Course Description and Objectives

Effective management of operations and supply chains requires **principled** and **data-driven** planning and decision-making approaches to acquire, allocate, and deploy resources so as to improve efficiency and profitability. These decision problems often involve many **inter-related** issues, with **complex tradeoffs**, that must also satisfy various policy requirements and constraints. Due to these characteristics, manual or intuitive decision-making can be ineffective (sub-optimal), cumbersome, and time-consuming. So, supply chain and operations managers at leading companies in many different industries, ranging from manufacturing and transportation to retailing and services, have come to rely heavily on **advanced decision technologies** that are based on **quantitative models** and techniques to guide and improve their decisions. These models, from the field of management science, have become particularly important as companies invest in systems to exploit the increasing availability and accessibility of “big data.”

Quantitative models, and the associated computer algorithms, serve as the “intelligence” needed for data-driven decisions and as the underlying “engine” for such **business analytics** initiatives. This course seeks to teach students the basic principles and applications of mathematical optimization and computer-based models and tools that are most commonly used for designing, planning, and managing supply chains, both for product fulfillment and service operations.

Specifically, the goals of the course are to:

- Introduce students to the main modeling approaches – optimization, queueing, and simulation – that are widely used and relevant to supply chain and operations management;
- Illustrate the use of these models to address operations planning and decision problems;
- Enable students to frame and structure managerial decision problems, decide which model to apply, and how to formulate and create an appropriate model;
outline some basic principles underlying the methods to analyze and solve these models; and,
provide practice in creating and solving models using spreadsheets and other software.
The course is particularly relevant for students interested in supply chain management,
operations, logistics, and consulting. Models (and their associated techniques and applications)
covered in the course include:
- Linear optimization (also called Linear Programming);
- Network models;
- Integer programming;
- Non-linear optimization;
- Queueing models; and
- Simulation.

Pre- or Co-requisites: OM 335 or OM 335H

Quantitative Reasoning Flag: This course carries the Quantitative Reasoning flag. “The
Quantitative Reasoning requirement helps you build skills necessary for understanding
quantitative arguments in your adult and professional life. Courses carrying the Quantitative
Reasoning Flag ask you to interpret quantitative models and apply quantitative reasoning to real-
world problems.” (http://www.utexas.edu/ugs/flags/students/about/quantitative-reasoning). So, a
substantial portion of the course emphasizes how to represent managerial decision and planning
problems as quantitative models, solve these models, and interpret their results.

Course materials

The course relies on material covered in two highly recommended textbooks:

Edition), Cengage Learning. (More information on the book, including corrections, is
available at http://www.kelley.iu.edu/albright/PMS_Home.htm.)

Analysis, and Applications, 3rd Edition, Sewickley, PA: Simio LLC. (This book is available
in electronic form for $29 at http://www.simio.com/publications/index.php, and is only
needed towards the end of the semester. Additional resources and corrections are available at
http://www.simio.com/publications/SASMAA/students/.)

The textbook by Winston and Albright (abbreviated as WA in the course schedule) emphasizes
the use of Excel for modeling and solving supply chain and operations problems. (In class, we
will also emphasize mathematical modeling, in addition to using Excel to represent and solve
these models.) The book contains chapters corresponding to most of the topics covered in this
course; we will use examples from these chapters for class discussions. Each chapter also
contains exercises and practice problems. The course schedule contains the book sections and
chapters that are relevant for each session. Students will find going through this material and
working out the practice problems/exercises to be useful as a supplement to class discussions and
to reinforce learning.
The second textbook, by Kelton, Smith, and Sturrock (abbreviated as KSS in the course schedule), focuses on “simulation,” a topic that we will cover during the last few weeks of the semester (and so the book is not needed in the first part of the semester).

The class discussions and homeworks require extensive use of Microsoft Excel. The course assumes that students know how to use Excel, and are very familiar with common features, commands, and operations in Excel. Students are strongly encouraged to refresh their Excel skills by going through the many Excel tutorials available online, especially on Lynda.com (free access for UT Austin students by entering “utexas.edu” as organization’s URL at https://www.lynda.com/signin/organization). Class discussions will cover some of the advanced and special features of Excel needed for modeling and optimization.

Course preparation and student evaluation
Before each class, students are expected to review the material covered in previous sessions and are encouraged to go through the relevant book sections (listed in the course schedule). Active class participation—responding to questions, raising interesting issues, and contributing to better understanding the material—is strongly encouraged. The course requirements include regular homework assignments (see schedule) and three tests during the semester.

The main purpose of the Homework assignments is to reinforce and build upon the concepts and techniques discussed in class, and to provide practice in applying, implementing, and interpreting the results of various models. For Individual Homework (abbreviated as IHW) assignments, students are permitted to discuss with classmates the broad approach for solving the homework problems, but each student must work out the details and write up the assignment on their own (e.g., formulating mathematical models, implementing the models using Excel, working out numerical answers, interpreting the results). DO not copy answers or computer models for IHW from other students (current or past) or other sources, and do not share your completed assignment with others. For Group Homework (abbreviated as GHW) assignments, students are permitted to work in groups of up to four students; only one written report needs to be submitted by each group. All questions in each assignment must be answered, but we may fully grade only selected problems. Homework grades will be based on clarity of work (including explanations), completeness, and correctness. Students who make a sincere attempt to answer a question and clearly explain their answer will receive at least 50% of the points allocated to that question. Additional points (above 50%) will be given based on the extent to which the student has understood and applied the learnings from class and the textbook, progressed towards solving the problem, and followed the appropriate approach.

The course Exams consist of three tests during the semester. These tests will have some overlapping coverage of topics (the scope of each test will be announced in class prior to the test). For each test, students are permitted to bring one 8.5 x 11 inch sheet (two-sided) of handwritten notes, and a business calculator (use of computers and other electronic devices is not permitted during tests). All tests will be held in the evening (from 7 p.m. to around 9 p.m.) on the dates specified in the course schedule. Students who have legitimate and unavoidable academic
conflicts should inform the instructor at least two weeks before the test, and may be required to provide supporting documentation for the conflict.

**Class participation** performance will be assessed based on regular attendance, preparedness for class (e.g., answering questions), and quality of comments in class.

Grades for the course will be based on a weighted sum of scores for class participation, homework assignments, and tests, with the following weights for each component:

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
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<tbody>
<tr>
<td>Homework (individual and group)</td>
<td>15%</td>
</tr>
<tr>
<td>Tests (3 @ 25% each)</td>
<td>75%</td>
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<tr>
<td>Class participation</td>
<td>10%</td>
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**Grading scheme and policies**
- Unless otherwise specified, homework assignments must be turned in (submitted via Canvas) before class on the day they are due. No credit for late homework submissions. Please submit your answers as a PDF file, together with any required spreadsheets. For hand-written answers, scan the document and submit as PDF file; do not submit photos of answer sheets.
- The lowest homework assignment score among all assignments will be dropped when determining the overall course homework score.
- All homework assignments have equal weight, and each test has a weight of 25%. The total actual points for each homework assignment and test varies (e.g., may not be out of 100), but the score for each assignment and test will be first converted to a % (i.e., out of 100) before computing the overall (weighted) final score and course grade.
- Canvas does not calculate the cumulative and average (weighted) scores properly. Use Canvas only to check your actual score on each assignment and test. Do not rely on cumulative or average scores shown in Canvas.
- The distribution of grades will follow the guidelines provided by the Undergraduate program. The instructor may “curve” the scores before deciding the letter grades.

**Feedback**
Your feedback is valuable, and facilitates continuous course improvement. Please do not hesitate to let me know, throughout the semester, how to improve the course and the learning experience it provides.

**Academic Integrity and Honor Code**
By enrolling in this class, you agree to abide by the University’s and McCombs School’s code of professional conduct (see also “Policy on Scholastic Dishonesty” below), and the following important professional code of conduct and protocols for this course.
- Turn off cell phones. Do not text, chat, check e-mail, use web, etc. during class.
- During class you are permitted to use a laptop/tablet only for activities related to this class, i.e., to take notes or to follow the instructor in developing and solving computer models.
During class, do NOT check e-mail, surf the web, send messages, or conduct work unrelated to the course.

- Do NOT copy (from other students or other sources) on tests, exams, and individual homework assignments.

Policy on Scholastic Dishonesty
The McCombs School of Business has no tolerance for acts of scholastic dishonesty. The responsibilities of both students and faculty with regard to scholastic dishonesty are described in detail in the BBA Program’s Statement on Scholastic Dishonesty at http://www.mccombs.utexas.edu/BBA/Code-of-Ethics.aspx. By teaching this course, I have agreed to observe all faculty responsibilities described in that document. By enrolling in this class, you have agreed to observe all student responsibilities described in that document. If the application of the Statement on Scholastic Dishonesty to this class or its assignments is unclear in any way, it is your responsibility to ask the instructor for clarification. Students who violate University rules on scholastic dishonesty are subject to disciplinary penalties, including the possibility of failure in the course and/or dismissal from the University. Since dishonesty harms the individual, all students, the integrity of the University, and the value of our academic brand, policies on scholastic dishonesty will be strictly enforced. You should refer to the Student Judicial Services website at http://deanofstudents.utexas.edu/sjs/ to access the official University policies and procedures on scholastic dishonesty as well as further elaboration on what constitutes scholastic dishonesty.

Use of Class Materials
The materials provided and used in this class, including lecture materials, tests, and homework assignments, are copyright protected works. Any unauthorized copying of these materials is a violation of federal law and may result in disciplinary actions being taken against the student. Additionally, the sharing of class materials without the specific, express approval of the instructor may be a violation of the University's Student Honor Code and an act of academic dishonesty, which could result in further disciplinary action. This includes, among other things, uploading class materials to websites for the purpose of sharing those materials with other current or future students.

Students with Disabilities
Students with disabilities may request appropriate academic accommodations from the Division of Diversity and Community Engagement, Services for Students with Disabilities, 512-471-6259, http://www.utexas.edu/diversity/ddce/ssp/.

Religious Holy Days
By UT Austin policy, you must notify the instructor of your pending absence at least fourteen days prior to the date of observance of a religious holy day. If you must miss a class, an examination, a work assignment, or a project in order to observe a religious holy day, you will be given an opportunity to complete the missed work within a reasonable time after the absence.
Campus Safety

Please note the following recommendations regarding emergency evacuation, provided by the Office of Campus Safety and Security, 512-471-5767, [http://www.utexas.edu/safety](http://www.utexas.edu/safety):

- Occupants of buildings on The University of Texas at Austin campus are required to evacuate buildings when a fire alarm is activated. Alarm activation or announcement requires exiting and assembling outside.
- Familiarize yourself with all exit doors of each classroom and building you may occupy. Remember that the nearest exit door may not be the one you used when entering the building.
- Students requiring assistance in evacuation should inform the instructor in writing during the first week of class.
- In the event of an evacuation, follow the instruction of faculty or class instructors.
- Do not re-enter a building unless given instructions by the following: Austin Fire Department, The University of Texas at Austin Police Department, or Fire Prevention Services office.
- Behavior Concerns Advice Line (BCAL): 512-232-5050
- Further information regarding emergency evacuation routes and emergency procedures can be found at: [http://www.utexas.edu/emergency](http://www.utexas.edu/emergency).