Computer Communication Systems

CS 258

Fall 2025   Section 01   In Person   3 Unit(s)   08/20/2025 to 12/08/2025   Modified 08/12/2025

👤 Contact Information

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Office Hours

Monday, Wednesday, 3:00 PM to 4:00 PM, MH 215

You don't need to make an appointment for these office hours. You can stop by my office.

💻 Course Description and Requisites

Design, analysis and survey of the latest advancements in network and Internet technologies, such as supporting TCP/IP over various network media, software-defined networks, networks supporting cloud computing, network security, peer-to-peer and overlay networks, and quality of services.

Prerequisite(s): CS 158A and Graduate standing. Allowed Declared Major: Computer Science, Bioinformatics, Data Science. Or instructor consent.

Letter Graded

✳ Classroom Protocols

- This course is conducted in person, which requires physical attendance for a significant portion of its delivery.
- Students are requested to use the Canvas message function to contact the instructor. Private messages sent to the instructor's email address get lost due to the large volume of emails received.
  - The instructor does not write messages after normal business hours, on weekends, or on holidays.

- Reviewing code for the homework and technical troubleshooting should be done during office hours. Never send your entire code for an assignment to the instructor. The instructor will not fix the bugs in your code.

▤ 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:

- Describe the characteristics of different types of modern network architectures and the underlying technologies, including optical networks, Software Defined Networking (SDN), and Network Function Virtualization (NFV)
- Identify the benefits and challenges of network softwarization
- Solve network resource optimization problems using advanced algorithms, including Integer Linear Programming (ILP), meta-heuristics, and Machine Learning (ML)
- Select an appropriate set of networking technologies and protocols to satisfy service requirements defined by users
- Develop network simulation and emulation software to evaluate protocol performance

▣ Course Materials

Textbooks

No textbook.

Suggested Reading:

- Jim Kurose and Keith Ross, "Computer Networking: A Top-Down Approach"
- Larry Peterson and Bruce Davie, Computer Networks: A Systems Approach, Elsevier, 2012. [eBook available here (https://book.systemsapproach.org/) under Creative Commons (CC BY 4.0)]
- Stallings, William; Foundations of Modern Networking: SDN, NFV, QoE, IoT, and Cloud, 1st edition, ISBN-13: 9780134175393, 2015. [eBook available here (https://www.oreilly.com/library/view/foundations-of-modern/9780134175478/) with your SJSU account]

Programming Languages

Python will be used to develop network simulators and emulators. Undergraduate-level knowledge and experience of software development are assumed. Students are recommended to review the basic syntax before any major assignments.

Software

The following software will be used in class.

- Docker Engine (https://docs.docker.com/ (https://docs.docker.com/))
- Postman (https://www.postman.com/ (https://www.postman.com/))
- Wireshark (https://www.wireshark.org/ (https://www.wireshark.org/))
- Mininet (https://mininet.org/ (https://mininet.org/)): All mininet demos assume a UNIX-like OS. It is recommended to use a virtual machine through Docker, multipass (https://canonical.com/multipass), or a cloud service.
- Google Cloud credits: All students will be given Google Cloud credits for experiments.

☰ Course Requirements and Assignments

- Students must complete the assignments as individual work. It is allowed to discuss general ideas to clarify the assignment questions, but any part of the answers or codes should NOT be shared among students in any form.
- Peer code reviews will be considered in the grading process. More details will be explained in class.

✔ Grading Information

Item	Grade Weight
Wednesday Quiz 1 - 5	15% (3% Each)
Assignment 1 - 3	45% (15% Each)
Mid-term Exam	20%
Final Project (No separate Final Exam)	20%

Extra-credits and Reworks

No extra-credit assignments or rework opportunities will be given.

Late Submission

No late submissions will be accepted.

Missed Assignments or Exams

When students need to miss an assignment deadline or exam due to health conditions or any other emergency, it should be reported within ONE week after the due date.

Final Grade Table

Total Grade	Letter Grade
97% and above	A plus
92% to 96%	A
90% to 91%	A minus
87% to 89%	B plus
82% to 86%	B
80% to 81%	B minus
77% to 79%	C plus
72% to 76%	C
70% to 71%	C minus
67% to 69%	D plus
62% to 66%	D
60% to 61%	D minus
59% and below	F

🏛 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

Date	Topic	Note

8/20	Course Intro	
8/25	Network Overview + Wireshark	
8/27	Intro to TCP/IP Model	
9/1	Labor Day - No class	
9/3	Application Layer	
9/8	Demo: Socket Programming / LE	
9/10	Application Layer - HTTP, CDN	wq1
9/15	Demo: Microservice deployment with Docker	
9/17	Demo: Microservice deployment with Docker	
9/22	Code review 1	a1 due
9/24	Transport Layer	wq2
9/29	Transport Layer	
10/1	Transport Layer	
10/6	Transport Layer	
10/8	Code review 2	wq3, a2 due
10/13	Mid-term exam review	
10/15	Mid-term exam	
10/20	Network Layer (Data Plane)	
10/22	Network Layer (Data Plane) + SDN	
10/27	Network Layer (Control Plane)	
10/29	Demo: Mininet	wq4
11/3	Link Layer	
11/5	Optical Networking	
11/10	Optical Networking	
11/12	Demo: Modeling and NetworkX	wq5

11/17	AI for Networking	a3 due
11/19	AI for Networking	
11/24	Demo: AI for Networking	
11/26	Fall break; No class	
12/1	Demo: AI for Networking	
12/3	Advanced Topics in Networking: Quantum Networks	
12/8	Advanced Topics in Networking: Semantic Communicaiton	
Final Week	(No final exam)	Project submission due