# MATH 4400-1/4400-100/6400-1 Linear Programming
## Spring 2019

**Instructor:** Dr. Yuyuan Ouyang (yuyuano@clemson.edu)

**Class Times:** MW 4:00pm–5:15pm  **Office:** Martin O-207
**Classroom:** Martin M-307  **Office Phone:** (864) 656-5225
**Office Hours:** M 2:30am–3:30am, T 10:00pm–11:00pm

**Textbook:** There is no textbook required for this course. The recommended reference books are:

- J. G. Ecker and M. Kupferschmid, *Introduction to Operations Research*, original edition (1988) or reprint edition (2004), Krieger Publishing.
- D. G. Luenberger and Y. Ye, *Linear and Nonlinear Programming*, 4th edition (2016), Springer.

**Prerequisites:** MATH 2060 (Calculus of Several Variables) and MATH 3110 (Linear Algebra)

**Objectives:** The goal of this course is to introduce linear programming (LP), which covers the formulation of LP models, simplex algorithm, duality and sensitivity analysis, and some network models. Upon successful completion of the course, the students are expected to

- Model some decision-making problems as LP
- Understand fundamental theories regarding LP
- Apply the learned techniques to solve LP models and interpret the answers

**Materials covered:** The tentative schedule of topics are

- LP modeling (1-2 weeks)
- Geometry of LP (1-2 weeks)
- The Simplex Algorithm (3 weeks)
- Duality (2 weeks)
- Sensitivity Analysis(1-2 weeks)
- Network Flow Problems (2 weeks or time permitting)

It should be noted that the above schedule does not necessarily follow the chapter sequence of the reference book. In addition, some additional materials may be covered during the course, in which case the notes will be posted on Canvas.

**Course evaluation:**

|  | Homeworks | Quizzes | Midterm exams | Project | Final exam |
|---|---|---|---|---|---|
| Points | 5 | 20 | 20x2 | 10 | 25 |

**Final grade:**

| Score | Over 90 | 80–89 | 70–79 | 60–69 | Below 60 |
|---|---|---|---|---|---|
| Grade | A | B | C | D | F |

**Homework policy:** Homeworks will be assigned after every class and collected periodically. Work on these daily assignments constitutes the students' primary involvement in the course material, and it is essential that those assignments be regularly completed. Any student reading the sections as assigned and working the problems regularly is expected to perform well in the class.

**Quiz policy:** Quizzes will be given frequently in class based on the homework assigned for the previous class. Scores of a small number of lowest scored quizzes will be dropped at the end of the semester. There will be no make-up quizzes.

**Exam policy:** Only a valid, well-written medical or university excuse can be accepted for making-up midterm exams. There will be no make-up final exam.

**Project policy:** Projects of different levels (4400-1/4400-100/6400-1) will be assigned. The 4400-1 level project requires some derivation and computation. The 4400-100 level requires real-life problem modeling and numerical implementation. The 6400-1 level requires additional literature reading and algorithm design for solving real-life problems. Late submissions after the project submission deadline are subject to up to 50% penalty. No submission is accepted two days after the submission deadline.

**Accommodation:** It is university policy to provide, on a flexible and individualized basis, reasonable accommodations to students who have disabilities. Students with disabilities requesting accommodations should make an appointment with Accessibility Services (656-6848), to discuss specific needs within the first month of classes. Students should present a Faculty Accommodation Letter from Student Accessibility Services when they meet with instructors. Accommodations are not retroactive and new Faculty Accommodation Letters must be presented each semester..

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**Academic integrity statement:** As members of the Clemson University community, we have inherited Thomas Green Clemson's vision of this institution as a "high seminary of learning". Fundamental to this vision is a mutual commitment to truthfulness, honor, and responsibility, without which we cannot earn the trust and respect of others. Furthermore, we recognize that academic dishonesty detracts from the value of a Clemson degree. Therefore, we shall not tolerate lying, cheating, or stealing in any form. In instances where academic standards may have been compromised, Clemson University has a responsibility to respond appropriately to charges of violations of academic integrity.