

# MBAD 6122 Decision Modeling and Analysis via Spreadsheets

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**Course content:** Accessible via [canvas.uncc.edu](https://canvas.uncc.edu)

**Textbook:** *Spreadsheet Modeling & Decision Analysis: A Practical Introduction to Business Analytics*, Cliff T. Ragsdale, South-Western, 8<sup>th</sup> Edition, 2018 (7<sup>th</sup> Ed. will also work).

**ISBN13:** 9781305947412

CENGAGE UNLIMITED (\$119.99/semester or \$179.99 a year) gives students access to **unlimited number** of eBooks. <https://www.cengage.com/unlimited/>

Also, there are less expensive rental options. <https://www.cengage.com/c/spreadsheet-modeling-decision-analysis-a-practical-introduction-to-business-analytics-8e-ragsdale/>

## **Hardware and Software requirements:**

Windows OS, Excel 2016/2013/2010 and Analytic Solver Platform for Education (ASPE). MAC users without a dual boot please see your option(s) in the ASPE installation guide.

- Students are **required to purchase a 140-day license** copy of Analytic Solver from Frontline systems for **\$25**. Instructions for this are posted in canvas and emailed as well.

## **Class Format: HYBRID & FLIPPED Spring 2020**

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 and flipped format**. *While hybrid & flipped course sections provide increased flexibility to students, they require a commitment to invest additional time and effort outside of scheduled class sessions.*

Students are **required** to study the online lecture notes, recorded examples along with the textbook and other posted materials **before** face-to-face (F2F) meetings. F2F meetings (~1.5h) will largely focus on applying the theories and concepts via larger problem formulating and solving activities.

**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. Today's inexpensive and exceptional computing capabilities coupled with friendly and intuitive user interfaces, such as spreadsheets, have been complemented by the availability of large volumes of previously less available structured and unstructured data. Personal computers, laptops, tablets, and smart phones 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 one or two small examples to be followed by group exercises that are more realistic and larger in size and scope. Small(er) or larger problems/cases begin with a discussion, model formulation and implementation in Excel followed by finding the best solution (if possible) via analytical solver add-in and its interpretation.. The main emphasis will be on formulating an appropriate model for a given business problem and the secondary (typically easier) emphasis will be developing an Excel based solution approach by utilizing the Analytic Solver.

**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>

**Grading and exam format:**

Four exams with the following max points: 100, 120, 100, 80 → total 400 points.  
400-360 A, 359-320 B, 319-280 C, 279-0 U

- Take home 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 of the team members will be adjusted accordingly.
- Take-home parts of some exams may be released over multiple weeks. Canvas updates and emails will clearly show the due dates.
- Please carefully follow the instructions on the exams.
- Should a student miss an exam, that student will receive a grade of zero. In the event that the excuse is approved (**must provide proper documentation, e.g., doctor's note, accident report, speeding ticket copy; a selfie with the officer might earn extra points**) then the student will

take the make-up within three school days. Students who miss more than one mid-term exam should drop the class otherwise will be given an F.

- Attending a **wedding** or other ceremonial events are not excusable absenteeism. Also, please let grandma and grandpa live another semester 😊

**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 Code of Student Academic Integrity (<https://legal.uncc.edu/policies/up-407#c6>) 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.

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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 (briefly)**

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 Drs. Saydam, Rajagopalan, and 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 Drs. Saydam, Rajagopalan, & DeVincenzo

### **Nonlinear programming and evolutionary optimization Chap. 8**

Objective function(s) and/or 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 Dr. Saydam

### **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