IE 3315 – 001
Operations Research I
Spring 2015
TTh 9:30 - 10:50 a.m.
Woolf Hall 404

Instructor: Bill Corley

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Office Hours: MTTh 2:00 - 3:00 p.m.

GTAs: Frank Puk (kinming.puk@mavs.uta.edu)

GTA Office Hours: Frank Puk – TTh 2:00 - 3:00 p.m. in WH 401.

Description of Course Content: An introduction to the major deterministic techniques of operations research and their application to decision problems. These techniques include linear programming, integer programming, network analysis, dynamic programming, and nonlinear programming. Course software is used.

Student Learning Outcomes: This course is designed to develop modeling skills and an ability to apply deterministic quantitative optimization methods to the decision-making process. At the end of this course, students should be able to understand the basic concepts of operations research and to apply these methods to representative deterministic real-world problems. These outcomes will be evaluated with three in-class quizzes.

Prerequisite: IE 3301 and Math 2326 or their equivalent.

Required Text: *Operations Research* by Taha, ninth edition, Pearson Educaton 2011.

Changes to Syllabus: The instructor reserves the right to make reasonable modifications to this syllabus as needed during the semester when circumstances arise. Students will be notified in advance of such changes both in class and by email. All students are responsible for such changes.

Attendance: It will not taken after the first two weeks of class, but class attendance is strongly encouraged. You are responsible for any information given in class.

Homework: Homework will not be graded. However, students are strongly encouraged to work the assigned practice problems. Failure to do so will likely lead to poor grades.

Expectations for Out-of-Class Study: Beyond the time required to attend each class meeting, students enrolled in this course should expect to spend at least an additional 6 hours per week of their own time in course-related activities. This time amounts to two hours outside class for every hour in it. Studying for exams will require further time.

Class Courtesy: To enhance learning, the instructor insists on a quiet classroom. Silence cell phones before class and refrain from talking during class. Students who come to class late should enter the classroom as discreetly as possible. The classroom may be locked 10 minutes after class begins, in

which case a student may not be allowed to enter. In general, students who are disruptive in class will be asked to leave.

Review Classes: Certain classes may be designated as review classes, as time permits. During these classes, the instructor or GTA will go over homework problems and old exam questions plus answering reasonable student question on the test material.

Description of Major Assignments and Examinations:

1. There will be three in-class quizzes on the dates in the schedule below. They will be closed-book as noted below in Exam Protocol. The problems on each exam will be equally weighted even though some may be easier or harder than others. Exam grades are not curved.
2. During the semester one or more assignments will be designated as *key assignments*. To pass this class you must successfully complete all key assignment requirements by the end of the semester or receive an I (incomplete). The key assignments are as follows.
   (a) The first problem on each of the first two tests will be designated as key assignments. If a student makes less than two-thirds of full credit on any such problem, he/she must rework the problem correctly and submit it to complete this key assignment. This reworking will not result in a change of the test score.

   (b) NLP Computer Project: There will be a computer project in which each student must submit the solution of five NLP problems created by himself/herself and solved by the Lingo software at www.lindo.com or other software such as Matlab. By creating the problems yourself, you will likely construct some that are infeasible or unbounded. Or you may get solutions that are only local optima due to the limitations of NLP software. Identify such situations. Submit this computer assignment on Thursday, April 30. Turn in both a printout and a typed description of anything not expected.
3. A copy of an applied journal article using an operations research model must also be submitted on April 30 with an explanation in the student's own words. This explanation must satisfy the instructor to complete this key assignment.

Make-up Exams: Make-up exams will only be given for documented illnesses and emergencies. Whenever, possible, you should contact the instructor before the exam in such cases.

Exam Proctocol:

1. Your cell phone and computer, plus all books and class notes, must be placed on the floor at the side of the room, front of the room, or back of the room. It is suggested that you not bring them.
2. You must sit in the seat on the seating chart shown on the door and at the front of the room. No exceptions.
3. The test may be videotaped.
4. Arrive early to put your books, etc., away and to find your assigned seat.
5. You will have at your desk only one 8 ½ by 11 sheet of paper on which you can put any notes that you want on both the front and back. You may also have a very basic nonprogrammable calculator. Cell phones cannot be used as calculators. The test is closed book so you may have no other materials at your desk.
6. The instructor will quickly go over the test at the beginning of the period. No questions will be answered for anyone about the test while you are taking it.
7. Absolutely no talking, looking on another student’s exam, or passing anything between students is permitted during the test. Such actions will be construed as cheating. Students are not permitted to leave the room during the exam. Suspicious activity will be noted on the seating chart.

8. Anyone finishing the test early must sit quietly until the end of the period. All tests will be taken up at one time.
9. The exams will be given back and explained during the next period. Afterward, the exams will be taken up. See below for grading grievances.
10. No exams will be given back outside of class.

Exam Grading Complaints: If you disagree with your grade on any test problem when the exam is returned, you must submit after that class a written statement on the back of the returned exam that clearly explains the reason you wish the problem to be regraded. Remember that only what you systematically wrote on the exam paper can be considered in grading a problem – not what you meant or claim to know. Moreover, answers that are submitted without supporting work will receive no credit. If a test is submitted for regrading, the entire test will be regarded. Finally, a student may request that an exam be regraded only on the day the exam is returned.

Schedule:

- Tuesday, January 20 – overview
- Thursday, January 22 – modeling with linear programming
- Tuesday, January 27 – simplex algorithm
- Thursday, January 29 – simplex algorithm
- Tuesday, February 3 – simplex algorithm
- Thursday, February 5 – simplex algorithm
- Tuesday, February 10 – duality and dual simplex algorithm
- Thursday, February 12 – dual simplex algorithm
- Tuesday, February 17 – integer programming
- Thursday, February 19 – integer programming
- Tuesday, February 24 – integer programming
- Thursday, February 26 – review period
- Tuesday, March 3 – quiz
- Thursday, March 5 – goal programming, quiz 1 returned
- Tuesday, March 10 – spring break
- Thursday, March 12 – spring break
- Tuesday, March 17 – network analysis
- Thursday, March 19 – network analysis
- Tuesday, March 24 – network analysis
- Thursday, March 26 – dynamic programming
- Tuesday, March 31 – dynamic programming
- Thursday, April 2 – dynamic programming
- Tuesday, April 7 – dynamic programming
- Thursday, April 9 – review period
- Tuesday, April 14 – quiz 2
- Thursday, April 16 – nonlinear programming, quiz 2 returned
- Tuesday, April 21 – nonlinear programming
- Thursday, April 23 – nonlinear programming
- Tuesday, April 28 – nonlinear programming
- Thursday, April 30 – nonlinear programming, NLP problems and journal article due
- Tuesday, May 5 – nonlinear programming
- Thursday, May 7 – review period
- Thursday, May 14, 8:00 -10:30 a.m. – quiz 3

Course Grade: The three exams are equally weighted. Typical Grading Format: A = 90 - 100, B = 80 - 89, C = 65 - 79, D = 55 - 64, F = below 55. Exams grades are not curved.

Drop Policy: Students may drop or swap (adding and dropping a class concurrently) classes through self-service in MyMav from the beginning of the registration period through the late registration period. After the late registration period, students must see their academic advisor to drop a class or withdraw. Undeclared students must see an advisor in the University Advising Center. Drops can continue through a point two-thirds of the way through the term or session. It is the student's responsibility to withdraw officially if they do not plan to attend after registering. Students will not be automatically dropped for non-attendance. Repayment of certain types of financial aid administered through the University may be required as the result of dropping classes or withdrawing. For more information, contact the Office of Financial Aid and Scholarships (http://wweb.uta.edu/aao/fao/).

Electronic Communication: UT Arlington has adopted MavMail as its official means to communicate with students about important deadlines and events, as well as to transact university-related business regarding financial aid, tuition, grades, graduation, etc. All students are assigned a MavMail account and are responsible for checking the inbox regularly. There is no additional charge to students for using this account, which remains active even after graduation. Information about activating and using MavMail is available at http://www.uta.edu/oit/cs/email/mavmail.php.

Americans with Disabilities Act: The University of Texas at Arlington is on record as being committed to both the spirit and letter of all federal equal opportunity legislation, including the Americans with Disabilities Act (ADA). All instructors at UT Arlington are required by law to provide "reasonable accommodations" to students with disabilities, so as not to discriminate on the basis of that disability. Any student requiring an accommodation for this course must provide the instructor with official documentation in the form of a letter certified by the staff in the Office for Students with Disabilities, University Hall 102. Only those students who have officially documented a need for an accommodation will have their request honored. Information regarding diagnostic criteria and policies for obtaining disability-based academic accommodations can be found at www.uta.edu/disability or by calling the Office for Students with Disabilities at (817) 272-3364.

Title IX: The University of Texas at Arlington is committed to upholding U.S. Federal Law “Title IX” such that no member of the UT Arlington community shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity. For more information, visit www.uta.edu/titleIX.

Academic Integrity: UTA expects all students, whether in-class or distance, to abide by its Honor Code posted at http://www.uta.edu/engineering/current-students/academic-honesty.php.

> *I pledge, on my honor, to uphold UT Arlington’s tradition of academic integrity, a tradition that values hard work and honest effort in the pursuit of academic excellence.*
>
> *I promise that I will submit only work that I personally create or contribute to group collaborations, and I will appropriately reference any work from other sources. I will follow the highest standards of integrity and uphold the spirit of the Honor Code.*

UT Arlington faculty members may employ the Honor Code as they see fit in their courses, including (but not limited to) having students acknowledge the honor code as part of an examination or requiring students to incorporate the honor code into any work submitted. Per UT System Regents’ Rule 50101, §2.2, suspected violations of university’s standards for academic integrity (including the Honor Code) will be referred to the Office of Student Conduct. Violators will be disciplined in accordance with University policy, which may result in the student’s suspension or expulsion from the University.

Student Support Services: UT Arlington provides a variety of resources and programs designed to help students develop academic skills, deal with personal situations, and better understand concepts and information related to their courses. Resources include tutoring, major-based learning centers, developmental education, advising and mentoring, personal counseling, and federally funded programs. For individualized referrals, students may visit the reception desk at University College (Ransom Hall),

call the Maverick Resource Hotline at 817-272-6107, send a message to resources@uta.edu, or view the information at www.uta.edu/resources.

Student Feedback Survey: At the end of each term, students enrolled in classes categorized as lecture, seminar, or laboratory shall be directed to complete a Student Feedback Survey (SFS). Instructions on how to access the SFS for this course will be sent directly to each student through MavMail approximately 10 days before the end of the term. Each student's feedback enters the SFS database anonymously and is aggregated with that of other students enrolled in the course. UT Arlington's effort to solicit, gather, tabulate, and publish student feedback is required by state law; students are strongly urged to participate. For more information, visit http://www.uta.edu/sfs.

Final Review Week: A period of five class days prior to the first day of final examinations in the long sessions shall be designated as Final Review Week. The purpose of this week is to allow students sufficient time to prepare for final examinations. During this week, there shall be no scheduled activities such as required field trips or performances; and no instructor shall assign any themes, research problems or exercises of similar scope that have a completion date during or following this week *unless specified in the class syllabus*. During Final Review Week, an instructor shall not give any examinations constituting 10% or more of the final grade, except makeup tests and laboratory examinations. In addition, no instructor shall give any portion of the final examination during Final Review Week. During this week, classes are held as scheduled. In addition, instructors are not required to limit content to topics that have been previously covered; they may introduce new concepts as appropriate.

Emergency Exit Procedures: Should we experience an emergency event that requires us to vacate the building, students should exit the room and move toward the nearest exit, which is located across the hallway through the double doors on the right. When exiting the building during an emergency, one should never take an elevator but should use the stairwells. Faculty members and instructional staff will assist students in selecting the safest route for evacuation and will make arrangements to assist handicapped individuals.

Inclement Weather Policy: If the University is closed, this class will not meet. Any scheduled assignments or examinations will be rescheduled to the next class period that the class meets. You can get information by dialing 972-601-2049 or checking the main website at www.uta.edu.