

# MATH:4400:001 Linear Programming

Fall 2020

**Class times & location:** 2:30 – 3:45 MW, Surrine Hall 382 & online

**Office hours & location:** 8:30 – 9:30 W, 2:30 – 3:30 F, and by appointment, online (& Martin Hall O-204 when necessary)

**Course format:** hybrid (online & in-class if possible)

**Instructor:** Boshi Yang

**Email & Phone** boshiy@clemsun.edu, (864)656-5198

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

**Objectives:** In general, mathematical optimization includes modeling, theory, methods and implementation/application. The main goal of this course is to introduce the above aspects in terms of linear programming (LP). Upon successful completion of the course, students are expected to:

- be able to model suitable real-life decision-making problems as LP;
- be familiar with common terminology of LP and mathematical optimization in general;
- have a through understanding of the Simplex Method and its variants;
- know computational tools to solve large-scale LPs;
- understand LP duality theory and sensitivity analysis;
- model and solve transportation-type problems on networks.

**Textbook:** *Linear Programming*, by Ignizio and Cavalier, Prentice Hall, ISBN: 0-13-183757-5. (recommended)

**Materials covered:** The course will cover the majority of Chapters 1-4, portions of Chapters 6 and 10, and selected topics of Chapters 5 and 9 if time permits. The tentative schedule of topics are:

- Introduction and LP Modeling (2 week)
- Foundations of the Simplex Method (2 weeks)
- The Simplex Method (4 weeks)
- Duality Theory and Sensitivity Analysis (4 weeks)
- The Transportation Problem (2 weeks)

Other topics may be covered in the course, in which case additional notes will be posted.

**Homework:** Homework will be assigned and collected on a weekly basis. Working on the assignments constitutes the student’s primary involvement in the course material, and it is essential that the assignments are regularly completed. Any student reading the sections as assigned and working the problems should perform well in the class. Due to the COVID-19, students are required to scan their work and submit it through Canvas on time.

**Course Projects:** Course projects will be assigned in the middle of the semester. Students are expected to work in groups. The course project may require real-life problem modeling, numerical implementation, and/or theoretical derivation. Project reports are due before the final exam week.

**Exams:** There will be three full-class midterm exams, with notice being given at least one week in advance. The tentative dates of the midterms are: 09/16, 10/14 and 11/11. A cumulative and mandatory final exam is scheduled by the university on Thursday, 12/10, from 3:00 PM to 5:30 PM. Exams may be proctored online.

**Course Evaluation:** Grading weights and scale are as follows:

Homework	Project	Midterm 1	Midterm 2	Midterm 3	Final
30%	15%	10%	10%	10%	25%

90%	80%	70%	60%	< 60%
A	B	C	D	F

**Attendance:** All students are expected to be regular and punctual in their class attendance. The class will be dismissed in the case when the instructor or the invited lecturer is not present within 15 minutes of the scheduled start time. Any exam that was scheduled at the time of a class cancellation will be given at the next class meeting unless contacted by the instructor. For a student who reports testing positive or is being asked to quarantine/isolate because of exposure to the virus, it will be up to the student to inform the instructor that they will be moving to online only instruction for at least the next two weeks. Students are directed to use the Notification of Absence link in Canvas to initiate this notification, which can be found under the “Help” button on the left navigation. Additional communication via email is encouraged; students should follow up with their instructor to develop a continued plan of study for each course. Students will not be penalized in their grade for needing to move to online instruction.

**Academic Integrity:** 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.

**Accessibility:** Clemson University values the diversity of our student body as a strength and a critical component of our dynamic community. Students with disabilities or temporary injuries/conditions may require accommodations due to barriers in the structure of facilities, course design, technology used for curricular purposes, or other campus resources. Students who experience a barrier to full access to a class should let the professor know, and make an appointment to meet with a staff member in Student Accessibility Services as soon as possible. You can make an appointment by calling 864-656-6848, by emailing [studentaccess@lists.clemson.edu](mailto:studentaccess@lists.clemson.edu), or by visiting Suite 239 in the Academic Success Center building. Appointments

are strongly encouraged – drop-ins will be seen if possible, but there could be a significant wait due to scheduled appointments. Students who receive Academic Access Letters are strongly encouraged to request, obtain and present these to their professors as early in the semester as possible so that accommodations can be made in a timely manner. It is the student’s responsibility to follow this process each semester. You can access further information here: <http://www.clemson.edu/campus-life/campus-services/sds/>.

**Sexual Harassment:** Title IX Policy: Clemson University is committed to a policy of equal opportunity for all persons and does not discriminate on the basis of race, color, religion, sex, sexual orientation, gender, pregnancy, national origin, age, disability, veteran’s status, genetic information or protected activity (e.g., opposition to prohibited discrimination or participation in any complaint process, etc.) in employment, educational programs and activities, admissions and financial aid. This includes a prohibition against sexual harassment and sexual violence as mandated by Title IX of the Education Amendments of 1972. The University is committed to combatting sexual harassment and sexual violence. As a result, you should know that University faculty and staff members who work directly with students are required to report any instances of sexual harassment and sexual violence, to the University’s Title IX Coordinator. What this means is that as your professor, I am required to report any incidents of sexual harassment, sexual violence or misconduct, stalking, domestic and/or relationship violence that are directly reported to me, or of which I am somehow made aware. There are two important exceptions to this requirement about which you should be aware: Confidential Resources and facilitators of sexual awareness programs such as ”Take Back the Night and Aspire to be Well” when acting in those capacities, are not required to report incidents of sexual discrimination. Another important exception to the reporting requirement exists for academic work. Disclosures about sexual harassment, sexual violence, stalking, domestic and/or relationship violence that are shared as part of an academic project, a research project, classroom discussion, or course assignment, are not required to be disclosed to the University’s Title IX Coordinator. This policy is located at <http://www.clemson.edu/campus-life/campus-services/access/title-ix/>. Ms. Alesia Smith is the Executive Director for Equity Compliance and the Title IX Coordinator. Her office is located at 223 Holtzendorff Hall, phone number is 864.656.3181, and email address is [alesias@clemson.edu](mailto:alesias@clemson.edu).

**Specific COVID-19 related information for in-person classes:** While on campus, face coverings are required in all buildings and classrooms. Face coverings are also required in outdoor spaces where physical distance cannot be guaranteed. Please be familiar with the additional information on the Healthy Clemson website (<https://www.clemson.edu/coronavirus/index.html>), such as the use of wipes for in-person classes. If an instructor does not have a face covering or refuses to wear an approved face covering without valid accommodation, students should notify the department chair. If a student does not have a face covering or refuses to wear an approved face covering without valid accommodation, the instructor will ask the student to leave the academic space and may report the student’s actions to the Office of Community & Ethical Standards (<https://www.clemson.edu/campus-life/student-conduct/>) as a violation of the Student Code of Conduct. If the student’s actions disrupt the class to the extent that an immediate response is needed, the instructor may call the Clemson University Police Department at 656-2222.