

San José State University
College of Science/Department of Computer Science
CS 258, ADVANCED COMPUTER COMMUNICATION SYSTEMS, Sec 1, Fall, 2015

Course and Contact Information

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|-------------------------|---|
| Instructor: | Dr. Melody Moh |
| Office Location: | MQH 411 |
| Telephone: | (408) (924-5088) |
| Email: | MyFirstName <dot> MyLastName <at> SJSU <dot> EDU |
| Office Hours: | MW 1115 to 1145 and 1500 to 1530 [<i>See University Policy S12-1 at http://www.sjsu.edu/senate/docs/S12-1.pdf for guidelines</i>] |
| Class Days/Time: | MW 1200 to 1315 |
| Classroom: | MQH 422 |
| Prerequisites: | CS 158 or instructor consent |

Course Description

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.

Topics Covered

- Network trends
- Network virtualization
- Software-defined networks (SDN)
- OpenFlow, OpenFlow switches and controllers
- Internet of Things
- Data center networks/Data center Ethernet
- LAN virtualization and extension
- Security issues

Learning Outcomes

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

1. **SLO 1** – Understand advanced and emerging networking technologies.
2. **SLO 2** – Obtain skills to do advanced networking research and programming.

Course Learning Outcomes (CLO)

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

1. **CLO 1** - Understand the above covered topics through completion of homework, quizzes, and examinations.
2. **CLO 2** - Successfully complete programming projects on advanced computer communication systems.
3. **CLO 3** - Work in a team to complete group projects, including independent research, oral presentation, and programming on a latest advancement in computer communication systems.

Required Texts/Readings

Textbook

Paul Goransson and Chuck Black, *Software Defined Networks: A Comprehensive Approach, 1st edition*, 2014, Morgan Kaufmann Publishers, Inc., San Francisco. ISBN-13: 978-0124166752, ISBN-10: 012416675X

REQUIRED REFERENCE

- (CS 158A textbook) L. Peterson and B. Davie, *Computer Networks: A Systems Approach*, 5th Edition, Morgan Kaufmann Publishers Inc., San Francisco, CA, 2007, ISBN 0123850592

Other Readings [Optional]

MAJOR REFERENCES

- Vivek Tiwari, *SDN and OpenFlow for beginners with hands on labs* [Kindle Edition], Amazon Digital Services, Inc. 2013
- Thomas D. Nadeau; Ken Gray, *SDN: Software Defined Networks*, O'Reilly Media, Inc. 2013.
- Other references for specific topics/projects, especially for advanced topics in Internet, will be given along with topic/project assignment sheets.

Other equipment / material requirements (include if applicable)

None.

Course Requirements and Assignments

SJSU classes are designed such that in order to be successful, it is expected that students will spend a minimum of forty-five hours for each unit of credit (normally three hours per unit per week), including preparing for class, participating in course activities, completing assignments, and so on. More details about student workload can be found in [University Policy S12-3](http://www.sjsu.edu/senate/docs/S12-3.pdf) at <http://www.sjsu.edu/senate/docs/S12-3.pdf>.

Homework is due typewritten (include source code, but not executable files) by class starting time on the due date. Each assigned problem requires a solution and an explanation (or work) detailing how you arrived at your solution. Cite any outside sources used to solve a problem. When grading an assignment, I may ask for additional information. A subset of the assigned problems will typically be graded.

ASSIGNMENTS

- **HW:** Weekly homework assignments and several in-class quizzes
- **PROJ:** Several individual and group research and programming projects will span the entire semester
- **Oral Presentation:** Included in projects (PROJ)

EXAMS

One mid-term exams (**Mid**) scheduled approximately at the end of 8th week, and a final exam (**FIN**).

Refer the course website for latest information of homework assignments.

NOTE that [University policy F69-24](http://www.sjsu.edu/senate/docs/F69-24.pdf) at <http://www.sjsu.edu/senate/docs/F69-24.pdf> states that “Students should attend all meetings of their classes, not only because they are responsible for material discussed therein, but because active participation is frequently essential to insure maximum benefit for all members of the class. Attendance per se shall not be used as a criterion for grading.”

Grading Policy

- I will determine letter grades for the course, including +/- grades based on*

| Percentage | Grade |
|---------------------|--------------|
| <i>92 and above</i> | <i>A</i> |
| <i>90 - 91</i> | <i>A-</i> |
| <i>88 - 89</i> | <i>B+</i> |
| <i>82 - 87</i> | <i>B</i> |
| <i>80 - 81</i> | <i>B-</i> |
| <i>78 - 79</i> | <i>C+</i> |
| <i>72 - 77</i> | <i>C</i> |
| <i>70 - 71</i> | <i>C-</i> |
| <i>60 - 69</i> | <i>D</i> |
| <i>59 and below</i> | <i>F</i> |

- Percentage weight [or point value] assigned to various class assignments*
 - HW - 20%, PROJ- 40%, Mid - 20%, FIN - 20%.*
- No make-up exams will be given and no late homework will be accepted.*

Note that “All students have the right, within a reasonable time, to know their academic scores, to review their grade-dependent work, and to be provided with explanations for the determination of their course grades.” See [University Policy F13-1](http://www.sjsu.edu/senate/docs/F13-1.pdf) at <http://www.sjsu.edu/senate/docs/F13-1.pdf> for more details.

Classroom Protocol

- The pre-requisites to this course (CS 158A or instructor’s consent) will be monitored.**
- No** make-up exams will be given and **no** late homework will be accepted.
- To encourage participation from students, **no** recording is allowed.
- Students are responsible for all materials distributed and discussed in the class.
- Most handouts are available on the web; hard copy distribution will be kept minimized.
- Attendance is crucial to doing well on assignments and examinations.
- Office hours are on a 90% basis; they may be rescheduled or canceled due to conflicting department/university or other professional meetings.
- Cheating will not be tolerable; a ZERO will be given to any cheated assignment/exam, and will be reported to the Department and the University.

University Policies

General Expectations, Rights and Responsibilities of the Student

As members of the academic community, students accept both the rights and responsibilities incumbent upon all members of the institution. Students are encouraged to familiarize themselves with SJSU's policies and practices pertaining to the procedures to follow if and when questions or concerns about a class arises. See [University Policy S90-5](http://www.sjsu.edu/senate/docs/S90-5.pdf) at <http://www.sjsu.edu/senate/docs/S90-5.pdf>. More detailed information on a variety of related topics is available in the [SJSU catalog](http://info.sjsu.edu/web-dbgen/narr/catalog/rec-12234.12506.html), at <http://info.sjsu.edu/web-dbgen/narr/catalog/rec-12234.12506.html>. In general, it is recommended that students begin by seeking clarification or discussing concerns with their instructor. If such conversation is not possible, or if it does not serve to address the issue, it is recommended that the student contact the Department Chair as a next step.

Dropping and Adding

Students are responsible for understanding the policies and procedures about add/drop, grade forgiveness, etc. Refer to the current semester's [Catalog Policies](http://info.sjsu.edu/static/catalog/policies.html) section at <http://info.sjsu.edu/static/catalog/policies.html>. Add/drop deadlines can be found on the current academic year calendars document on the [Academic Calendars webpage](http://www.sjsu.edu/provost/services/academic_calendars/) at http://www.sjsu.edu/provost/services/academic_calendars/. The [Late Drop Policy](http://www.sjsu.edu/aars/policies/latedrops/policy/) is available at <http://www.sjsu.edu/aars/policies/latedrops/policy/>. Students should be aware of the current deadlines and penalties for dropping classes.

Information about the latest changes and news is available at the [Advising Hub](http://www.sjsu.edu/advising/) at <http://www.sjsu.edu/advising/>.

Consent for Recording of Class and Public Sharing of Instructor Material

[University Policy S12-7](http://www.sjsu.edu/senate/docs/S12-7.pdf), <http://www.sjsu.edu/senate/docs/S12-7.pdf>, requires students to obtain instructor's permission to record the course and the following items to be included in the syllabus:

- “Common courtesy and professional behavior dictate that you notify someone when you are recording him/her. You must obtain the instructor's permission to make audio or video recordings in this class. Such permission allows the recordings to be used for your private, study purposes only. The recordings are the intellectual property of the instructor; you have not been given any rights to reproduce or distribute the material.”
 - It is suggested that the greensheet include the instructor's process for granting permission, whether in writing or orally and whether for the whole semester or on a class by class basis.
 - In classes where active participation of students or guests may be on the recording, permission of those students or guests should be obtained as well.
- “Course material developed by the instructor is the intellectual property of the instructor and cannot be shared publicly without his/her approval. You may not publicly share or upload instructor generated material for this course such as exam questions, lecture notes, or homework solutions without instructor consent.”

Academic integrity

Your commitment, as a student, to learning is evidenced by your enrollment at San Jose State University. The [University Academic Integrity Policy S07-2](http://www.sjsu.edu/senate/docs/S07-2.pdf) at <http://www.sjsu.edu/senate/docs/S07-2.pdf> requires you to be honest in all your academic course work. Faculty members are required to report all infractions to the office of Student Conduct and Ethical Development. The [Student Conduct and Ethical Development website](http://www.sjsu.edu/studentconduct/) is available at <http://www.sjsu.edu/studentconduct/>.

Campus Policy in Compliance with the American Disabilities Act

If you need course adaptations or accommodations because of a disability, or if you need to make special arrangements in case the building must be evacuated, please make an appointment with me as soon as possible, or see me during office hours. [Presidential Directive 97-03](http://www.sjsu.edu/president/docs/directives/PD_1997-03.pdf) at http://www.sjsu.edu/president/docs/directives/PD_1997-03.pdf requires that students with disabilities requesting accommodations must register with the [Accessible Education Center](http://www.sjsu.edu/aec) (AEC) at <http://www.sjsu.edu/aec> to establish a record of their disability.

CS 258, Fall 2015, Course Schedule

The schedule is subject to change with fair notice and the notice will be made available in class.

Course Schedule

| Week | Date | Topics, Readings, Assignments, Deadlines |
|------|-------|--|
| 1 | 8/24 | Greensheet |
| 1 | 8/26 | Network Trends |
| 2 | 8/31 | SDN Intro 1 |
| 2 | 9/2 | SDN Intro 2 |
| 3 | 9/7 | No school – Labor Day |
| 3 | 9/9 | NFV |
| 4 | 9/14 | HW 2 presentation (Project1 topics preview) |
| 4 | 9/16 | NFV |
| 5 | 9/21 | Project 1 proposals review Why SDN? |
| 5 | 9/23 | Data Center Networks SDN in the Data Center |
| 6 | 9/28 | The Genesis of SDN How SDN Works? |
| 6 | 9/30 | IoT |
| 7 | 10/5 | Project 1 outline presentation |
| 7 | 10/7 | DC Ethernet SDN in Other Environments |
| 8 | 10/12 | The OpenFlow Specification |
| 8 | 10/14 | Alternative Definitions of SDN |
| 9 | 10/19 | Project 2 proposal presentation |
| 9 | 10/21 | SDN – Major Players and Applications |
| 10 | 10/26 | SDN – Open source and business ramification Midterm exam review |
| 10 | 10/28 | Carrier IP/MPLS |
| 11 | 11/2 | SDN Security |
| 11 | 11/4 | Midterm exam |
| 12 | 11/9 | Advanced Topic 1 – Management of NFV |
| 12 | 11/11 | No School – Veteran’s Day |
| 13 | 11/16 | Advanced Topic 2 – SDN for Service Providers |
| 13 | 11/18 | Advanced Topic 3 – Data Center Networks |

| Week | Date | Topics, Readings, Assignments, Deadlines |
|-------------|-------------|--|
| 14 | 11/23 | Advanced Topic 4 – Sensor Networks |
| 14 | 11/25 | Advanced Topic 5 – SDN/NFV Integration Thanksgiving Day Eve |
| 15 | 11/30 | Advanced Topic 6 – Segmentation Routing |
| 15 | 11/2 | Advanced Topic 7 – IoT |
| 16 | 11/7 | Exam Review |
| Final Exam | | 12/10, 0945-1200 |