San José State University
Department of Computer Science
CS158B, Computer Network Management, Section 1, Fall 2016

Course and Contact Information

Instructor: Alberto Gonzalez Prieto

Office Location: MH 222

Telephone: 408 409 3584

Email: alberto.prieto@sjsu.edu

Office Hours: Mondays and Tuesdays: 8:45 – 9:25 pm

Class Days/Time: Mondays and Tuesdays: 7:30 – 8:45 pm

Classroom: MH 222

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.

Course Learning Outcomes (CLO)

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

1. Understand what network management is and why it is relevant, which are the common management tasks, and what tools are used to perform them.
2. Understand the FCAPS management functional areas.
3. Understand the design and functionality of the SNMP protocol and use it.
4. Understand the design and functionality of CLI interfaces for network management
5. Understand the design and functionality of the Netconf protocol and the Yang modeling language and use them in conjunction.
6. Understand the design and functionality of syslog
7. Understand the goals and challenges of autonomic management
8. Understand the goals and challenges of distributed management
9. Understand network security and cyber defense

Required Texts/Readings

No required text

Other Readings

- Alexander Clemm, "Network Management Fundamentals," Cisco Press 2007, ISBN 1-58720-137-2
- William Stallings, "SNMP, SNMPv2, SNMPv3, and RMON 1 and RMON2". Addison-Wesley 1996 (3rd edition), ISBN 0-201-48534-6
- L. Peterson and B. Davie, "Computer Networks: A Systems Approach", 5th Edition, Morgan Kaufmann Publishers Inc., San Francisco, CA, 2012

Other technology requirements / equipment / material

- Necessary for the assignments
    - Net-snmp. http://net-snmp.sourceforge.net/
    - Pyang. http://code.google.com/p/pyang/
    - OpenNMS http://www.opennms.org/
    - OpenYuma https://github.com/OpenClovis/OpenYuma
    - Netopeer Cli http://code.google.com/p/netopeer/
        - Requires libnetconf http://code.google.com/p/libnetconf/
- Recommended (used in the lectures by the instructor)
    - Virtual Box https://www.virtualbox.org/
    - Wireshark www.wireshark.org

Course Requirements and Assignments

- 3 in-class quizzes
- Project: Set-up of a management agent and a management station
- Project: SNMP Programming Project
- Project: Set-up of a netconf server and netconf client. Write Yang model
- Oral presentation of a research paper
- Exams
    - Mid-term exam (scheduled approximately half-way through the course)
    - Final exam

Final Examination or Evaluation

The final exam will take place on December 14th at MH 222 at 7:30 pm
The final exam covers all the concepts covered in the lectures and assignments, including the student presentations. The weight of the final examination in the overall grade is 20%.

Grading Information

Determination of Grades

- Programming Project: 30%
- Mid-term: 15%
- Quizzes: 15%
- Oral Presentation: 10%
- Management Station/Agent 5%
- Netconf Server/Client 5%

- Final: 20%

Percentage	Grade
94 & above	A
90 - 93	A-
87 - 89	B+
83 - 86	B
80 - 82	B-
77 - 79	C+
73 - 76	C
70 - 72	C-
60 - 69	D
59 and below	F

Classroom Protocol

- Attendance is crucial to doing well on assignments and examinations.
- The pre-requisites to this course will be monitored.

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 at http://www.sjsu.edu/gup/syllabusinfo

Course Number / Title, Semester, Course Schedule

List the agenda for the semester including when and where the final exam will be held. Indicate the schedule is subject to change with fair notice and how the notice will be made available.

Course Schedule

Week	Date	Topics, Readings, Assignments, Deadlines
1	8/24	Course Introduction
2	8/29	What it network management and why it is important
2	8/31	Managing networks. Architectural functional blocks for network management
3	9/5	(Labor Day)
3	9/7	Network management tools
4	9/12	FCAPS: fault management
4	9/14	FCAPS: configuration, and accounting management
5	9/19	FCAPS: performance, and security management
5	9/21	Introduction to SNMP
6	9/26	SNMP: SMI, defining objects. Quiz #1
6	9/28	SNMP: object identifiers, communities
7	10/3	SNMP: operations, lexicographical order
7	10/5	SNMP: MIB-II
8	10/10	SNMPv2: SMIv2, operations
8	10/12	Midterm
9	10/17	SNMPv2: operations (continuation). Assignment #1 due
9	10/19	SNMPv2: MIB-II, conformance statements
10	10/24	SNMPv3
10	10/26	CLI
11	10/31	Syslog
11	11/2	Netconf: key features, protocol layers. Quiz #2
12	11/7	Netconf: operations.
12	11/9	Yang: key features Assignment #2 due. Assignment #4: research paper selection
13	11/14	Yang: modules, data nodes, notifications, advanced statements
13	11/16	Autonomic Management
14	11/21	Decentralized Management
14	11/23	(Thanksgiving)

Week	Date	Topics, Readings, Assignments, Deadlines
15	11/28	Security: privacy, data security, scam, and fraud
15	11/30	Security: users, facility, incident response. Student Paper Presentations
16	12/5	Student Paper Presentations. Assignment #3 due. Quiz#3
16	12/7	Student Paper Presentations
17	12/12	Student Paper Presentations
Final Exam	12/14	Venue and Time: MH 222 at 7:30 pm to 8:45 pm