ESI 6420: Fundamentals of Mathematical Programming

Tuesday 5:10- 8:10 PM (WEIL 0279), Fall 2019

Instructor: **Yongpei Guan**
Office: Room 413, Weil Hall
E-mail: guan@ise.ufl.edu
Office hours: By appointment

Course Description:

Credits: 3; Introduction to Mathematical Programming, with an emphasis on fundamental mathematical concepts used in optimization, classical optimization theory and applications of optimization in engineering. Focus on convex analysis (convex sets, separation theorems, convex functions), optimality conditions (Fritz-John & Karush-Kuhn-Tucker) and lagrangian duality.

Course Objectives:

In this class, we will cover classical models in Mathematical Programming. At the end of the class, we expect students to be able to (1) determine when problems they face can be formulated as continuous optimization problems, (2) recognize when these problems are convex, (3) know classical results characterizing optimal solutions to these problems and (4) understand how to use these classical results on application problems. Through the course of the class, we also expect that students will develop an ability to formulate mathematical statements precisely and to prove them rigorously.

Required Textbooks and Software:

- **Nonlinear Programming: Theory and Algorithms**, Bazaraa, Sherali and Shetty, Wiley, 2006, 3rd Edi- tion (ISBN-10 number: 0-471-48600-0).

Reference Books:

- Bertsekas, **Nonlinear Programming**, Athena Scientific, 1995.
- Luenberger, **Introduction to Linear and Nonlinear Programming**, Addison-Wesley, 1984.

Attendance Policy, Class Expectations, and Make-Up Policy:

- Attendance is not required but strongly suggested. In the event a student is unable to attend the midterm or the final exam because of a valid reason (UF-imposed curriculum requirement, religious holiday, jury duty, or a family/medical emergency), a make-up exam will be organized as soon as feasible for both the instructor and the student, provided that the instructor was given advanced notice of the situation. Students who miss an exam without advanced notice to the instructor (or without a valid reason for which such notice could not be given) will receive a F for the exam and will not be given a make-up exam. Make-up will not be given for homework. The instructor might extend the deadline or forgo homework for a student who has a valid reason (see above), provided that the instructor is given advanced notice.

Homework and Exams

There are four to five homework assignments in total. Discussion is allowed and individual submission is required. All exams are in class. Requests for a re-grade of exam/homework will be considered only within one week from the time the graded exam/homework is returned.

Grading
Homework 20% Midterm 30% (TBD) Final 50% (12/09/2019 @ 3:00 - 5:00 PM)

Grading Scale
Your grade will be the better one of the following two schemes
1. 90-100 A, 85-89 A-, 80-84 B+, 75-79 B, 70-74 B-, 65-69 C+, 60-65 C, <60 F
2. Top 40% A or A-, 70%-50% B+, others B or below

In order to graduate, graduate students must have an overall GPA and an upper-division GPA of 3.0 or better (B or better). Note: a B- average is equivalent to a GPA of 2.67, and therefore, it does not satisfy this graduation requirement. For more information on grades and grading policies, please visit: http://gradschool.ufl.edu/catalog/current-catalog/catalog-general-regulations.html#grades

Students Requiring Accommodations:
Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, https://www.dso.ufl.edu/drc) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

Course Evaluation:
Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at https://evaluations.ufl.edu/evals. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at https://evaluations.ufl.edu/results/.

University Honesty Policy:
UF students are bound by The Honor Pledge which states, We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: On my honor, I have neither given nor received unauthorized aid in doing this assignment. The Honor Code (https://www.dso.ufl.edu/sccr/process/student- conduct-honor-code/) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel.

Software Use:
All faculty, staff, and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

Student Privacy:
There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see: http://registrar.ufl.edu/catalog0910/policies/ regulationferpa.html.