

Instructor: Karthik Chandrasekaran (karthe@illinois.edu)

Office Hour: Tue, 3:30–4:30pm
301 Transportation Building

Lectures: Tue & Thu, 9:30–10:50am
106B3 Engineering Hall

- I will post lectures notes in Canvas a day before the lecture. I encourage you to print and take notes.
- I might update lecture notes after the lecture. Check Canvas by Fri 6pm for updated notes.

Teaching Assistant: Duo Lin

Office Hour: Mon & Thu, 4-5pm
114 CSL

Course Outline: <https://karthik.ise.illinois.edu/courses/ie511/ie511-sp-25.html>

Course Resources:

- All course resources will be available in Canvas: <https://canvas.illinois.edu>.
- For discussions, we will use **Piazza**. I encourage you to post your questions on Piazza. Your questions will benefit everyone in the course. See Canvas for link to course page in Piazza.
- For homework and exam submissions, we will use **Gradescope**. See Canvas for link to Gradescope. Note: You will have to enroll in Gradescope using the course link provided in Canvas.

Textbooks that you may wish to consult:

Nemhauser and Wolsey, Integer and Combinatorial Optimization
Wolsey, Integer Programming
Schrijver, Theory of Linear and Integer Programming

Course Description: The course will provide a comprehensive treatment of integer optimization including theory, algorithms and applications at the introductory graduate level. Some specific topics to be covered are: Modeling & Formulations, Polyhedral Theory, Complexity, Relaxations, Dynamic Programming, Branch & Bound, Cutting Planes, and Lagrangian Duality.

Mathematical maturity at the level of a beginning graduate student will be assumed. Familiarity with reading and writing mathematical proofs and basic knowledge in Linear Algebra are required. Prior coursework in Linear Programming, Linear Algebra and Graph Theory will be helpful.

Student Learning Objectives: Develop a thorough understanding of the theory and algorithms for Integer Programming. Practice and improve rigorous mathematical proof writing skills.

Grading:

Homeworks 50%

Class Participation 10%

Exams 20% each

Homework and Exam policies:

- The purpose of homeworks and exams is to gain the confidence to solve problems on your own and the ability to write proofs in a rigorous manner.
- Start working on homeworks early.
- Homeworks will be posted in *Gradescope*. Strict due dates will be enforced.
- Typesetting homework solutions (in 11pt or larger font) is recommended. Figures and math formulae may be drawn by hand in black ink. I will provide a latex template for your convenience.
- The purpose of homeworks and exams is to gain the ability and the confidence to solve problems on your own. Other solution sources on problems assigned for homeworks and exams are **NOT** permitted. Do **NOT** google/web-search the problems. Refer to lecture notes and your notes.
- You may cite and use theorems/lemmas mentioned during lectures. If you are unsure whether you need to prove a result that you use, then clarify with the instructor. Do **NOT** cite publications, books, online lecture notes, online solution sources, wikipedia, and blogs.
- Exams will be in take-home format.
- We will use gradescope for grading homeworks and exams: <https://www.gradescope.com/>. Use the code given in Canvas to register for this course in gradescope.
- While submitting the scan, ensure that you match the question number to the page in your submission.
- Ensure that you **click the buttons to complete the submission and receive a confirmation email** of submission via gradescope.
- Account for the time needed for uploading your submission (i.e., do not attempt to upload 1-min before the deadline) - aim to upload at least 15-30 mins before the deadline. Gradescope will close the submission server at deadline. Email submissions will **NOT** be accepted.
- Mathematical rigor, correctness, and clarity of exposition will be factors in grading. Do proofread your solutions before submission.

- Grading clarifications (in homeworks and exams) should be resolved within a week from the date of return of the graded submissions. No clarifications will be entertained after a week.
- Solutions for homework and exam problems will **NOT** be distributed. If you would like to know the solution, meet the instructor/TA during office hours after the submission due date.
- Plagiarism will be dealt with severely. No credit for the homework or the exam.
- You are welcome to discuss the course material with your colleagues.

Homework Collaboration policy:

1. **No collaboration on exams.**
2. You are allowed to collaborate on homeworks. You may choose to not collaborate.
3. Collaboration in homeworks is allowed in groups of two.
4. Write the name of your collaborator in the submission.
5. Each student should submit their own individual homework.
6. Collaborating beyond your mentioned partner will be considered as plagiarism. All collaborators will be penalized.

Guidelines:

- Raise questions and clarify doubts during lectures. No question is s-t-o-o-p-i-d!
- You are encouraged to answer the questions raised during the lectures. No answer is a-b-s-u-r-d!
- A few exercise problems will be assigned during lectures. You do not have to submit solutions to these problems. Solving them will help you keep up with the course material.
- Start working on homeworks as soon as they are released. Homeworks take time to solve.
- **If you are starting to have difficulties in this course**, it is imperative that you meet with me and talk to me before you are so far behind that it is impossible to catch up. I want you to succeed in this course and am here to help you do so.

Academic Integrity: Please review the University of Illinois, Urbana-Champaign's academic integrity policy at https://studentcode.illinois.edu/article1_part4_1-401.html.