

California State University Dominguez Hills
Computer Science Department
Course Syllabus
CSC 451/551 Computer Networks, 3 units, Fall 2016

Course Information

Monday and Wednesday, 4:00pm-5:15pm, SAC 2102

Faculty Information

Dr. Bin Tang
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office hours Office is NSM E-117
Office hours: Mondays 3pm-4pm, Wednesdays 7pm-8pm, and Thursdays 4pm-5pm, or by appointment

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Course Information

This course provides an introduction to fundamental concepts in the design and implementation of computer communication networks, their protocols, and applications. Topics to be covered include: overview of network architectures, applications, network programming interfaces (e.g., sockets), transport, congestion, routing, data link protocols, addressing, and local area networks. Examples will be drawn primarily from the Internet (e.g., TCP, UDP, and IP) protocol suite.

Prerequisites Good programming experience with at least one high level programming language.

Course content and instructional method This course consists of lectures, five homework assignments, five programming assignments, one term project and presentation, one midterm and one final exam. Homework is done individually; programming assignments and term projects are done in groups of at most three students.

Required textbook **Computer Networking: A Top-Down Approach (6th Edition)**, by James F. Kurose and Keith W. Ross, ISBN-13: 978-0132856201, ISBN-10: 0132856204.

Programming Assignment The following three programming language/software/environment will be used for programming:

- a. **Python:** Following the textbook, we will use Python programming language to do a few programming assignments. If Python is new to you, one good place to start is <https://www.codecademy.com>, a free interactive website learning specific web development languages and skills. Please also visit <http://www.sthurlow.com/python/> for a beginner's Python Tutorial. An official Python document is available at <https://docs.python.org/2/>, which you should refer to often when you do the programming assignments.
- b. **Wireshark** (<http://www.wireshark.org/>): Wireshark is a packet-sniffing software that "sees" network protocols by observing the sequence of messages exchanged between protocol entities. There is nice [YouTube tutorial](#) available.
- c. OpenFlow and Mininet: [OpenFlow](#) is one of the software defined network (SDN) standard. [Mininet](#) is a tool to emulate an arbitrary openflow network on your laptop. Here is a [tutorial](#) for you to get start.

Term Project The topic of the term project is mainly "data center networking" (Chapter 5.6), or [software defined network and openflow](#). Each group will read a research paper in these fields, identify a research problem, solve the problem by designing algorithms and simulations or mininet implementation, and submit a final report. Each group consists of at most three students, and will give one final 10-15 minutes presentation.

To start, please 1) read Chapter 5.6: Data Center Networking, and 2) read below survey paper titled: "Software-Defined Networking: State of the Art and Research", which is available at

<https://arxiv.org/pdf/1406.0124>

Lecture Schedule

WEEK	DATE	READING	TOPICS
1	8/22, 24	Chapter 1.1-1.3	Computer Networks and the Internet
2	8/29, 8/31	Chapter 1.4-1.5	Computer Networks and the Internet
3	9/7	Chapter 2.1-2.2	Application Layer
4	9/12, 14	Chapter 2.3-2.5	Application Layer
5	9/19, 21	Chapter 2.6-2.7	Application Layer
6	9/26, 28	Chapter 3.1-3.3	Transport Layer
7	10/3, 5	Chapter 3.5	Transport Layer
8	10/10, 12	Chapter 3.7	Transport Layer
9	10/17, 19	Chapter 4.1-4.2	Network Layer, Mid-term
10	10/24, 26	Chapter 4.3-4.4	Network Layer
11	10/31, 11/2	Chapter 4.5-4.6	Network Layer
12	11/7, 9	Chapter 4.5-4.5	Network Layer
13	11/14, 16	Chapter 5.1-5.2	Link Layer
14	11/21, 23	Chapter 5.3-5.4	Link Layer
15	11/28, 30	Chapter 5.6	Data Center, review, and term project presentation
16	12/5	Chapter 5.6	Data Center, review, and term project presentation

Examinations **Midterm Examination is scheduled on 10/17 Monday, in class. It covers the Chapters 1,2,3. Final Examination is scheduled on 12/12 Monday, 4:00pm-6:00pm. It covers Chapters 4,5. Exams are close book/notes.**

No class on 9/5 Monday, Labor Day Holiday

Grading

- 15% Homework Assignments
- 20% Programming Assignments
- 25% Midterm Exam
- 30% Final Exam
- 10% Term Project

Course letter grades For all assignments, their numerical grading equivalent, and course grade, the grading criteria is described as follows:

- A – Outstanding Work: In addition to the criteria for a “B”, superior knowledge regarding details, assumptions, implications, history; superior thinking with information relevant to application, critique, and relationship to other information. An outstanding mastery of the subject with excellence evident in preparation for and attendance in class sessions, curious and retentive mind, unusual ability to analyze and synthesize material, with a positive attitude making productive contributions to the learning community in the classroom with
- B – Above Average Work: In addition to the criteria for a “C”, more than adequate knowledge regarding technical terms, distinctions, and possesses an ability to use information. Above average student in terms of attendance, preparation, time management, mostly consistent in test taking, and attitude.
- C – Average Work: Basic knowledge needed to function and carry on learning regarding major principles, central terms, major figures, also possesses an awareness of field or discipline. Average or typical student in terms of attendance, preparation, time management, inconsistent test taking, and attitude.
- D – Below Average Work: Serious gaps in knowledge, confusion of concepts and categories, inability to recall basic information. Below average or atypical student in terms of attendance, preparation, time management, inconsistent test taking, and attitude--minimally passing in performance.
- F – Not Acceptable Work: Absence of knowledge, incapable of carrying on a conversation about the subject, misunderstands most concepts, confuses all categories.. Inadequate/insufficient performance. Repeat course.

Incompletes will not be given for this course without extenuating circumstances and convincing reasons demonstrated by the student to the instructor’s satisfaction.

Grade Scale	93% to 100%, A
	90% to 92%, A-
	87% to 89%, B+
	83% to 86%, B
	80% to 82%, B-

77% to 79%, C+
73% to 76%, C
70% to 72%, C-
60% to 69%, D
<60%, F

Course Policies

Attendance, Preparation and Participation	Arriving promptly to class, coming fully prepared, participating actively in the discussions and activities are important components of this part of your grade for the course. Tardiness and absences must be discussed with the instructor.
Classroom Disruption	Learning is best achieved in an atmosphere where the passion for learning is encouraged and everyone has the opportunity to participate in classroom activities. There are six categories of student incivility that undermine this atmosphere. They are disengaged, disinterested, disrespectful, disruptive, defiant and disturbed behaviors. Actions that fall into these categories impede teaching and learning processes for all and will not be permitted. Scholarly disagreement with the instructor does not itself constitute incivility. Classroom actions that fall into one of these categories may result in dismissal from the course.
Deadlines	All assignments for the course are to be completed and submitted on time in order to receive consideration for full credit of the assignment. No late submission will be accepted after the last day of the course.
Make-up Work	Late work is not permitted for any assignment in this course. No make-ups are available for any homework, lab session, or examination in this course.
Withdrawal Policy	See undergraduate catalog for policies on withdrawals, grade permanence and all policies relating to academic records.
Special Course Policies	The instructor may designate certain assignments as teamwork assignments. If every member of the team does a similar amount of work, every member of the team will receive the same grade. However, if the instructor perceives that there is an inequitable workload, then individual team members may receive more points, or fewer points, than other members. The decision to adjust the point distribution within a team is reserved for the instructor's discretion.

Academic Integrity Policy

Honesty, Integrity and Professional Ethics	The mission of CSUDH includes cultivating in each student not only the academic skills that are required for a university degree, but also the characteristics of academic integrity that are integral to a CSUDH education. It is therefore part of the mission of the university to nurture in each student a sense of moral responsibility consistent with the biblical teachings of honesty and accountability. Furthermore, a breach of academic integrity is viewed not merely as a private matter between the student and an instructor but rather as an act which is fundamentally inconsistent with the purpose and mission of the entire university.
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Consequences for violations of academic integrity in this class will automatically receive an "F" in the course and may be in jeopardy of expulsion from the university.

Academic dishonesty includes:

Cheating – Intentionally using or attempting to use unauthorized materials, information, or study aids in any academic exercise.

- Students completing any examination should assume that external assistance (e.g., books, notes, calculators, and conversations with others) is prohibited unless specifically authorized by the instructor.
- Students may not allow others to conduct research or prepare work for them without advance authorization from the instructor.
- Substantial portions of the same academic work may not be submitted for credit in more than one course without authorization.

Fabrication – Intentional falsification or invention of any information or citation in an academic exercise.

Facilitating academic dishonesty – Intentionally or knowingly helping or attempting to help another commit an act of academic dishonesty.

Plagiarism – Intentionally or knowingly representing the words, ideas, or work of another as one's own in any academic exercise.”

Further details may be found in the Undergraduate Academic Integrity Policy. Wherever the current university policy is different from the policies in this syllabus, the university policy takes precedence.

Disability services

Students in this course who have a disability that might prevent them from fully demonstrating their abilities should meet with an advisor in the Office of Special Services as soon as possible to initiate disability verification and discuss accommodations that may be necessary to ensure full participation in the successful completion of course requirements

Bibliography

Computer Networks, A Systems Approach: Larry Peterson and Bruce Davie, Morgan Kaufmann.
Computer Networks: Andrew Tanenbaum and David Wetheral, Prentice Hall.
An Engineering Approach to Computer Networking: ATM Networks, the Internet, and the Telephone Network by Srinivasan Keshav.