

Business Analytics

Quantitative approaches to decision making. Mathematical modeling including linear, integer, and nonlinear programming; decision analysis; queuing analysis; simulation modeling; multi-criteria analysis.

22-QA-380-001, 4 Undergraduate Credit Hours

Winter Quarter, 2011 – 2012

Tuesdays and Thursdays, 10:00 A.M. – 11:45 A.M.

Fealy Auditorium, 112 Carl H. Lindner Hall

Department of Operations, Business Analytics, and Information Systems

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Office Hours: Mondays 2:30 P.M. – 3:30 P.M. & Tuesdays 12:30 P.M. – 1:30 P.M.

Course Prerequisites: [College of Business Sophomore Business Core](#)

15-COMM-171 Effective Public Speaking

15-COMM-281 Business Communications

15-ECON 101 & 102 Intro. to Econ. I & II

15-ENGL-101 & 102 English Comp. I & II

15-MATH-224 Fundamentals of Applied Calculus **or** 15-MATH-225 Finite Mathematics

15-MATH-226 & 227 Applied Calculus I & II

22-ACCT-281 Financial Accounting

22-ACCT-282 Managerial Accounting

22-BLAW-280 Legal Environment

22-IS-280 Computer Problem Solving in Business

22-QA-281 & 282 Business Statistics I & II

Course Objectives

1. Develop skill in recognizing situations where quantitative analyses are a valuable modeling tool.
2. Develop skill in formulating, analyzing, & interpreting commonly encountered math models.
3. Develop a solid background in the basics of linear, integer, and nonlinear programming; transportation/transshipment modeling and personnel assignment; queuing analysis; simulation; decision analysis; and making multi-criteria decisions.
4. Acquaint the student with currently available software packages for analyzing mathematical models. *Microsoft EXCEL Solver* and *Oracle Crystal Ball* will be employed for problem solving.

Grading Policy: Exam#1: **25%** Assignment #1: **10%** Exam#2: **25%** Assignment #2: **10%**
Final Exam: **30%**

Notes: 1) It is the student's responsibility to keep all graded work in case your grade is at question.
2) Without mutually agreeable prior arrangements, late work will not be accepted.

Text: Anderson, David R., Sweeney, Dennis J., Williams, Thomas A., Camm, Jeffrey D., and Martin, Kipp, *An Introduction to Management Science: Quantitative Approaches to Decision Making*, Thirteenth Edition Revised, South-Western Cengage Learning, ISBN10: 1-111-53222-2, ISBN13: 978-1-111-53222-2, Mason, OH, 2012.

Note: The text is available at the UC Bookstore and may be purchased on-line. To rent a print copy or purchase an electronic version of the book in its entirety or chapter by chapter:

<http://www.cengagebrain.com/shop/en/US/storefront/US?cmd=catProductDetail&ISBN=978-1-4390-4327-1>

<http://www.coursesmart.com/9781439043271>

Available at the Reserve Desk of Langsam Library

Two copies of the text are on reserve. Please notify library staff if any pages are missing.

Information Resources

Extensive use of *Blackboard Learning and Community Portal System TM Version 9* will be employed for students to access documents such as PowerPoint slides, the syllabus, or assignments, and for communication such as announcements and postings for office hours. Email communication will be maintained through Blackboard and this requires that you keep a functioning email address registered, a setting you control. You may access Blackboard at <http://blackboard.uc.edu/> and the **Contact Support Team** at the Help button may assist.

Examinations and Assignments

Examination #1 (25%) and **Examination #2 (25%)** are unit examinations covering only material from that portion of the course. The **Final Examination (30%)** will consist of a unit examination that covers the material covered since Examination #2 and a comprehensive portion that may include problems and questions from any portion of the class. You may pick up your graded final examination after final grades have been submitted.

Disruptions during examinations for large classes are an issue. And, providing assistance to only those who ask is not quite fair to all unless all answers are broadcast to all students. Thus, *questions during examinations will not be taken*. If you are uncertain with respect to the interpretation of a passage or what assumption you should be making, it is your choices in these areas that are an important part of the decision-making process. Read and take problem wording literally and write down explicitly any interpretations and assumptions that you wish to make.

Two **Assignments (10% each)** will involve development of a model and a computer solution for linear programming with *EXCEL Solver* and risk analysis with *Crystal Ball*, respectively. You may work individually or in groups limited in size as stated in the assignment description. Assignments submitted beyond the deadline without prior approval will not be accepted.

Make-Up Examinations

Make-up examinations will not be given. If you miss one or both of the first two examinations with an excused absence, the weight of the final exam will be increased by the amount of the missed exam(s). An excused absence is one that meets all of the following conditions: 1) the professor is notified in advance or as soon as possible if advance notification was not possible; 2) the professor approves the absence; 3) written verification is provided. Unexcused absences from examinations will be recorded with a grade of zero percent.

Grade Improvement

Grades will be earned for the required work only. No additional work will be provided for "extra credit" or "grade improvement".

Auditing and Pass/Fail Options

Should you wish to audit the course, the only requirement other than registering officially as an auditor is that you attend and participate in the class. You may have copies of the examinations and the solutions to them, and you may perform a project, but the staff will not evaluate or grade the work. Auditors who fail to attend class will be assigned a grade of F. Taking the course with a Pass/Fail option is not an option.

Incomplete Policy

The university policy will be followed regarding the awarding of an I grade, i.e., the I grade will be given only if a student is unable to complete the course and has an excused absence for any delinquent work. Students receiving an I grade must contact Dr. Rogers before the end of the first week of the immediately following quarter to arrange a method for completing the course. If you will not be able to schedule a meeting prior to the first week of the immediately following quarter, prior arrangements should be made regarding when you will be able to meet. Unless an acceptable reason exists to postpone completing the course during the next academic quarter, all work necessary to change an I grade must be finished during the immediately following quarter or your grade will be converted to an F.

Notification of Grades

Final grades will be available through UC OneStop and will not be posted nor will they be provided over email, telephone, or personally. The Teaching Assistants and administrative staff do not have access to final grades nor are they authorized to release any grades.

Withdrawal Policy

The university policy will be followed regarding the awarding of a W grade, i.e., the W grade will be given only if a student withdraws before the officially stated university deadline. According to UC policy you may withdraw until **5:00 P.M., Wednesday, February 29, 2012**. After this date the W grade is no longer an option.

Absences

While absences from class are extremely discouraged, sometimes exceptional circumstances arise that require missing a class. If you must miss a class, *please do not contact the professor* since attendance is not recorded and such an interaction is not needed. Each class is digitally recorded and you may view any missed class within hours after it is over. In the event that you do miss a class, it is your responsibility to determine what you missed and obtain handouts. Please work with fellow students to acquire any additional course policies and procedures, obtain homework assignments, and determine the material that was covered. You may use Office Hours to answer specific questions regarding missed materials but a repeat or detailed synopsis of the missed lecture will not be performed.

Special Needs Policy and Disability Services

If you have any special needs related to your participation in this course, including identified visual impairment, hearing impairment, physical impairment, communication disorder, and/or specific learning disability that may influence your performance in this course, you should meet with the instructor to arrange for reasonable provisions to ensure an equitable opportunity to meet all the requirements of this course. At the discretion of the instructor, some accommodations may require prior approval by Disability Services.

If utilizing Disability Services results in any changes of usual procedures for any examination, project, or homework, please notify the professor and process the required paperwork immediately with the professor in his office. A photocopy of the paperwork must be given to the professor. For all such cases, the end of the second week of the quarter is the deadline for processing paperwork from Disability Services. If paperwork from Disability Services is pending, please discuss the situation with the professor before the end of the second week of the quarter. Failure to follow these guidelines will result in the usual procedures for any examination, project, or homework being retained. If you are taking any examination with Disability Services, you must schedule the examination so that it overlaps with the time period the class is taking the examination.

Class Participation Policy

Attendance is not taken or recorded. It is up to you to be responsible enough to come to class and participate. If you are going to miss a regular (non-examination) class session, please do not contact the professor to indicate such. Should you decide to withdraw, you must have participated in one of the first two examinations or have submitted assignment #1 to receive an indication of class participation for the W grade. Otherwise, non-participation will be indicated for withdrawals resulting in the WX grade.

Electronics

Please either turn off or place on vibrate all cell phones. If you must take a call or text with someone, please leave the room. Please do not Facebook, Tweet, LinkedIn, YouTube, Google, eBay, instant message, or other distracting activity in the classroom.

Emergency Class Cancellation Policy

In the rare case of emergency cancellation of a class, because of inclement weather or any other unexpected reason, such cancellation will be communicated to students via email through ***Blackboard***. For a suspected inclement weather closure, you may also wish to scan local television, radio, and websites since they may receive and release information regarding UC closures prior to my email. Emergencies are also posted to UC's homepage **Error! Hyperlink reference not valid.** If UC is closed, class is cancelled. If UC does not close, unless you hear otherwise from me, assume class will be held as scheduled.

Academic Integrity Policy

The University Rules, including the ***Student Code of Conduct***, and other documented policies of the department, college, and university related to academic integrity will be enforced. Any violation of these regulations, including acts of plagiarism or cheating, will be dealt with on an individual basis according to the severity of the misconduct. Please refer to the ***Student Code of Conduct*** at <http://www.uc.edu/studentlife/conduct/conduct.html>.

It is expected and encouraged that students should discuss readings, homework assignments, and case reports with each other unless otherwise specified. When doing homework and cases, try on your own, ask for help from anyone, and get the work completed. However, getting an exercise or case worked through to a solution is not necessarily learning. Make sure you know what the problem is, what the solution is, and what the solution implies. Merely copying someone's work will not guarantee this.

Classroom examinations will be "closed-book" and, along with any take-home examinations, are to be the sole work of individual students. A grade of D- or F for the course will be assigned to anyone receiving assistance or assisting another during any in-class or take-home examinations. Furthermore, any other academic misconduct during an in-class or take-home examination will result in immediate dismissal and a course grade of D- or F. Academic misconduct for an in-class examination includes, but is not limited to, inappropriate behaviors such as: talking; passing any physical thing(s) such as notes, calculators, or writing devices; scanning the room and your classmates and potentially their work; peering at another individual and/or their work; communication of any type with a classmate; and behavior disruptive to the examination. Further disciplinary action for any academic misconduct may be taken that could result in dismissal from the university.

A grade of D- or F for the course will be given to anyone receiving assistance from or assisting another individual or group for assignments for which the work is to be that of each individual student or group. Integrity of take-home assignments is of paramount importance. Should there be an indication that any take-home assignment or examination is to be performed by an individual or limited number of participants, violating this policy will be determined as academic misconduct and a grade of D- or F will be assigned for the course. Plagiarism or representing someone else's work as your own will result in a course grade of D- or F. Further disciplinary action for any academic misconduct mentioned in this section may be taken that could result in dismissal from the university.

Tentative Course Outline

<u><i>Date-Session#</i></u>	<u><i>Topic</i></u>	<u><i>Text Reading</i></u>
1/3-1	Introduction to Business Analytics <i>Problems: Ch. 1: 1-7 (Formulate Only)</i>	Syllabus; 1.1-1.5
1/5-2	Introduction to Business Analytics Mathematical Modeling & Linear Programming <i>Problems (Formulate Only): Ch. 1: 8-17, Ch. 2: 14-16</i>	1.1-1.5 2.1
1/10-3	Standard Form and Formulating Linear Programs (LP) <i>Problems (Formulate Only): Ch. 2: 23-30, 36-41, 46, 49-54</i>	2.1, 2.5, 2.7
1/12-4	2015: Ten Predictions for Decision Sciences LP Formulations <i>Problems (Formulate and/or Standard Form Only): Ch. 4: 1-25; Ch. 2: 17-20</i>	Handout 4.1-4.3
1/17-5	LP Formulations Linear Programming Solution Insights from Two-Variable Models Unique Optimal, Bounded/Unbounded, Feasibility, Redundancy, Slack/Surplus <i>Problems: Ch. 2: 1-16, 18-21</i> Special Solutions - Infeasible, Multiple Optimal <i>Problems: Ch. 2: 31-35, 42-45, 49-50</i>	2.2-2.3, 2.5 2.6
1/19-6	<i>Lee Armstrong, Associate Director, International Programs</i> LP Insights Examples Integer LP <i>Problems: Ch. 7: 1-25</i>	
1/24-7	Integer LP <i>Problems: Ch. 7: 1-25</i> Nonlinear Programming <i>Problems: Ch. 8: 1-21</i> <i>End of Material for Examination #1</i>	7.1-7.4 7.1-7.4 8.1-8.5, Appendix 8.2
1/26-8	<i>Examination #1 (25%)</i>	
1/31-9	EXCEL Solver <i>Problems: Ch. 3: 1-32</i> <i>Assignment #1 Distributed Approximately Here</i>	2.4; Appendices 2.2 & 7.1
2/2-10	Sensitivity for EXCEL Solver <i>Problems: Ch. 3: 1-32</i>	3.1-3.5, Appendix 3.1, Appendix 4.1
2/7-11	Transportation, Transshipment, & Assignment Models <i>Problems (Formulate/Draw Network Only): Ch. 6: 1-36</i>	6.1-6.3, 6.6, Appendix 6.1
2/9-12	Transportation, Transshipment, & Assignment Models <i>Problems (Formulate/Draw Network Only): Ch. 6: 1-36</i>	6.1-6.3, 6.6, Appendix 6.1
2/14-13	Waiting Line Models <i>Problems: Ch. 11: 1-12, 14, 16</i>	11.1-11.2, 11.6
2/16-14	Waiting Line Models <i>Problems: Ch. 11: 13, 15, 17-26</i> <i>End of Material for Examination #2</i>	11.3-11.5
2/21-15	Computer Simulation <i>Problems: Ch. 12: 1-12</i> Crystal Ball	12.1-12.4 Appendix 12.2
2/23-16	<i>Examination #2 (25%)</i>	

2/28-17	Computer Simulation <i>Problems: Ch. 12: 1-12</i>	12.1-12.4
	<i>Assignment #1 Due; Assignment #2 Distributed Approximately Here</i>	
3/1-18	Simulation Modeling Examples	
	Crystal Ball	Appendix 12.2
	Decision Analysis <i>Problems: Ch. 13: 1-15</i>	13.1-13.3
3/6-19	Decision Analysis <i>Problems: Ch. 13: 1-15</i>	13.1-13.3
	Decision Making & Utility	Notes
3/8-20	Multi-Criteria Decision Making & Goal Programming	14.1-14.2
	<i>Problems (Formulate Only): Ch. 14: 1-8</i>	
3/9	<i>Assignment #2 Due, 2:00 P.M., Friday</i>	
3/15-21	<i>Final Examination (30%) – 10:30 A.M. – 12:30 P.M., Thursday</i>	