

CS224W: Machine Learning with Graphs

Instructor Jure Leskovec

Co-Instructor Michele Catasta

Office Hours: exclusively about projects, on appointment (arranged via personal email)

Lectures 3:00-4:20pm Tuesday and Thursday in NVIDIA Auditorium, Huang Engineering Center

Course website <http://cs224w.stanford.edu>

Contact

- For course related questions, use Piazza: <http://piazza.com/stanford/fall2019/cs224w> (use your @stanford.edu address to register)
- For personal matters, or in emergencies, e-mail us at cs224w-aut1920-staff@lists.stanford.edu
- SCPD students can attend office hours remotely via a Google Hangout; the link will be posted on Piazza just before the office hours start.

TAs (Office Hours in Huang Basement, check website for the schedule)

- Christina Yuan [head TA]
- Lingzi (Liz) Guo
- Benjamin (Ben) Hannel
- Kuangcong (Cecilia) Liu
- Vasco Portilheiro
- Andrew Wang
- Alexis Goh Weiyang
- Zhitao (Rex) Ying

Topics

- Six degrees of separation
- Models of the Small World
- Network Motifs, Structural Roles in networks
- Message passing and Node classification
- Node Representation Learning, Node2Vec
- Graph Neural Networks
- Power-laws and Preferential attachment
- Models of network evolution
- Cascading behavior in networks
- Models of network cascades
- Influence maximization in networks
- Link analysis, PageRank
- Knowledge Graphs and Metapaths
- Finding communities and clusters in networks
- Spectral clustering and large scale community structure in networks
- Modularity and large scale community structure in networks
- Network Inference
- Network Robustness

Course Grading

- 1 setup homework (1%) + 3 (9.6% each) homework requiring coding and theory (30%)
- 2 hour open-book exam (30%)
- Final project: proposal, milestone report, poster presentation, and final report (40%)
- Piazza and course participation, contributions to the SNAP codebase (extra credit factored in during grading)

Assignment Policy

Questions We try very hard to make questions unambiguous, but some ambiguities may remain. Ask (i.e., post a question on Piazza) if confused or state your assumptions explicitly. Reasonable assumptions will be accepted in case of ambiguous questions.

Honor Code We strongly encourage students to form study groups. Students may discuss and work on homework problems in groups. However, each student must write down the solutions independently. That is, each student must understand the solution well enough in order to reconstruct it by him/herself. In addition, each student should write down the set of people whom s/he collaborated with.

Late Submissions Each student will have a total of 2 late periods to use for homework. Homework are due on Thursdays (11:59pm PT) and late periods extend to midnight (11:59pm PT) of the following Monday. Only one late period can be used per assignment, and no assignment will be accepted more than one late period after its due date (modulo a 15min grace period). Late periods can also be used for the submissions related to the final project (i.e., proposal and milestone) **except** the final writeup.

Assignment Submission All students (SCPD and non-SCPD) submit their homework via Gradescope (<http://www.gradescope.com>). Students can typeset or scan their homework. Make sure that you answer each question on a *separate page*. That is, one answer per page regardless of the answer length. You will be added to Gradescope as soon as you officially enroll to CS224W. When Gradescope requires you to upload code for a specific question, include all the code pertaining to that single question into a compressed file and upload it.

Prerequisites

Students are expected to have the following background (recitation sessions will refresh these topics):

- Knowledge of basic computer science principles, sufficient to write a non-trivial computer program (e.g., CS107 or CS145 or equivalent are recommended.)
- Familiarity with the basics of probability theory (CS109 or Stat116 are sufficient but not necessary.)
- Familiarity with the basics of linear algebra (any one of Math 51, Math 103, Math 113, or CS 205 would be much more than necessary.)

Materials

Notes and reading assignments will be posted on the course website. Selected readings for the class will be from: *Networks, Crowds, and Markets: Reasoning About a Highly Connected World* by D. Easley and J. Kleinberg (PDFs available online).

Important Dates

Assignment	Out	Due
Homework 0	now	October 3
Homework 1	September 26	October 10
Project proposal		October 17
Homework 2	October 10	October 24
Project milestone		November 7
Homework 3	October 24	November 14
Exam		November 19
Project final report		December 10 (no late periods)
Project poster session		December 12, 12:15-3:15pm

We will also hold 2 review sessions (**which will be recorded**) in the first two weeks of the course:

- SNAP.PY and Google Cloud tutorial: Skilling Auditorium, Friday 09/27, 3:00-4:20pm
- Review of probability, linear algebra, and proof techniques: Skilling Auditorium, Friday 10/4, 3:00-4:20pm