

Course Syllabus

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San José State University

Science/Computer Science

SE/CS 158B, Network Management, Section 1, Spring 2021

Course and Contact Information

Instructor:	Ben Reed
Office Location:	https://sjsu.zoom.us/j/4077267356 (https://sjsu.zoom.us/j/4077267356) VR office hours: _____
Telephone:	(408) 924-5174
Email:	ben.reed@sjsu.edu
Office Hours:	VR office hours (this is for class office hours where everyone can join in.) M & W 3:30-4:15 Tues & Thurs 12:30-1:20 zoom office hours (this is for 1:1 advising. first come, first serve) Thurs 3:00-4:00 Wed 4:15-5:15
Class Days/Time:	TuTh 4:30PM - 5:45PM

Classroom:	zoom: https://sjsu.zoom.us/j/95755951735?pwd=alhCdTFnL0J3M2phU3RTR2w1b25RZz09 (https://www.google.com/url?q=https://sjsu.zoom.us/j/95755951735?pwd%3DalhCdTFnL0J3M2phU3RTR2w1b25RZz09&sa=D&source=calendar&ust=1597589507528000&usg=AOvVaw0mRb-4ld61mSPMLZeyBJja)
Prerequisites:	CS 158A or CMPE 148 (with a grade of "C-" or better), or instructor consent

Course Description

Principles and technologies of network management: reference models, functions (fault, configuration, performance, security and accounting management), management information, communication protocols, integration, and assessment. Network security and cyber defense: cryptography, key distribution, authentication protocols, network attacks, access control, and example systems. Prerequisite: CS 158A or CMPE 148 (with a grade of "C-" or better), or instructor consent.

Course Learning Outcomes (CLO)

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

1. Understand and use fundamental network management protocols.
2. Understand and use the facilities provided by SNMP.
3. Understand how VLANs work and why they are used.
4. Understand how firewalls work and manage them.
5. Experience the challenges of managing networked systems.
6. Know how to monitor and manage faults in networked systems.
7. Know how to use packet capture tools to understand problems in networks.

Required Texts/Readings

Textbook

[TCP/IP Illustrated Volume 1, Second Edition \(The Protocols\) \(https://learning.oreilly.com/library/view/tcpip-illustrated-volume/9780132808200/front_cover.html\)](https://learning.oreilly.com/library/view/tcpip-illustrated-volume/9780132808200/front_cover.html)

Other technology requirements / equipment / material

Programming assignments will be a significant part of this course, so access to a computer is required.

Course Requirements and Assignments

Homework will be given, but will not be graded. It is intended for self-evaluation and will be the basis for future exams. I encourage students to work on homework 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.

We will be doing both individual and group programming assignments. You may turn in submissions 3 days late with a 10 point penalty. Submissions over 3 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.

Group projects will also be a major component of this course. Using code from outside the group, including bringing code with you from a previous group, constitutes cheating. You may think "in the real world there is open source, so this restriction is unrealistic". In the real world, you will probably work for a company. Bringing code with you from other companies or claiming open-source code as your own can cause huge problems for you and your company. Even in open source, you cannot copy code from one open source project to another without attribution. Sharing solutions with other students, even if it is indirectly through public source repositories, falls under "aiding and abetting".

The [University Policy S16-9 \(http://www.sjsu.edu/senate/docs/S16-9.pdf\)](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

In place of a final exam, we will have a "storm". We will simulate a mass outage of the cluster, the storm evaluation score will be calculated based on the group's ability to recover from the storm.

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 20% group projects, 20% individual projects, 20% exam 1, 20% exam 2, 10% ethics assignment, 10% storm.

Exams will be administered using Respondus Monitor. Students must use webcams and do environment checks during the exam.

Percentage	Grade
97 and above	A+
92-96	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.

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 \(http://www.sjsu.edu/gup/syllabusinfo/\)](http://www.sjsu.edu/gup/syllabusinfo/) at <http://www.sjsu.edu/gup/syllabusinfo/> Make sure to review these policies and resources.

Course Schedule

Week	Date	Topics, Readings, Assignments, Deadlines
1	1/28/2021	DNS (RFC 1035)
2	2/2/2021	wireshark/nc/protocols/OSI network layer/RFCs (Chapter 1)
2	2/4/2021	Ethernet (Chapter 3) IP (Chapter 5) UDP (Chapter 10)
3	2/9/2021	DHCP (Chapter 6)
3	2/11/2021	PXE Project Phase I https://web.archive.org/web/20131102003141/http://download.intel.com/design/archives/wfm/downloads/pxespec.pdf (https://web.archive.org/web/20131102003141/http://download.intel.com/design/archives/wfm/downloads/pxespec.pdf)
4	2/16/2021	SNMP information (RFC 1157 1155 1156 1213) http://intronetworks.cs.luc.edu/current/html/netmgmt1.html (http://intronetworks.cs.luc.edu/current/html/netmgmt1.html)
4	2/18/2021	SNMP actions http://intronetworks.cs.luc.edu/current/html/netmgmt23.html

		http://intronetworks.cs.luc.edu/current/html/netmgmt23.html)
5	2/23/2021	ARP (Chapter 4)
5	2/25/2021	TCP (Chapter 12)
6	3/2/2021	TCP Connection Management (Chapter 13)
6	3/4/2021	systemd https://www.freedesktop.org/wiki/Software/systemd/ (https://www.freedesktop.org/wiki/Software/systemd/) https://www.suse.com/media/white-paper/systemd_in_suse_linux_enterprise_12_white_paper.pdf (https://www.suse.com/media/white-paper/systemd_in_suse_linux_enterprise_12_white_paper.pdf)
7	3/9/2021	Exam 1
7	3/11/2021	VLAN (Chapter 3)
8	3/16/2021	Post mortems https://landing.google.com/sre/workbook/chapters/postmortem-culture/ (https://landing.google.com/sre/workbook/chapters/postmortem-culture/) https://landing.google.com/sre/sre-book/chapters/postmortem-culture/ (https://landing.google.com/sre/sre-book/chapters/postmortem-culture/)
8	3/18/2021	Project Phase II/Monitoring https://landing.google.com/sre/workbook/chapters/monitoring/ (https://landing.google.com/sre/workbook/chapters/monitoring/) https://landing.google.com/sre/sre-book/chapters/monitoring-distributed-systems/ (https://landing.google.com/sre/sre-book/chapters/monitoring-distributed-systems/)
9	3/23/2021	SOCKS (https://tools.ietf.org/html/rfc1928 (https://tools.ietf.org/html/rfc1928).)
9	3/25/2021	systemd https://www.freedesktop.org/wiki/Software/systemd/ (https://www.freedesktop.org/wiki/Software/systemd/) https://www.suse.com/media/white-paper/systemd_in_suse_linux_enterprise_12_white_paper.pdf (https://www.suse.com/media/white-paper/systemd_in_suse_linux_enterprise_12_white_paper.pdf)

10	4/6/2021	VPN (Book 18.8 https://tools.ietf.org/html/draft-mavrogiannopoulos-openconnect-02 (https://tools.ietf.org/html/draft-mavrogiannopoulos-openconnect-02))
10	4/8/2021	NAT (Chapter 7)
11	4/13/2021	NAT (UDP) (Chapter 7)
11	4/15/2021	DNS (Chapter 11)
12	4/20/2021	https://en.wikipedia.org/wiki/Load_balancing_(computing) (https://en.wikipedia.org/wiki/Load_balancing_(computing))_Load Balancing (section 11.6) https://network-insight.net/2015/02/load-balancing-and-scale-out-architectures/ (https://network-insight.net/2015/02/load-balancing-and-scale-out-architectures/)
12	4/22/2021	Phase III ethernet from python
13	4/27/2021	ICMP (Chapter 8) (tracpath, ping)
13	4/29/2021	IPv6 (Chapter 5) IPv6 neighbor discovery (8.5)
14	5/4/2021	Attacks (3.10, 4.11, 5.7, 6.6, 7.7, 8.7) https://nmap.org/book/port-scanning.html (https://nmap.org/book/port-scanning.html) https://nmap.org/book/scan-methods.html (https://nmap.org/book/scan-methods.html)
14	5/6/2021	Exam 2
15	5/11/2021	Public key/Certificate management
15	5/13/2021	Storm prep
Storm	Friday, May 21, 2021	2:45PM