

**San José State University  
Science/Computer Science  
CS176, Introduction to Social Network Analysis, Section 1, Spring, 2024**

**Course and Contact Information**

Instructor(s):	Aikaterini Potika
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Office Hours:	Mondays-Wednesdays 9:30-10:00 am and Mondays 12-1 pm or by appointment
Class Days/Time:	Mondays-Wednesdays 10:30-11:45 am
Classroom:	MacQuarrie Hall 422
Prerequisites:	CS 146 (with a grade of "C-" or better in each); or instructor consent.

**Course Description**

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

**Course Format**

**Course Learning Outcomes (CLO)**

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 main tools to analyze complex networks

## Required Texts/Readings

### Textbook

[Networks, Crowds, and Markets: Reasoning About a Highly Connected World](#), 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](#) (1st Edition) by Albert-László Barabási (Author), Márton Pósfai, ISBN: 978-1107076266
- [Mining of Massive Datasets](#), by Jure Leskovec, Anand Rajaraman, Jeff Ullman
- Online resources.

### Other technology requirements / equipment / material

Software

<https://networkx.github.io>

<https://www.r-project.org/>

<https://igraph.org/>

<https://gephi.github.io/>

<http://ccl.northwestern.edu/netlogo/index.shtml>

Network Data Repositories

<https://snap.stanford.edu/data/>

<http://konect.uni-koblenz.de>

## 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 (one for each module):** individual, regularly assigned, written problem assignments, and perhaps some online exercises. Solutions are not posted. The homework is a tool for you to 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 top 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.

**Class notes:** In-class note-taking of a topic (one or two students per lecture), writing a small report, and hands-on examples of the problems and methods we cover using various datasets.

**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 given by me. 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.

**Midterm exam:** One Midterm exam 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**

No extra point options (only the final exam offers extra points option). The final exam is comprehensive.

### **Grading Information**

### **Determination of Grades**

No make-up exams except in 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. Rubrics and examples will be given.

### **Final Grade:**

- 25% Project
- 15% Quizzes
- 10% Homework
- 10% Participation & Discussions
- 5% Activities
- 5% Class Notes
- 15% Midterm
- 15% Final

<i>Grade</i>	<i>Percentage</i>
A plus	96 to 100%
A	93 to 95%
A minus	90 to 92%

<i>Grade</i>	<i>Percentage</i>
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%

### **Classroom Protocol**

During zoom meetings: camera on, mute yourself (unless you have a question or want to contribute), and dress appropriately. Private interactions with other students are prohibited unless you are in a breakroom. Please avoid disturbing the class: turn off cell phones (or put them on vibrate mode), no text messaging in the class or the exams, no taking pictures and videos, avoid coming late, no talking or whispering with other students during the instructor's presentation. You may not publicly share or upload material from this course such as exam questions, lecture notes, or solutions without my consent.

### **University Policies**

Per [University Policy S16-9](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 [Syllabus Information web page](http://www.sjsu.edu/gup/syllabusinfo) (<http://www.sjsu.edu/gup/syllabusinfo>), which is hosted by the Office of Undergraduate Education. Make sure to visit this page to review and be aware of these university policies and resources.

### **CS 176 Section 1 / Introduction to Social Network Analysis, Spring 2024, Course Schedule**

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

<b>Lesson</b>	<b>Date</b>	<b>Topic</b>	<b>Reading/Projects (part of chapters covered)</b>
<b>1</b>	1/24	Introduction	Chapters 1
<b>2</b>	1/29	Graphs	Chapter 2

3	1/31	Datasets, the Web, Visualization	Chapter 2
4	2/5	Centrality measures	Other resources
5	2/7	Centrality measures	Other resources
6	2/12	Strong/Weak Ties	Ch 3
7	2/14	Graph Partitioning, Community Detection	Ch 4
8	2/19	Homophily/Segregation	Ch 4
9	2/21	Positive and Negative Relationships, Structural Balance	Ch 5,
10	2/26	Machine Learning on graphs, Natural Language Processing	Other resources, project proposal
11	2/28	Node/edge/graph embeddings	Other resources
12	3/4	Graph Neural Networks intro	Other resources
13	3/6	Behavior Analysis, Game Theory	Ch 6, 8
14	3/11	Behavior Analysis, Game Theory	Ch 6, 8
15	3/13	Auctions and Markets	Ch 9, 10, Project demo
16	3/18	Auctions and Markets	Ch 9, 10
	3/20	Midterm	
17	3/25	Matching Markets	Ch 10
18	3/27	Sponsored Search Markets	Ch 15
	4/1-4/5	<b>Break</b>	
19	4/8	Sponsored Search Markets	Ch 15
20	4/10	Structure of the Web	Ch 13
21	4/15	Link Analysis, Web Search	Ch 14

22	4/17	Link Analysis	Ch 14
23	4/22	Recommender Systems	other resources, Project presentation due
24	4/24	Information cascades	Ch 16
25	5/1	Influence maximization.	Ch 21, Project report due
26	5/6	Properties of graphs and random graphs, Project presentation	Ch 18,20
27	5/8	Project presentations	
28	5/13	Project presentations	
		<b>Final exam</b> Wednesday, May 15, 9:45 AM-12:00 PM	