

Syllabus

Spring 2019

- Course meeting time: Tue, Thu 12:30-1:45 PM
- Classroom: Transportation Building room 114
- Credit hours: 3 Hours (enrollment in IE311 provides an additional credit hour)
- Instructor: Ruoyu Sun (ruoyus@illinois.edu)
- Office location: Transportation Building Room 209D
- Office hours: Tuesdays 2:00-3:00 PM
- Teaching Assistants:
 - Roshanak Khaleghi (khalegh2@illinois.edu)
 - Reza Soleymanifar (reza2@illinois.edu)
- Textbook: “Introduction to Operations Research”, Frederick S. Hillier and Gerald J. Lieberman (9th Edition)
- Course description: This course is intended to be an introduction to and survey of deterministic optimization models with applications to systems found in operations research. The student should complete this course with the ability to identify problems that can be addressed using operations research models, as well as the ability to use such models to solve problems.
- Learning outcomes: Following the completion of this course, students should be able to
 - formulate mathematical models for common operations research applications
 - identify the objectives, constraints, and decision variables for common optimization problems
 - apply common optimization algorithms for a variety of optimization problems (e.g., linear programs, network models, integer programs)
- Prerequisites: Credit or concurrent registration in MATH415 (required)
- Students with disabilities: All reasonable accommodations required for students with disabilities will be provided, as ensured by Article 1, Part 1 of the Student Code.
- Tentative list of topics
 - Linear Programming (Ch.3,4,5,6,7)
 - * Model formulation
 - * Graphical approach [Homework 1]
 - * Simplex method [Homework 2]
 - * Variations of the simplex method
 - * Sensitivity analysis [Homework 3, Midterm 1]
 - Graphs and Networks (Ch.8,9)
 - * Transportation problem
 - * Assignment problem [Homework 4]
 - * Minimum spanning tree problem
 - * Shortest path problem
 - * Max flow problem
 - * Project management (PERT/CPM) [Homework 5, Midterm 2]
 - Integer programming (Ch.11)
 - * Uses of binary variables
 - * Branch and bound [Homework 6]
 - Nonlinear Programming (Ch.12)
 - * Unconstrained optimization - search methods
 - * Constrained optimization - Lagrange multipliers, KKT conditions [Homework 7]

Grading policy

- Grades will be based on the following:
 - Two midterm exams: 40% (20% each)
 - Final exam: 30%
 - Homework assignments: 30%
- Assignment Policies:
 - *Assignment Schedule and Submission:* Roughly seven assignments will be collected during the semester. Instructions for how to submit homework assignments will be provided. Please follow these instructions carefully! Late submissions will not be accepted. To accommodate unanticipated tardiness, each students' lowest homework score will be dropped.
- Exam Policies (Midterms and Final):
 - *Schedule:* Exam dates will be announced in class.
 - *Absences:* To ensure that student performance is assessed uniformly, make-up exams will only be allowed under extraordinary and unavoidable circumstances. Appropriate documentation verifying the absence may be required; in cases of illness you may be asked to have documentation from a physician reviewed and verified by the Dean of Students. Please notify the instructor as early as possible if you believe you will need to take a make-up exam. Make-up exam arrangements will be made on a case-by-case basis.
 - *Allowed materials:* Exams are closed books and closed notes, though you are permitted to bring one 8.5" 11" sheet of notes, double sided, so formulas and expressions need not be memorized. Calculators are allowed as long as they do not have communication abilities, and may be inspected at any time. Calculators should only be used for numerical computation purposes; all work must be shown. Cell phones should not be brought to exams!
- Attendance: You are expected to attend all course meetings and participate in class discussions. Important course announcements will be made during class; you are responsible for being aware of these announcements.
- Academic Integrity: It is expected that your exams will contain only your own work, and that your assignments will contain only the work of your group. Any student who misrepresents their work in an exam, or group who misrepresents their work on an assignment, will receive a grade of zero on that exam or assignment; other penalties may also be pursued, as allowed by University policy.
- Cell Phones and Other Devices: Please turn off all cell phones before class. Use of other electronic devices (tablets, laptops, etc.) is allowed for course-related purposes only. Do not bring any electronic devices (other than a calculator) to exams.
- NOTE: The policies contained in this syllabus are subject to change. You will be notified in the event of any changes.