

FA21: CS-158A Sec 01 - Computer Networks

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Course Information

- Instructor: Genya Ishigaki
 - Office Location: MH 215
 - Email: genya.ishigaki@sjsu.edu (<mailto:genya.ishigaki@sjsu.edu>)
- Office Hours:
 - Monday 1:30 - 3 PM (In-person)
 - Thursday 3:30 - 5 PM (Zoom)
 - By appointment
- Class Days/Time: Monday & Wednesday 9 - 10:15 AM
- Classroom: Science Building 311
- Prerequisites: CS 146, and CS 147 or CMPE 120 (with grades of "C-" or better in each)

Course Description

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

Course Learning Outcomes (CLO)

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

- Understand the network layers and their roles.
- Understand how to use IP.
- Understand the difference between TCP and UDP and when to use each of them.
- Understand how to use DNS and SNMP.
- Understand security risks of computer networks.
- Understand the basis of emerging network technologies.
- Understand how to use a packet capturing software.
- Develop applications using both TCP and UDP.

Textbook

- Larry Peterson and Bruce Davie, *Computer Networks: A Systems Approach*, Elsevier, 2012.
 - This book is [available online for free](https://book.systemsapproach.org/) [_\(https://book.systemsapproach.org/\)_](https://book.systemsapproach.org/) under [Creative Commons \(CC BY 4.0\)](https://creativecommons.org/licenses/by/4.0/) [_\(https://creativecommons.org/licenses/by/4.0/\)_](https://creativecommons.org/licenses/by/4.0/).
 - We do not cover all the topics in the book as it is a comprehensive computer networking textbook. Appropriate sections will be indicated in syllabus and classes.
- (Optional) Peter L Dordal, *An Introduction to Computer Networks*.
 - This is an open textbook available [here](http://intronetworks.cs.luc.edu/current/html/index.html) [_\(http://intronetworks.cs.luc.edu/current/html/index.html\)_](http://intronetworks.cs.luc.edu/current/html/index.html).

Other equipment

- Laptop (We will have a few hands-on coding/experiment sessions in class.)
- Java development environment
- [Wireshark](https://www.wireshark.org/) [\(https://www.wireshark.org/\)](https://www.wireshark.org/)
- [GNS3](https://www.gns3.com/) [\(https://www.gns3.com/\)](https://www.gns3.com/)

Grading

Projects, and Problem sets

- Students are evaluated mainly by THREE exams and THREE projects (two in-class, one take-home).
- A sample problem set will be given two weeks prior to each exam. Only first two problem sets will be graded, but it is highly recommended to use them for exam preparation.
- A submission and passing grade of Individual Project 3 is **required to get a pass grade**.

| Item | % in Final Grade |
|----------------------|------------------|
| Exam 1 | 20 % |
| Exam 2 | 20 % |
| Exam 3 | 20 % |
| Individual Project 1 | 7 % |
| Individual Project 2 | 7 % |
| Individual Project 3 | 16 % |
| Problem Set 1 | 5 % |
| Problem Set 2 | 5 % |
| Problem Set 3 | Not Graded |

Grading Table

| Total Grade | Letter Grade |
|--------------|--------------|
| 97 and above | A+ |
| 92-96 | A |
| 90-91 | A- |
| 87-89 | B+ |
| 82-86 | B |
| 80-81 | B- |
| 77-79 | C+ |
| 72-76 | C |
| 70-71 | C- |
| 67-69 | D+ |
| 62-66 | D |

| Total Grade | Letter Grade |
|-------------|--------------|
|-------------|--------------|

| | |
|-------|----|
| 60-61 | D- |
|-------|----|

| | |
|--------------|---|
| 59 and below | F |
|--------------|---|

Late Submission

Late submissions within 24 hours will be deducted 10% of its final grade. Submissions over 24 hours late will have 20% grade deducted. Late submissions over 2 days will not be accepted.

Attendance

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.

Grading Policy

The University Policy S16-9, Course Syllabi (<http://www.sjsu.edu/senate/docs/S16-9.pdf> (<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."

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

Tentative Schedule and Topics

- Please note the following is a tentative schedule.

| Week | Date | Topic | Reference | Note |
|------|------|----------------------------|---|------|
| 1 | 8/23 | Overview | | |
| 1 | 8/25 | Intro to Computer Networks | Peterson & Davie 1.2 (https://book.systemsapproach.org/foundation/architecture.html) | |
| 2 | 8/30 | Internet Protocol Suite | Peterson & Davie 1.3 (https://book.systemsapproach.org/foundation/architecture.html) | |
| 2 | 9/1 | Internet Protocol Suite | | |
| 3 | 9/6 | No Class (Labor Day) | | |

| Week | Date | Topic | Reference | Note |
|------|-------|--|---|--|
| 3 | 9/8 | Transport Layer: UDP | Peterson & Davie 5.1 (https://book.systemsapproach.org/e2e/udp.html) | |
| 4 | 9/13 | Network Programming: UDP | Peterson & Davie 1.4 (https://book.systemsapproach.org/foundation/software.html) | Project 1 due (in- class) |
| 4 | 9/15 | Network Layer: IPv4 | Peterson & Davie 3.3 (https://book.systemsapproach.org/internetworking/basic-ip.html#) | |
| 5 | 9/20 | Network Layer: IP Routing | Peterson & Davie 3.4 (https://book.systemsapproach.org/internetworking/routing.html) | |
| 5 | 9/22 | Network Layer: IP Routing | | |
| 6 | 9/27 | Network Layer: IPv6 | Peterson & Davie 4.2 (https://book.systemsapproach.org/scaling/ipv6.html) | |
| 6 | 9/29 | Data Link Layer & Review | Peterson & Davie 2.1 (https://book.systemsapproach.org/direct/perspective.html) | Problemset 1 due before class |
| 7 | 10/4 | Exam 1 (Beginning to IPv6) | | |
| 7 | 10/6 | Data Link Layer: Error Detection | Peterson & Davie 2.4 (https://book.systemsapproach.org/direct/error.html) | |
| 8 | 10/11 | Data Link Layer: ACK | Peterson & Davie 2.5 (https://book.systemsapproach.org/direct/reliable.html) | |
| 8 | 10/13 | Packet Sniffing: Wireshark | | Project 2 due (in- class) |
| 9 | 10/18 | Transport Layer: TCP | Peterson & Davie 5.2 (https://book.systemsapproach.org/e2e/tcp.html) | |
| 9 | 10/20 | Transport Layer: TCP | | |
| 10 | 10/25 | Transport Layer: Congestion Control | Peterson & Davie 6.3 (https://book.systemsapproach.org/congestion/tcpcc.html) | |
| 10 | 10/27 | Security | Peterson & Davie 8 (https://book.systemsapproach.org/security.html) | |
| 11 | 11/1 | SNMP & Review | Peterson & Davie 9.3 (https://book.systemsapproach.org/applications/infrastructure.html) | Problemset 2 due before class |
| 11 | 11/3 | Exam 2 (Data Link to Security) | | |

| Week | Date | Topic | Reference | Note |
|------|-------|----------------------------------|--|---------------|
| 12 | 11/8 | SNMP | Peterson & Davie 9.3 (https://book.systemsapproach.org/applications/infrastructure.html) | |
| 12 | 11/10 | HTTP | Peterson & Davie 9.1 (https://book.systemsapproach.org/applications/traditional.html#world-wide-web-http) | |
| 13 | 11/15 | DNS | Peterson & Davie 9.3 (https://book.systemsapproach.org/applications/infrastructure.html) | |
| 13 | 11/17 | Wireless Networks | Peterson & Davie 2.7 (https://book.systemsapproach.org/direct/wireless.html) | |
| 14 | 11/22 | Mobility | Peterson & Davie 4.5 (https://book.systemsapproach.org/scaling/mobile-ip.html) | |
| 14 | 11/24 | No Class (No Instruction Day) | | |
| 15 | 11/29 | Advanced Topics: SDN | Peterson & Davie 3.4 (https://book.systemsapproach.org/internetworking/impl.html#software-defined-networks) | Project 3 due |
| 15 | 12/1 | Review | | |
| 16 | 12/6 | Exam 3 (Everything after Exam 2) | | |

Useful Links

- When you are struggling to find a space to study
 - "San Jose State University offers many classrooms in various buildings across campus, Peer Connections space, and library resources for student study and workspace purposes."
 - Fall 2021 - <https://www.sjsu.edu/learnanywhere/campus-resources/study-resources.php>
(<https://www.sjsu.edu/learnanywhere/campus-resources/study-resources.php>)
- If you do not have right equipment (laptop, etc.)
 - "SJSU students, faculty, and staff can borrow laptops, iPads, and more from SCS at no charge. Laptops will be available for week-long and semester-long loan."
 - <https://library.sjsu.edu/student-computing-services/student-computing-services>
(<https://library.sjsu.edu/student-computing-services/student-computing-services>)
- If you want to talk to someone
 - "Whether you are struggling with stress, depression, anxiety or relationship problems, Counseling and Psychological Services is here to provide the support you need to succeed at SJSU. In our current state of remote online instruction, CAPS is providing all of its services through confidential telehealth sessions."
 - <https://www.sjsu.edu/counseling/> (<https://www.sjsu.edu/counseling/>)
- If you need additional accommodation for your learning
 - "The Accessible Education Center (AEC) proudly presents its vision of redefining ability at San Jose State University by providing comprehensive services in support of the educational development and success of student with disabilities."
 - <https://www.sjsu.edu/aec/> (<https://www.sjsu.edu/aec/>)
- If you find a financial challenge

- o "SJSU Cares is here to provide assistance when you need it most. We provide resources and services for SJSU students facing an unforeseen financial crisis. If you're having trouble paying for food, housing or other bills, face homelessness, food insecurity, etc."
- o <https://www.sjsu.edu/sjsucares/> [\(https://www.sjsu.edu/sjsucares/\)](https://www.sjsu.edu/sjsucares/)

Course Summary:

Date

Details

Due
