**MBAD 6122 Decision Modeling and Analysis via Spreadsheets**

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**Course content:** Accessible via [http://moodle2.uncc.edu/](http://moodle2.uncc.edu/)

**Text:**
Note: 5th edition will not work.  
**ISBN13:** 978-0-538-74631-1

**Hardware and Software note:**
- Windows OS, Excel 2013/2010 and Analytic Solver Platform for Education (ASPE)  
  - ASPE does not run on Mac OSX – the following is from their website:  
  - “We highly recommend that you ask students to use a dual-boot or virtual machine setup (such as Parallels or VMWare Fusion) on their Macs, with Windows and Microsoft Office for Windows installed alongside Mac OSX. A Mac with this setup makes an excellent host for Analytic Solver Platform for Education.”
- Students who have a Windows PC/laptop with Excel 2013/2010 or running VMWare & MS office on their Macs will be able to download and install the 140 day license of ASPE. Instructions will be distributed during the first week of classes.

**Class Format: HYBRID Spring 2016**
In order to allow more flexibility for the students in our MBA and Data Science and Business Analytics programs, the Belk College of Business is offering select courses via hybrid format. The class will meet face-to-face for problem and case exercises, and for in class portions of the exams. The weeks (evenings) designated as “self-study” allow students to work on their own and within their groups at times and places that are most convenient for them. Online components include recorded lectures, essentially covering the entire course, examples and other materials made available on Moodle. Students are expected to study the online lectures along with the textbook and other materials hence the F2F meetings will largely focus on applying the theories and concepts via problems and cases.

**Additional Readings:** Select articles and cases will be posted or emailed as attachments.

**Course Description:** This course is designed to provide students, primarily in the fields of business and economics, with a sound conceptual understanding of the role management science plays in the decision making process. This is an important course in developing decision models and their application to management problems. The emphasis is on models that are widely used in all industries and functional areas, including operations, supply chain management, finance, accounting, and marketing.
The rapid and phenomenal advances in computing have propelled the use of decision models in recent years. Today’s inexpensive and fast computing capabilities coupled with friendly and intuitive user interfaces, such as spreadsheets, have been complemented by the availability of large volumes of previously unavailable data, such as the automatic capture of point-of-sale information, and easy access to large databases (e.g., Enterprise Resource Planning (ERP) and Customer Relationship Management (CRM) systems.) Personal computers, laptops, tablets, and even smart phones with user friendly interfaces have become effective “delivery vehicles” for powerful decision models that were once the exclusive province of experts. Information has come to be recognized as a critical resource, and models play an increasingly critical role in deploying this resource, in organizing and structuring information so that it can be used more productively. Specific topics covered in this course include fundamental techniques such as linear, integer, goal and multi objective programming, queuing theory and applications, decision support via Monte Carlo simulation, decision making under uncertainty and risk, decision trees, and multi-criteria decision making.

Typical class format will include brief discussion on background theory, by initially simpler and smaller business problems (often provided by recorded lectures posted on the course webpage), followed by group exercises that are more realistic and larger in size and scope. The emphasis will be on both formulating an appropriate model for a given business problem and developing an Excel based solution approach by utilizing built-in and add-in software tools like Analytic Solver Platform and Data Analysis.

**Prerequisites:** MBAD 5141/5142. A keen interest in problem solving (logic, math, and statistics) and a desire to practice higher level analytics and applied information technology skills.

**Catalog Description:** MBAD 6122. Decision Modeling and Analysis via Spreadsheets. (3G) Prerequisite: MBAD 5141/2 or equivalent. An analytical approach to the management process. Generalized models for decision making with major emphasis on application of the scientific method to management problems. (Yearly)

**Statement on Diversity:** The Belk College of Business strives to create an inclusive academic climate in which the dignity of all individuals is respected and maintained. Therefore, we celebrate diversity that includes, but is not limited to ability/disability, age, culture, ethnicity, gender, language, race, religion, sexual orientation, and socio-economic status.

**Religious Accommodation for Students:** The University of North Carolina at Charlotte is committed to diversity, nondiscrimination and inclusiveness, and to supporting its students, regardless of religious affiliation or non-affiliation, in accordance with state and federal laws and regulations. As part of this commitment, the University makes good faith efforts to accommodate a student’s religious practice or belief, unless such accommodation would create undue hardship. Details associated with this policy can be found by visiting [https://legal.uncc.edu/policies/up-409](https://legal.uncc.edu/policies/up-409)
Grading and exam format:
Four exams with the following max points: 100, 120, 100, 80 \rightarrow total 400 points.

400-360 A, 359-320 B, 319-280 C, 279-0 U

- Part(s) of each exam can be done in groups up to three persons.
- Group (team) members will evaluate each other via a confidential peer evaluation form. As needed based on the evaluations group members grades can be adjusted where only the member(s) with top scores earn the full grade.
- Take-home parts of some exams may be released over multiple weeks. Moodle updates and emails will clearly show the due dates.
- Please carefully follow the instructions on the exams.

Individual and group work: You are encouraged to study in groups, solve the suggested problems together, and simply help each other learn the material. During the exams for both group and individual parts you should not get help from any outside source or person. When permitted, solve the group part in your group, otherwise work alone.

Academic honesty/integrity: THE UNC CHARLOTTE CODE OF STUDENT ACADEMIC INTEGRITY governs the responsibility of students to maintain integrity in academic work, defines violations of the standards, describes procedures for handling alleged violations of the standards, and lists the applicable penalties. The following is a list of prohibited conduct in that Code as violating these standards: A) Cheating; B) Fabrication and Falsification; C) Multiple Submission; D) Plagiarism; E) Abuse of Academic Materials; and F) Complicity in Academic Dishonesty. For more detail and clarification on these items and on academic integrity, students are strongly advised to read the current "UNCC undergraduate catalog." The instructor may ask students to produce identification at examinations and may require students to demonstrate that graded assignments completed outside of class are their own work.

Incomplete Grade Policy
Receiving a grade of incomplete ("I") is not based solely on a student’s failure to complete work or as a means of raising his/her grade by doing additional work after the grade report time. An incomplete grade can be given only when a student has a serious medical problem or other extenuating circumstance that legitimately prevents completion of required work by the due date. In any case, for a student to receive an 'I' grade, the student's work to date should be passing, he/she must have completed a significant portion of the course, and the student must provide proper written proof (e.g., a doctor’s note) of the extenuating circumstances.

Diversity
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Religious Accommodation for Students Policy
The instructor will observe University Policy 409 (https://legal.uncc.edu/policies/up-409) on matters of religious accommodation. Please note that the procedure prescribed by this
policy requires a notice to the instructor prior to the census date of the semester (typically the tenth day of instruction).

**Tentative Course Outline**

**Intro to Modeling Chap. 1, 2**
The emphasis is on the process of building models by capturing the essence of a real problem into a model, spreadsheet or otherwise.

**Intro to optimization and linear programming Chap. 3**
Practice building models for different application domains and implementing them in Excel; Product mix, blending problems, portfolio optimization, foreign exchange, recycling, investment, and marketing examples.

Case: Putting the Link in the Supply Chain

**Sensitivity analysis Chap. 4**
Post optimally analysis for large-scale applications to address managerial questions, and evaluate new alternatives.

Case: HiTek Corp. Early Retirement Program

**Network modeling Chap. 5**
Study some of the well-known models such as transportation, transshipment, assignment models, supply chain optimization; multi period modeling of plant/equipment replacement; leasing office space; multi period product/cash flow optimization models

Case: Equality or Choice Determining Optimal School Busing Strategies (single objective part) by Saydam, Rajagopalan, DeVincenzo

**Integer linear programming Chap. 6**
Advantages, disadvantages of using integer variables; various uses of binary variables applied to problems in project selection, plant location, emergency response vehicle/base location, modeling fixed vs. variable costs using binary variables; airline crew scheduling, timber harvest examples.

Case: Power Dispatching at Old Dominion

**Goal programming and multi objective modeling Chap. 7**
Handling multiple goals (targets) or objectives; re-visit/re-formulate some of the earlier examples;

Case: Equality or Choice Determining Optimal School Busing Strategies (goal programming part) by Saydam, Rajagopalan, DeVincenzo
Nonlinear programming and evolutionary optimization Chap. 8
Objective function(s) and constraint(s) are naturally nonlinear.

Case: Newspaper Advertising Insert Scheduling

Decision Support using Monte Carlo Simulation approach Chap. 12
Modeling risky decisions via Monte Carlo simulation; simulating new product introduction; simulation of financial models.

Case: Should Charlotte Motor Werks, Co. Introduce a New Roadster? By Saydam

Queuing Theory and Applications Chap. 13
Various analytical models for most common waiting line problems.

Case: Bulls Eye Department Store

Decision Analysis Chap. 14
Decision making under uncertainty and risk, decision trees, multi-criteria decision making; Analytical Hierarchy Process applications to vendor/software selection; plant/operations site evaluation.

Case: The Spreadsheet Wars