

Introduction to Social Network Analysis

CS 176

Fall 2026 Section 01 In Person 3 Unit(s) 08/19/2026 to 12/07/2026 Modified 08/23/2026

Contact Information

Instructor(s):	Aikaterini Potika
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Office Hours:	Tuesday-Thursday 9:30-10 am, and Tuesday 12:15-2:15 pm or by appointment

Course Information

Class Days/Time:	Tuesday-Thursday 10:30-11:45 am
Classroom:	Engineering Building 401
Prerequisites:	CS 146 (with a grade of "C-" or better in each); or instructor consent.

Course Description and Requisites

The Web and social networks are complex networks. We study them by unifying tools from different disciplines: computer science, economics, and social sciences. Topics include graph theory, information networks, search, advertisement, auctions.

Prerequisite(s): CS 146 (with a grade of C-). Computer Science or Software Engineering majors only, or instructor consent.

Letter Graded

Classroom Protocols

Attendance is highly recommended. Please avoid disturbing the class: turn off cell phones (or put them on vibrate mode), no text messaging during class or exams, no taking pictures or videos, and avoid coming late. You may not publicly share or upload material for this course without my consent, such as exam questions, lecture notes, or solutions.

Academic Integrity & AI Policy

AI-based tools (such as ChatGPT Edu) are permitted only for brainstorming, summarizing, and grammar/syntax checking of assignments. They may not be used for drafting or writing content, code, pseudocode, or proofs. All submissions must be original, human-written work. If AI is used, you must include a "Use of AI" statement explaining its specific role and list the prompts used. You are solely responsible for the technical integrity of your work. Always verify AI output, as it may contain hallucinations. Presenting AI-generated text or code as your own will be treated as a violation of academic integrity.

Program Information

Diversity Statement - At SJSU, it is important to create a safe learning environment where we can explore, learn, and grow together. We strive to build a diverse, equitable, inclusive culture that values, encourages, and supports students from all backgrounds and experiences.

Course Learning Outcomes (CLOs)

Upon successful completion of this course, students will be able to:

- CLO1. Discuss graph theory used to predict and determine network behavior
- CLO2. Reflect on the basic topics of behavior analysis
- CLO3. Carry out the basics of web search, sponsored, and matching markets
- CLO4. Determine network properties and features in real-world settings
- CLO5. Integrate different approaches from computer science, economics, and social studies to design complex networks
- CLO6. Carry out network analysis using various software and visualizations
- CLO7. Summarize the main tools to analyze complex networks

Course Materials

Textbook

[Networks, Crowds, and Markets: Reasoning About a Highly Connected World](https://www.cs.cornell.edu/home/kleinber/networks-book/)

(<https://www.cs.cornell.edu/home/kleinber/networks-book/>), by David Easley and Jon Kleinberg, Cambridge University Press, ISBN-13 978-0521195331

Other Readings

- Social and Economic Networks, by Matthew O. Jackson, ISBN: 9780691148205
- Social Media Mining An Introduction, by Reza Zafarani, Mohammad Ali Abbasi, Huan Liu, ISBN: 9781107018853
- [Network Science](http://networksciencebook.com/) (<http://networksciencebook.com/>) (1st Edition) by Albert-László Barabási (Author), Márton Pósfai, ISBN: 978-1107076266
- [Mining of Massive Datasets](http://www.mmids.org/) (<http://www.mmids.org/>), by Jure Leskovec, Anand Rajaraman, Jeff Ullman

- [Speech and Language Processing_](https://web.stanford.edu/~jurafsky/slp3/) (<https://web.stanford.edu/~jurafsky/slp3/>)(3rd ed. draft), by Dan Jurafsky and James H. Martin
- Online resources.

Other technology requirements/equipment/material

Software

- <https://networkx.github.io> (<https://networkx.github.io>)
- <https://gephi.github.io/> (<https://gephi.github.io/>)
- <http://ccl.northwestern.edu/netlogo/index.shtml> (<http://ccl.northwestern.edu/netlogo/index.shtml>)

Course Requirements and Assignments

Success in this course is based on the expectation that students will spend, for each unit of credit, a minimum of 45 hours over the length of the course (normally three hours per unit per week) for instruction, preparation/studying, or course-related activities, including but not limited to internships, labs, and clinical practica. Other course structures will have equivalent workload expectations as described in the syllabus.

Homework assignments: individual, regularly assigned, written problem assignments, and perhaps some online exercises. Solutions are not posted. Homework is a tool to help you learn the material and prepare for the exams.

Reading and Video assignments: Reading assignments and posted videos are regular and for the next class (see schedule).

Quizzes: Regular quizzes are online (total 6, only 5 count). Cover topics from the reading and video assignment and/or the homework.

Participation & Discussions (one for each module): Contribution during meetings, polls, and in the discussion forum of Canvas.

Group Project: A programming project of your choice related to the course's topics in groups of two students to cover CLO 6 and CLO 7. Never use any code you find on the web unless I provide it. The penalty for late submission is 5% for every 3 days up to 9 days; after that, no submission will be accepted. The final presentation at the end of the semester is mandatory.

Activities: In-class hands-on examples of social network analysis on various datasets. Requires paper and pencil, or a laptop.

Midterm exams: Two Midterm exams during the semester.

Final Examination or Evaluation: One final, written, and cumulative exam is split into two parts. The exams contain multiple-choice questions, short-answer questions, and questions that require pseudocode and/or computations.

Grading Information

Determination of Grades

No make-up exams except in the case of verifiable emergency circumstances.

Penalty for late submission: 5% for every 3 days up to 9 days; after that, no submission is accepted (without counting weekends).

Never email your assignments; always upload them to Canvas.

Final Grade:

20% Project

10% Homework

10% Participation & Discussions

15% Quizzes

15% Midterm 1

15 % Midterm 2

15% Final

Grade	Percentage
A plus	96 to 100%
A	93 to 95%
A minus	90 to 92%
B plus	86 to 89 %
B	82 to 85%
B minus	78 to 82%
C plus	74 to 77%
C	70 to 73%
C minus	65 to 69%
D plus	62 to 64%
D	58 to 61%
D minus	55 to 57%
F	<54%



University Policies

Per [University Policy S16-9 \(PDF\)](http://www.sjsu.edu/senate/docs/S16-9.pdf) (<http://www.sjsu.edu/senate/docs/S16-9.pdf>), relevant university policy concerning all courses, such as student responsibilities, academic integrity, accommodations, dropping and adding, consent for recording of class, etc. and available student services (e.g. learning assistance,

counseling, and other resources) are listed on the [Syllabus Information](https://www.sjsu.edu/curriculum/courses/syllabus-info.php) (<https://www.sjsu.edu/curriculum/courses/syllabus-info.php>) web page. Make sure to visit this page to review and be aware of these university policies and resources.

Course Schedule

CS 176 Section 1 / Introduction to Social Network Analysis, Fall 2026, Course Schedule

The schedule is subject to change with fair notice, and how the notice will be made available.

Lesson	Date	Topic	Reading/Projects (part of the chapters covered)
1	8/20	Introduction	Chapter 1
2	8/25	Graphs	Chapter 2
3	8/27	Datasets, the Web, Visualization	Chapter 2
4	9/1	Centrality measures I	Other resources
5	9/3	Centrality measures II	Other resources
6	9/8	Strong/Weak Ties	Ch 3
7	9/10	Graph Partitioning, Community Detection	Ch 4
8	9/15	Homophily/Segregation, Influence Maximization	Ch 4, Ch 21, Add/Drop
9	9/17	Positive and Negative Relationships, Structural Balance	Ch 5
10	9/22	Natural Language Processing, GenAI, LLMs (transformers)	Other resources, project proposal
11	9/24	Midterm 1	
12	9/29	Machine Learning on graphs, Node/edge/graph embeddings	Other resources
13	10/1	Behavior Analysis, Game Theory I	Ch 6, 8
14	10/6	Behavior Analysis, Game Theory II	Ch 6, 8
15	10/8	Auctions and Markets I	Ch 9, 10
16	10/13	Auctions and Markets II	Ch 9, 10

17	10/15	Matching Markets	Ch 10
18	10/20	Sponsored Search Markets I	Ch 15
19	10/22	Sponsored Search Markets II	Ch 15
19	10/27	Structure of the Web	Ch 13, Project demo
20	10/29	Midterm 2	
21	11/3	Link Analysis, Web Search	Ch 14
22	11/5	Link Analysis	Ch 14
23	11/12	Recommender Systems	other resources, Project presentation due
24	11/17	Information cascades, Properties of graphs	Ch 16
25	11/19	Random graphs, Project presentations	Ch 18,20,
26	11/24	GenAI GraphRAG, GANs, Project presentations	other resources, Project report due
27	12/1	Project presentations	
28	12/3	Project presentations	
		Final exam Thursday, December 10 10:45 AM-12:45 PM	