Schedule
Introduction to Graduate Algorithms.
Spring 2023.

- WEEK 1 (Jan 9-13) Dynamic Programming (Chapter 6 on the book).
  First day of classes: Monday, January 9.
  ~~LIS, LCS (DP1 lecture video).~~
  Homework 0 (∗)
  Logistic Quizzes released (graded).
  Meet your team. Wednesday, 8pm EST via Teams.

- WEEK 2 (Jan 16-20) Dynamic Programming (Chapter 6).
  ~~Knapsack, Chain Multiply (DP2 lecture video)~~
  TODO before Exam 1
  Shortest paths (DP3 lecture video)
  ~~HW1 released. Poll 1 released.~~

- WEEK 3 (Jan 23-27) Divide and conquer I (Chapter 2).
  ~~Fast Multiplication, Recurrences. (DC1 and DC3 lecture videos)~~
  HW2 released. Coding Project I Released. Poll 2 released.
  Class Communication and Logistics is due.

- WEEK 4 (Jan 30- Feb 3) Divide and conquer II (Chapter 2).
  ~~Fast Fourier Transform (DC4 DC5 lecture videos)~~
  ~~Median of medians (DC2 lecture video)~~
  HW3 released. Poll 3 released.
  Academic Integrity Quiz is due.

- WEEK 5 (Feb 6-10) RSA cryptosystem (Chapter 1).
  Modular Aritmethic (RA1 lecture video)
  RSA protocol, primality testing (RA2 lecture video)
  EXAM 1 **Thursday, Feb 9 10am-Monday, Feb 13 8am.** Will cover content from weeks 1 to 4.

- WEEK 6 (Feb 13-17) Graph algorithm I (Chapter 3 and 4).
  ~~Strongly Connected Components (GR1 lecture video)~~
  ~~2-SAT (GR2 lecture video)~~
  HW4 released. Poll 4 released.

- WEEK 7 (Feb 20-24) Graph algorithm II and Max Flow I (Chapters 3, 5 and 7).
  MST (GR3 lecture video)
  Ford-Fulkerson algorithm for Max-flow (MF1 lecture video)
  HW5 released. Poll 5 released.

- WEEK 8 (Feb 27-March 3) Max Flow II (Chapter 7).
  Max-flow=min-cut (MF2 lecture video)
  Image segmentation (MF3 lecture video)
  Flow variant: demands (MF5 lecture video)
  HW6: RSA released.
  Coding Project II released.

- WEEK 9 (Mar 6-10) Max Flow III (Chapter 7).
  Edmonds-Karp algorithm for max-flow (MF4 lecture video)
  EXAM 2 **Thursday, Mar 9 10am-Monday, Mar 13 8am**. Will cover content from weeks 5 to 9.

- WEEK 10 (Mar 13-17) NP completeness (Chapter 8).
  NP, Reductions (NP1 lecture video)
  3-SAT (NP2 lecture video)
  Graph problems (NP3 lecture video)
  HW7 released. Poll 6 released.

- WEEK 11 (Mar 20-24) Spring Break.

- WEEK 12 (Mar 27-31) Linear programming (Chapter 7).
  LP introduction (LP1 lecture video)
  Duality and Geometry (LP2 lecture video and LP3 lecture video)
  HW8 released. Poll 7 released.

- WEEK 13 (Apr 3-7) NP and LP (Chapter 7 and 8).
  Max-SAT approximation algorithm. (LP4 lecture video)
  Knapsack (NP4 lecture video)
  Coding Project III released. Poll 8 released

- WEEK 14 (Apr 10-14) More on complexity (Chapter 8).
  Halting problem (NP5 lecture video)
  EXAM 3 **Thursday, Apr 13 10am-Monday, Apr 17 8am**. Will cover content from weeks 10 to 13.

- WEEK 15 (Apr 17-21) Markov Chains (∗) (GR4 Lecture video)

- WEEK 16 (Apr 24-28) Final Week.
  Last day of classes: Tuesday, April 25.
  Final Exam. Cumulative. **Thursday, April 27 at 10am- Monday, May 1 at 8am**.

`Material and assignments marked with (∗) won't be graded. Please do not submit.`