SP23: CS-158A Sec 03 - Computer Networks

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San José State University

Science/Computer Science

CS 158A, Computer Networks, Section 3, Spring 2023

Course and Contact Information

Instructor:	Ben Reed
Office Location:	MH 213
Telephone:	(408) 924-5174
Email:	ben.reed@sjsu.edu
Office Hours:	4:30-6:00PM Monday 10-11:30AM Tuesday over zoom **https://sjsu.zoom.us/j/4077267356** ↪ **(https://sjsu.zoom.us/j/4077267356)** 11:30-1PM Wednesday 3:30-5PM Thursday over zoom **https://sjsu.zoom.us/j/4077267356** ↪ **(https://sjsu.zoom.us/j/4077267356)**
Class Days/Time:	Monday & Wednesday/ 1:30-2:45
Classroom:	MH 223
Prerequisites:	CS 146 and CS 47 (with a grade of "C-" or better)

Course Description

Introduction to computer networks, including network layered architectures, local and wide area networks, mobile wireless networks, Internet TCP/IP protocol suite, network resource management,

network programming, network performance, network security, network applications

Course Learning Outcomes (CLO)

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

1. Understand the different network layers and how they work together.
2. Understand how to use IPv4 and IPv6.
3. Understand how to use DNS to resolve addresses.
4. Understand the difference between TCP and UDP and when to use each of them.
5. Develop applications using both TCP and UDP.
6. Develop secure applications using TLS.
7. Identify and reason about ethical issues surrounding network protocols.

Required Texts/Readings

Textbook

An Introduction to Computer Networks: **http://intronetworks.cs.luc.edu/** ⤷ **(http://intronetworks.cs.luc.edu/)** This is a free and comprehensive textbook. We will only be covering a portion of it.

Other technology requirements / equipment / material

Programming assignments will be a significant part of this course, so access to a computer is required. The programming projects will be done in Java, so a Java development environment is also required.

Course Requirements and Assignments

A study guide with questions covering the content of each section will be provided. It is intended for self-evaluation and will be the basis for future exams. I encourage students to work on the study guide in groups and discuss possible solutions together. We will take time at the beginning of each class to discuss any difficulties students have completing the homework.

Along with technical questions in the homework, we will also discuss ethical issues related to networks. We want you to understand that along with technical choices come moral implications, and we want to be able to identify and reason about them. There will be 2 written (1 page) assignments to discuss contemporary ethical issues in networks today.

We will be using iClicker to make sure everyone is up to speed. To encourage participation 1% of your final grade will come from your participation. I will use the participation points as the basis for your iClicker grade. At the end of the semester, the points you will receive 100% if you get at least 70% of the total possible points. Anything under 70% will be prorated.

I do not grade on a curve. The exams and projects measure what you are expected to have learned. There aren't many opportunities for extra credit, but there are bonus questions on exams.

We will be doing individual programming assignments. Submissions 5 days before the due date will receive 4 extra credit points. After that, submissions that are not late will receive 2 extra credit points. Submissions over 4 days late will not be accepted. **Individual programming assignments are not group projects.** If students get help on assignments, even to resolve a stupid problem, it must be documented in the code with the name of the person rendering the help and a brief description of the help provided. Extensive help on a project will result in a reduced grade. Failure to document help, or any other forms of cheating will result in a failing grade on the assignment at a minimum and may result in failure of the course. All incidents will be reported to the Office of Student Conduct & Ethical Development. See **http://info.sjsu.edu/static/schedules/integrity.html** ↪ **(http://info.sjsu.edu/static/schedules/integrity.html)** for more information. Even in open source, you cannot copy code from one open source project to another without attribution. Sharing solutions with other students, even indirectly through public source repositories, falls under "aiding and abetting".

The **University Policy S16-9** ↪ **(http://www.sjsu.edu/senate/docs/S16-9.pdf)** , Course Syllabi (http://www.sjsu.edu/senate/docs/S16-9.pdf) requires the following language to be included in the syllabus:

"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."

Final Examination or Evaluation

This course will have a cumulative final exam given during exam week.

There will be three in-class exams given in the semester (the last being the final exam). The second exam will have two questions derived from the previous exam, and the final exam will have two questions derived from the first exam and two questions derived from the second exam.

Grading Information

Determination of Grades

Grades will be calculated by averaging the percentages of the average of group project grades, the individual project grades, the two mid-semester exams, and the final. Thus, the grade distribution is 23% individual projects, 21% exam 1, 21% exam 2, 24% final exam, 10% ethic projects, and 1% participation via (iClicker). **Note, this is a programming class; if you get below a C- on the programming assignments, you cannot get above a D+ on your final grade.**

This class uses minimum grading: you cannot get below a 50% on any submission or exam. For example, if you do not submit a solution explanation or your submission falls far short and only scores 35%, you will be assigned a 50% in the grade book. The minimum grading does not apply to cases of academic integrity.

Percentage	Grade
98 and above	A+
92-97	A
90-91	A-
88-89	B+
82-87	B
80-81	B-
78-79	C+
72-77	C
70-71	C-
68-69	D+
62-67	D
60-61	D-
59 and below	F

Classroom Protocol

This is your class. Please ask questions. Please come prepared. Do not engage in activity that may distract other students.

I do not take attendance except for the first two classes. Students not attending either of the first two classes will be dropped to make room for students on the waiting list. Attempting to get marked as present (by have someone else attend in your place or using technological deceptions) will be considered academic dishonesty and at a minimum will result in you getting dropped from the course.

Class VPN

We use a class VPN to connect to servers and other classmates for our projects. Trying to hack or otherwise gain unauthorized access to servers or computers of others using the VPN will be reported and may result in academic and other penalties.

University Policies

Per University Policy S16-9, university-wide policy information relevant to all courses, such as academic integrity, accommodations, etc. will be available on Office of Graduate and Undergraduate Programs' **Syllabus Information web page** ▷ **(http://www.sjsu.edu/gup/syllabusinfo/)** at http://www.sjsu.edu/gup/syllabusinfo/" Make sure to review these policies and resources.

CS 158A, Computer Networks, Section 3, Spring 2023 Course Schedule

Week	Date	Topics, Readings, Assignments, Deadlines
1	1/25/2023	Intro to Networks (using nc) and VPNs
2	1/30/2023	Network Programming **http://intronetworks.cs.luc.edu/current/html/intro.html** ▷ **(http://intronetworks.cs.luc.edu/current/html/intro.html)** Assignment 1: TCP Hello given in class and due in the same class.

2	2/1/2023	UDP **http://intronetworks.cs.luc.edu/current/html/udp.html** ⤷ **(http://intronetworks.cs.luc.edu/current/html/udp.html)** Assignment 2: UDP Hello
3	2/6/2023	Packets **http://intronetworks.cs.luc.edu/current/html/packets.html** ⤷ **(http://intronetworks.cs.luc.edu/current/html/packets.html)**
3	2/8/2023	Packets & Wireshark
4	2/13/2023	Ethernet **http://intronetworks.cs.luc.edu/current2/html/ethernet1.html** ⤷ **(http://intronetworks.cs.luc.edu/current2/html/ethernet1.html)**
4	2/15/2023	IPv4 **http://intronetworks.cs.luc.edu/current/html/ipv4.html** ⤷ **(http://intronetworks.cs.luc.edu/current/html/ipv4.html)**
5	2/20/2023	IPv4 multi-cast
5	2/22/2023	IPv4
6	2/27/2023	Assignment 3: UDP Hello Server
6	3/1/2023	IPv6 **http://intronetworks.cs.luc.edu/current/html/ipv4.html** ⤷ **(http://intronetworks.cs.luc.edu/current/html/ipv4.html)**
7	3/6/2023	IPv6
7	3/8/2023	exam 1
8	3/13/2023	Abstract Sliding Windows **http://intronetworks.cs.luc.edu/current/html/slidingwindows.html** ⤷ **(http://intronetworks.cs.luc.edu/current/html/slidingwindows.html)**
8	3/15/2023	Assignment 4: Web client

9	3/20/2023	Abstract Sliding Windows
9	3/22/2023	TCP **http://intronetworks.cs.luc.edu/current/html/tcp.html** ⤷ **(http://intronetworks.cs.luc.edu/current/html/tcp.html)**
10	3/27&3/29	Spring break
11	4/3/2023	Assignment 5: TCP Hello server
11	4/5/2023	TCP
12	4/10/2023	TCP
12	4/12/2023	Security **http://intronetworks.cs.luc.edu/current/html/security.html** ⤷ **(http://intronetworks.cs.luc.edu/current/html/security.html)**
13	4/17/2023	Security
13	4/19/2023	Assignment 6: Secure Hello
14	4/24/2023	Security
14	4/26/2023	Exam 2
15	5/1/2023	gRPC: **https://grpc.io/docs/guides/** ⤷ **(https://grpc.io/docs/guides/)** **https://developers.google.com/protocol-buffers/docs/overview** ⤷ **(https://developers.google.com/protocol-buffers/docs/overview)** ⤷ **(https://grpc.io/docs/guides/)** ⤷ **(https://grpc.io/docs/guides/)** nice example to look at: **https://www.baeldung.com/grpc-introduction** ⤷ **(https://www.baeldung.com/grpc-introduction)** nice example to build: **https://github.com/jpdna/gRPC-maven-helloworld** ⤷ **(https://github.com/jpdna/gRPC-maven-helloworld)**
15	5/3/2023	Assignment 7: gRPC Hello

16	5/8/2023	gRPC
16	5/10/2023	Other LAN **http://intronetworks.cs.luc.edu/current/html/otherLANs.html** ⇗ **(http://intronetworks.cs.luc.edu/current/html/otherLANs.html)**
17	5/15/203	⇗ **(http://intronetworks.cs.luc.edu/current/html/otherLANs.html)** review/slack
Final Exam	5/23/2023	from 12:15-14:15