITES:
  ▪ Institute for Management Science & Operations Research (INFORMS)
    http://www.informs.org
  ▪ WWW for Operations Research & Management Science (Encyclopedia)
    http://www.maths.mu.oz.au/~worms/
  ▪ Analytics Magazine:
    http://www.analytcs-magazine.org/
  ▪ OR/MS Today: The most current articles
    http://www.orns-today.org/ormsmain.shtml

■ SOME RELEVANT JOURNALS:
  ▪ Interfaces
  ▪ MS/OR Today Management Science
  ▪ Operations Research
  ▪ International Journal of Supply Chain Management
  ▪ Operations Management
  ▪ Operations and Production Management

■ COURSE ACTIVITIES EVALUATION:

<table>
<thead>
<tr>
<th>Main Activity</th>
<th>Main Activity Percentage Contribution</th>
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<tbody>
<tr>
<td>Group Homework Assignments</td>
<td>15%</td>
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<tr>
<td>Group Business Analytics</td>
<td>10%</td>
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<tr>
<td>Summary Stories</td>
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<tr>
<td>Group Case Study Assignments</td>
<td>35%</td>
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<td>Group Real-World Semester Project</td>
<td>15%</td>
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<tr>
<td>Pop Quizzes</td>
<td>25%</td>
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<tr>
<td>Final Comprehensive Exam</td>
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<td>Total</td>
<td>100%</td>
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Important Notes:
A. You need to be involved in ALL group activities to receive individual credits toward your final grade.
B. Individual performance evaluations and final grades are determined based on my evaluation and your group member evaluations.

FINAL GRADE ASSIGNMENT:

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<tr>
<th>Percentage Range</th>
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<tbody>
<tr>
<td>90-94.99%</td>
<td>A-</td>
<td>77-79.99%</td>
<td>C+</td>
</tr>
<tr>
<td>87-89.99%</td>
<td>B+</td>
<td>74-76.99%</td>
<td>C</td>
</tr>
<tr>
<td>84-86.99%</td>
<td>B</td>
<td>70-73.99%</td>
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<td>80-83.99%</td>
<td>B-</td>
<td>60-69.99%</td>
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<td>&lt;60%</td>
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INDIVIDUAL STUDENT AND STUDENT GROUP ACTIVITIES:

- **Textbook Chapters, Readings and Videos Assignments:** To prepare for our class discussions, three sets of readings assignments are assigned to individual student. These assignments should be completed prior to the designated class session. They include: (a) Chapters from the textbook prior to class sessions; (b) Relevant papers supporting our discussions; and (c) YouTube videos discussing different topics, modeling approach, real-world applications and Excel modeling functions and tools.

- **Group Homework Assignments:** Practicing on the topics covered and in preparation for assigned case studies, a few problems are assigned from the relevant chapter(s). Student groups are responsible to solve these problems and organize their solutions and relevant Excel workbooks in the Group Assignment Binder/memory device, to be submitted at the end of semester.

- **Group Business Analytics Summary Stories:** On a weekly basis, each group is responsible to: (a) identify a relevant business analytics story. The source could be published articles in magazines and newspapers or videos; (b) summarize the story; (c) present it in the class; (d) collect a copy of the summary story along with a copy of the reference (or URL) in the Group Assignments Binder/memory device. These summary stories will be posted on the course website for access of other student groups.
- **Group Case Study Assignments:** Giving students the opportunity to practice the learned business analytics knowledge, methods and tools, from each chapter/lecture, a set of case studies would be assigned to different student groups for analysis and presentation in the class. Each student group is required to submit a single case analysis report and PowerPoint presentation for each assigned case. Copies of the case studies presentation, report, and relevant Excel workbooks should be organized in the Group Assignments Binder/Memory Device.

Above, I have listed an optional book, *The Case Study Handbook: How to Read, Discuss, and Write Persuasively about Cases*. This book would be very useful in analyzing and reporting the outcomes of case studies. Knowing that MBA-level courses all involve case studies, I believe the book would be a good investment for not only this course but also the courses you plan to take within the MBA program. This also would be useful for your group semester project.

- **Student-Group Real-World Semester Project:** Each student group: (a) selects one a real-world project from one of the group members’ affiliated organization, (b) develops and submits a project proposal by the indicated deadline; (c) applies business analytics, the learned knowledge, methods and techniques toward solution recommendation; (d) during the final exams dates, each student group presents the project outcomes, including organization overview, the specific managerial issue, data collection, modeling efforts, solution and analysis of results, and final recommendations; and (e) submits a project report along with relevant Excel workbooks should be submitted. Groups may follow the format of the assigned case studies to develop the project report followed by the analysis and recommendation. Guidelines provided in the *Case Study Handbook* would be very useful in developing your presentation and final report.

- **Pop-Quizzes:** Occasionally, you will have pop-quizzes covering my previous lecture and contents of the assigned chapters. Be sure that you keep up with your readings assignments and lectures.

- **Final Comprehensive Exam:** To be sure that the fundamental knowledge, methods and tools covered in this course are learned, a final comprehensive exam will be administered. All students will be taking the exam on the scheduled dates. The exams might be offered in the class or be given online. **There is no make-up exam.**

- **GROUP MEMBERS EVALUATION:**

At the completion of the semester, each group member provides evaluations about the degree and quality of contributions of her/his teammates to completion and delivery of: (a) Group Homework Assignments; (b) Group Business Analytics Summary Stories; (c) Group Case Studies Assignments; and (d) Group Real-World Semester Project. Evaluation form is posted on the course website. These individual evaluations are confidential and should NOT be shared with the group members.
The outcomes of these evaluations has a major impact on the individual final grades.

- **STUDENT ATTENDANCE AND PARTICIPATION POLICIES:**

  Class attendance and participation are expected. Active participation of students in all class discussions, homework assignments, case study discussions, and semester projects discussions are encouraged by the course grading method. Topics may be presented that are not within the textbook. A substantial portion of this class is intended to foster learning through discussion.

- **REQUIRED MICROSOFT EXCEL SKILLS & ADD-INS:**

  Using the *Analytics Solver Platform for Education (ASPE)* software effectively, you all need to have basic Excel skills. To be refreshed about Excel, I recommend you all to review Chapters 2 through 7 & 11 in the textbook.

- **REQUIRED ANALYTICS SOLVER PLATFORM FOR EDUCATION (ASPE) SOFTWARE SYSTEM:**

  Lectures, in-class exercises and group assignments require the use of ASPE. ASPE is an excel-based software platform. It is free for installation and use during the semester. You may find a document, within the *Getting Started* folder on the course website, describing a step-by-step process to download the software. After you complete the ASPE installation, you may access the ASPE *User Guides* for different platforms, including discussions of examples, are available via the Help tab. In addition, examples for different business analytics methods are also included via the ASPE *Help* tab.

  **ASPE Efficiency:** For ASPE working efficiently, please note that:

  1. **Required Laptop Specification for ASPE:** For a laptop installation, running Windows 10 with an i5 processor (3rd generation of newer) or higher with at least 4GB of RAM in the system is a recommendation. While this is not necessary, anything older (I.E. windows 7 or 8.1 and i3 processors) do not have the same optimized performance parameters as the above recommendation. Anything faster or more may improve performance overall, but with models for education these improvements are generally minimal.

  2. **ASPE Slow Access via Cloud:** Resolving the issue of ASPE slowness via cloud, when accessing the cloud interface a wired connection and using the Google Chrome browser is recommended. Depending on their set-up their connection speed is likely the issue (especially if they’re on the University network, while the network may be able to support a high speed connection there are often time many users on it, and the connection speed is distributed among them, potentially slowing it down significantly, even if wired into the network). Even on the work or home network loading the page initially, take 3-5. Seconds,
this is due to the back-end applications being loaded for the functionality of the cloud interface itself.

- **CLASSROOM CONDUCTS:**

  1. Please arrive on time.
  2. Be prepared.
  3. Submit your assignments on time.
  4. Turn-off your cells during the class sessions.
  5. No Internet browsing unless it is permitted for a class exercise.

- **MBA DEGREE PROGRAM LEARNING OUTCOMES:**

  The learning outcomes for this degree program are located on the following URL. Notice that Goals indicate Learning Outcomes for the degree program. The objectives under each learning outcome indicate what must be done to reach the learning outcome. Faculty members in the Fogelman College developed these learning outcomes and periodically assess students to determine the level that the learning outcomes are being met. URL:
  [http://www.fcbeassessment.net/LearningOutcomes/MBADegreeLearningOutcomes.pdf](http://www.fcbeassessment.net/LearningOutcomes/MBADegreeLearningOutcomes.pdf)

- **ACADEMIC INTEGRITY, CLASS CONDUCT AND PRE-REQUISITES:**

  Students are expected to familiarize themselves with the guidelines outlined on the website of the Office of Student Judicial and Ethical Affairs ([http://saweb.memphis.edu/judicialaffairs](http://saweb.memphis.edu/judicialaffairs)) and to behave accordingly. Any violations of academic integrity will be reported to the University's authorities. The University has strict codes concerning cheating (see the Academic Misconduct section of the Student Handbook). Compliance with University code is required and will be strictly enforced.

- **STUDENT SERVICES:**

  Please access the FCBE Student Services page for information about:
  - Students with Disabilities
  - Tutoring and other Academic Assistance
  - Advising Services for Fogelman Students
  - Technical Assistance

- **COURSE SCHEDULE:**

  The schedule presented in this syllabus is a tentative outline for the course. We will make a reasonable effort to adhere to this schedule. However, you should know that I reserve the right to alter this calendar as circumstances may dictate. All changes
will be announced in class/the course website. The lecture topic and number, related chapter in the textbook, Student-Group Homework Assignment, Student-Group Case Assignment, and activities regarding the Student-Group Semester Project describe each session. Other reading/video assignments and exercises are included within the lecture PP slides posted on the course website.

**Abbreviations used in the course schedule:**
- CH: Refers to Chapter in the textbooks.
- E: Refers to the Evan textbook
# Introduction to Business Analytics: SCMS 7110: Fall 2018

<table>
<thead>
<tr>
<th>Session</th>
<th>Date</th>
<th>Topic</th>
<th>Readings</th>
<th>PP Lecture</th>
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<tr>
<td>00</td>
<td>Pre-Semester</td>
<td><strong>BUSINESS ANALYTICS: DESCRIPTIVE ANALYTICS PRE-REQUISITE</strong></td>
<td>CHs 2 through 7</td>
<td>Distributed email</td>
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<td>01</td>
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<td><strong>MODULE I: BUSINESS ANALYTICS</strong></td>
<td>CH 01</td>
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<tr>
<td>02</td>
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<td>Regression Models &amp; Analysis</td>
<td>CHs 8 &amp; 11</td>
<td>Lecture 02</td>
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<td>03</td>
<td>R 09/13</td>
<td>Regression Models &amp; Analysis</td>
<td>CHs 8 &amp; 11</td>
<td>Lecture 02</td>
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<td>Forecasting Models &amp; Analysis</td>
<td>CHs 9 &amp; 11</td>
<td>Lecture 03</td>
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<td>R 09/20</td>
<td>Forecasting Models &amp; Analysis</td>
<td>CHs 9 &amp; 11</td>
<td>Lecture 03</td>
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<td>Data Mining Methods &amp; Analysis</td>
<td>CHs 10 &amp; 11</td>
<td>Lecture 04</td>
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<td>CHs 10 &amp; 11</td>
<td>Lecture 04</td>
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<td>06</td>
<td>R 10/04</td>
<td><strong>Group Case Study 01: Presentations &amp; Discussions</strong></td>
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<td>07</td>
<td>R 10/11</td>
<td><strong>MODULE III: STATIC PRESCRIPTIVE ANALYTICS</strong></td>
<td>CH 13</td>
<td>Lecture 05</td>
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<td>Optimization Models &amp; Analysis</td>
<td>CH 13</td>
<td>Lecture 05</td>
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<td>Optimization Models &amp; Analysis Extensions</td>
<td>CHs 14 &amp; 15</td>
<td>Lecture 06</td>
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<td><strong>Fall Break: Saturday – Tuesday October 13-16</strong></td>
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<td>08</td>
<td>R 10/18</td>
<td><strong>Group Real-World Semester Project: Groups Breakout Session</strong></td>
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<td>09</td>
<td>R 10/25</td>
<td><strong>Group Real-World Semester Project: Proposal Deadline</strong></td>
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<td><strong>Group Case Study 02: Presentations &amp; Discussions</strong></td>
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<td>Optimization Models &amp; Analysis Extensions</td>
<td>CHs 14 &amp; 15</td>
<td>Lecture 06</td>
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<td><strong>Group Case Study 03: Presentations &amp; Discussions</strong></td>
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<td>Decision Models &amp; Analysis</td>
<td>CH 16</td>
<td>Lecture 07</td>
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<td>11</td>
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<td>Decision Models &amp; Analysis and Simulation Models &amp; Analysis</td>
<td>CH 16 &amp; 12</td>
<td>Lecture 07 Lecture 08</td>
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<td>12</td>
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<td>Group Case Study 04: Presentations &amp; Discussions</td>
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<td></td>
<td>Simulation Models &amp; Analysis</td>
<td>CH 12</td>
<td>Lecture 08</td>
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**Thanksgiving: Wednesday - Sunday, November 21-25**

| 13 | T 11/29 | Group Case Study 05: Presentations & Discussions |
|    |        | Final Comprehensive Exam |

**LAST DAY OF CLASSES: Wednesday, December 6**

| 14 | T 12/04 | Group Real-World Project: Presentations & Discussions |
|    |        | Confidential Group Members Performance Evaluation & Group Assignments Binder: Submissions |
Dr. Amini is the George Johnson Professor of Supply Chain and Operations Management at the Department of Marketing & Supply Chain Management, in the Fogelman College of Business and Economics (FCBE), at The University of Memphis. He serves as Associate Director of FedEx Center for Supply Chain Management and Director of the Enterprise Simulation and Optimization Lab (eSOL), at The University of Memphis. For the past decade, he held Visiting Professorships at both Royal Institute of Technology and Luleå University of Technology in Sweden. In addition, he served as Director of FCBE Master Programs from 1994 to 1996.

For over two decades, Dr. Amini primary teaching have been in the areas of supply chain management, operations management, sustainable enterprise and business analytics. He has been teaching in the undergraduate, Professional MBA, Executive MBA, Customer-Driven MBA, International MBA, and Ph.D. programs in United States and countries in Europe, Africa, and Middle East.


Dr. Amini has received several millions dollars of funding from institutions within the private and public sectors to support different research projects. Dr. Amini has been involved in corporate research, consulting, and executive educational programs for more than two decades. He has received several university awards for excellence in teaching, research, service, and outreach efforts.

Dr. Amini holds a BA in Business Administration from The University of Tehran. He received his MBA degree in Production Operations Management from the University of North Texas, USA, and MS and Ph.D. degrees in Operations Research from Southern Methodist University, USA.