OPER3203 Decision Modeling & Analysis

Instructor: Dr. Cem Saydam
Email: saydam "at" uncc.edu
Office hours: To be determined and posted on canvas.

Course content: Accessible via canvas.uncc.edu
Textbook: *Spreadsheet Modeling & Decision Analysis: A Practical Introduction to Business Analytics,* Cliff T. Ragsdale, South-Western, 8th Edition, 2018 (7th 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/

Hardware and Software requirements:
Windows OS, Excel 2016/2013/2010 and Analytic Solver Platform for Education (**ASPE**)

- Students are required to purchase a 140-day license copy of ASPE from Frontline systems for $25. Instructions for this will be emailed and posted in canvas separately.
- ASPE is available via PCs in lab 339 and in the open lab on the second floor in the Belk College.
- **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."

Class Format: HYBRID & FLIPPED
This course will be delivered in a hybrid format using a combination of face-to-face lecture meetings and online content. *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.* Face-to-face class sessions will be held, on average, once a week with a corresponding weekly online session scheduled for self-study of course materials.

In Spring 2019 face-to-face class sessions will be held mostly on **Tuesday** of each week, and the **four midterm exams** will be on **Thursdays**. If/when needed (e.g., due to snow/ice closures) we may have face-to-face class on Thursdays, which will be clearly marked in canvas. **Self-study** days will be marked on the course schedule as well and will be identified throughout the semester based on the nature and pace of the current material on "**canvas.uncc.edu**". **Self-Study (Thursdays)** are best used as "group study/problem solving sessions".

Catalog Course Description: Prerequisite: OPER 3100 with a grade of C or above. Analytical approach to understanding the management process and solving management problems with emphasis on model formulation, solution techniques, and interpretation of results. Specific topics covered in this course include: techniques such as linear, integer,

network, and goal programming, queuing theory and applications, decision support via Monte Carlo simulation, decision making under uncertainty and risk, decision trees, and multi-criteria decision making. Excel along with ASPE are the main analytical tools.

Learning Objectives: 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. Emphasis is placed on quantitative approaches to decision making as well as how they can be applied and interpreted. Specific topics covered in this course include fundamental techniques such as linear programming, integer programming, queuing theory, and simulation. In summary, the ability to develop models to support decision making is one of the critical areas of competency that should be demonstrated by students who have successfully mastered the OSCM major. These skills will be measured by the following learning outcomes:
- Students develop decision models to determine the best allocation of limited resources.
- Students develop Monte Carlo based simulation models to support decision making under uncertainty.

Attendance Policy: Everyone must attend all in lab quizzes, exams and post-exam reviews. Since the entire course content is available via the recorded lectures lab sessions will focus on framing and solving problems, working additional examples.

Philosophy of teaching: I demand meaningful learning which can be interpreted by being able to translate the ideas, free of errors, into your own words and solve problems that are **structurally different** from those presented in class and textbook(s). Hence, always try to learn the materials by concentrating on the underlying principles. I will try to make you think by asking you questions and problems which may not be directly covered during the class lectures.

Grading:
Eight mini-quizzes, four mid-terms and a cumulative final (2.5h).
The lowest of the five exams and the lowest three of the eight mini-quizzes will be dropped.
o   Some or parts of exams are closed book and some parts will be on the computer (via Excel and ASPE).
o   Mini-quizzes are generally closed book and computer. Specific instructions will be posted or emailed for each mini-quiz.

Exams: 100 points ea. x 4 (best) = 400
Mini-quizzes: 20 points ea. x 5 (best) = 100

Final letter grades will be based on the following percentages: A 100-90, B 89-80, C 79-70, D 69-60, F 59-0.

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 and a selfie with the officer) 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 ☺

No make ups for missing mini-quizzes (note: 3 out of 8 are automatically dropped).

I will review the exam only once and in class. Absent students forfeit their chance to review their exam. Therefore, it is very important that all students are present during these reviews.

Posting grades: Via Canvas.

Assignments & Group work: I expect each student enrolled in this class to do the suggested problems on their own. At the same time you are encouraged to study in groups, solve the suggested problems together, and simply help each other learn the material.

Student workload: This 3-credit **hybrid & flipped** course requires 1h 15m of classroom or lab instruction and about seven (7) hours of out-of-class student work each week for approximately 15 weeks. Out-of-class work include but is not limited to: required reading, reviewing, studying recorded lectures, working suggested problems and more, practicing Excel based decision modeling tools, and studying for exams and quizzes.

Class Cancellation: In the event that I am unable to attend class or the University is closed unexpectedly, assume the material will be moved forward to the next meeting or made available via online (course webpage).

Academic honesty/integrity: As a program that helps to create business and government leaders, the College of Business has an obligation to ensure academic integrity is of the highest standards. Standards of academic integrity will be enforced in this course.

University regulations will be strictly enforced in all cases of academic irregularities, cheating or plagiarism or any variations thereof. Students assume full responsibility for the content and integrity of the academic work they submit. The guiding principle of academic integrity shall be that a student's submitted work, examinations, reports, and projects must be his/her own work.

All UNCC students have the responsibility to be familiar with and to observe the requirements of The UNCC Code of Student Academic Integrity (see the Catalog and also https://academicintegrity.uncc.edu/). This code forbids cheating, fabrication or falsification of information, multiple submission of academic work, plagiarism of written materials and software projects, abuse of academic materials (such as library books on reserve), and complicity in academic dishonesty (helping others to violate the code). Additional examples of violation of the Code include:
- Representing the work of others as your own.
- Using or obtaining unauthorized assistance in any academic work.
- Giving unauthorized assistance to other students.
- Modifying, without instructor approval, an examination, paper, record, or report for the purpose of obtaining additional credit.
- Misrepresenting the content of submitted work.

- Students are expected to report cases of academic dishonesty they become aware of to the course instructor who is responsible for dealing with them.

Any further specific requirements or permission regarding academic integrity in this course will be stated by the instructor, and are also binding on the students in this course. Students who violate the code can be punished to the extent of being permanently expelled from UNCC and having this fact recorded on their official transcripts. The normal penalty is zero credit on the work involving dishonesty and, potentially, further substantial reduction of the course grade to a lower or failing grade.

If you are unclear about whether a particular situation may constitute an honor code violation, you should meet me to discuss the situation. Feel free to discuss the definition of cheating and/or plagiarism with me if you are unclear on these terms or have questions about the acceptability of a particular type of action.

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.

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

Miscellaneous:
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.

UNC Charlotte is committed to access to education. If you have a disability and need academic accommodations, please provide a letter of accommodation from Disability Services by Friday of the first week of classes. For more information on accommodations, contact the Office of Disability Services at 704-687-0040 or visit their office in Fretwell 230.

Also, note:
- The instructor reserves the right to change the course outline, and the course contents.
- There will be no extra credit offered for any individual student during the semester.
- The instructor will keep all exams. Students may see them in class or during my office hours.
- All electronic & telecom equipment such as desktop PCs, laptops, iPads, etc., and in particular cell phones, beepers,. must be kept silent (muted) during the lecture.
- Mobile phones and iWatches (and alike equipment) must be kept in bags or pockets.
- Mobile phones and other devices can't be used as calculators. Only calculators can be used as needed.

Important Dates:
Students should note the important dates such as the last course withdrawal date and dates for their finals via the **Academic Calendar:** http://registrar.uncc.edu/printable-calendar

Full course schedule is available via http://canvas.uncc.edu

<u>**Tentative Course Outline**</u>

Decision Support using Monte Carlo Simulation approach Chap. 12

Modeling risky decisions via Monte Carlo simulation; simulating new product introduction; simulation of financial models.

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. Solve models via Excel/ASPE.

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. Solve models via Excel/ASPE.

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. Solve models via Excel/ASPE.

Goal programming Chap. 7 (omit Multi-Objective programming)

Handling multiple goals (targets); re-visit/re-formulate some of the earlier examples; Solve models via Excel/ASPE.

Queuing Theory and Applications Chap. 13

Various analytical models for typical waiting line problems via a built-in Excel template.

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. Implement decision trees via Excel/ASPE.