Course Syllabus

San José State University

Science/Computer Science
SE/CS 158B, Network Management, Section 1, Fall 2020
Course and Contact Information

Instructor:	Ben Reed
Office Location:	https://sjsu.zoom.us/j/4077267356 (https://sjsu.zoom.us/j/4077267356)
Telephone:	(408) 924-5174
Email:	ben.reed@sjsu.edu
Office Hours:	MW 4:30-5:45PM TR 11AM-12PM F 9-10AM
Class Days/Time:	TuTh 9:00AM - 10:15AM
Classroom:	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)

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. 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)** , 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.

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/) at http://www.sjsu.edu/gup/syllabusinfo/" Make sure to review these policies and resources.

CS 158B, Network Management, Section 1, Fall 2018

Course Schedule

Week	Date	Topics, Readings, Assignments, Deadlines
1	8/20/2020	TFTP (RFC 1350)
2	8/25/2020	wireshark/nc/protocols/OSI network layer/RFCs (Chapter 1)
2	8/27/2020	Ethernet (Chapter 3) IP (Chapter 5) UDP (Chapter 10)
3	9/1/2020	DHCP (Chapter 6)
3	9/3/2020	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	9/8/2020	SNMP information (RFC 1157 1155 1156 1213)
4	9/10/2020	SNMP actions
5	9/15/2020	ARP (Chapter 4)
5	9/17/2020	TCP (Chapter 12)

6	9/22/2020	TCP Connection Management (Chapter 13)
6	9/24/2020	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	9/29/2020	Exam 1
7	10/1/2020	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/)**
8	10/6/2020	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	10/8/2020	VLAN (Chapter 3)
9	10/13/2020	Public key/Certificate management
9	10/15/2020	VPN (Book 18.8 **https://tools.ietf.org/html/draft-mavrogiannopoulos-openconnect-02** **(https://tools.ietf.org/html/draft-mavrogiannopoulos-openconnect-02)**)
10	10/20/2020	SOCKS (**https://tools.ietf.org/html/rfc1928** **(https://tools.ietf.org/html/rfc1928)**)
10	10/22/2020	NAT (Chapter 7)
11	10/27/2020	NAT (UDP) (Chapter 7)
11	10/29/2020	DNS (Chapter 11)
12	11/3/2020	**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	11/5/2020	Phase III ethernet from python
13	11/10/2020	ICMP (Chapter 8) (tracepath, ping)
13	11/12/2020	IPv6 (Chapter 5) IPv6 neighbor discovery (8.5)
14	11/17/2020	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	11/19/2020	Review
15	11/24/2020	Exam 2
16	12/1/2020	Training video presentations
16	12/3/2020	Training video presentations

17	12/7/2019	Storm prep
Storm	Wednesday, December 9	7:15AM - 9:15AM