Computer Network Fundamentals
CSC/CPE138-01
Fall 2024

Instructor: Dr. Syed Badruddoja, Assistant Professor, Computer Science

Office and Phone: RVR3006, 916-278-7328

Office Hours (Online): Tu,Th 2:30 PM – 4:00 PM

Zoom Link: https://csus.zoom.us/j/82588604485

Class Time and Location: Tu,Th, 10:30 AM – 11:45 AM, Alpine Hall 156

E-mail: badruddoja@csus.edu

Course Description

This course will provide the overview, structure, concepts, principles, and protocols of computer networking. We will study the network architecture, OSI reference model, TCP/IP protocol stack, layering, protocols and encapsulation. The course will also introduce socket programming fundamentals and test knowledge through programming assignments. Moreover, we will study end-to-end communication, multiplexing and demultiplexing, reliable data transfer, flow control, and congestion control. Additionally, we will discuss internet protocol (IP) addressing, routing algorithms and internet routing designs. The course will explain switching concepts, LAN topologies, link layer error corrections and how the underlaying hardware works in switches. Finally, we will study some of the security components and their implications in computer networks.

Course Objectives:

- Explain the basic principles, architecture, layered models, and implementations of computer networks.
- Describe the details of important network protocols on different layers across the protocol stack.
- Apply reliable communication including the various methods for error detection, correction, retransmission, flow control, and congestion control.
- Explain the working mechanisms of routing, forwarding, internet addressing, and switching.
- Identify professional and ethical responsibilities, security issues and countermeasures.

Prerequisite

This course requires completion of CSC60 and CSC130 or their equivalents. It is assumed that each student is prepared for this course and meets the criteria. If not, then the student requires outside preparation.

Textbook & Course Materials

Computer Networking: A Top-Down Approach, 7/8th edition, Kurose and Ross, Pearson, ISBN-10: 9780133594140, 1292405465 ISBN-13: 978-0133594140, 978-129240546

Grading Policy

Your course grade will be a weighted average according to the following:

In-Class Activity	5.0%
Homework & Programming	20.0%
Lab Assignment	15.0%
Project	10.0%
Midterm Exam	25.0%
Final Exam	25.0%
Total	100.0%

Grades will be posted on Canvas throughout the semester to provide an ongoing assessment of student progress, though the final assessment will be measured using the weighted average given above. Once a grade is assigned on Canvas, students have two (2) weeks to dispute the grade for assignments. The proper channel for grade disputes is to first go to the original grader (if one is available) in an attempt to resolve the issue. If, however, a resolution cannot be reached between the student and the grader, the student shall then go to the instructor, who will have the final say on the grade.

In-Class Activities: These grades will be based on in-class assignments, group activities, or short quizzes, which may be given at any time during the class. Students must be present in class at the time the in-class activity is assigned to receive credit for the in-class activity.

Homework and Programming Assignments: Homework will be assigned based on material from the lectures and textbook. These assignments are meant for you to become familiar with the course material, and this practice will aid you in mastering the concepts on the programming assignments and exams. No late homework will be accepted, so please make sure that you complete and submit all homework assignments on time.

There will be programming assignments in this course. These assignments will be completed outside of class, though some in-class time may be dedicated to answering questions about or working on these programs. They are an integral part of this course and are intended to provide experience in the application of the design techniques discussed in the lectures. These assignments are meant to be individual programming assignments, so you should work on these alone unless explicitly directed otherwise by your instructor.

Lab Assignments: There will be lab assignments for packet capture and analysis of network captured packets. The lab tasks are to be performed in virtual machines. You will be given detailed instructions and tutorial to configure virtual machines and do the tasks in the lab.

Midterm Exam: There will be a midterm examination given in this course. The dates of this exam will be posted on Canvas and announced in class at least one week prior to the date of the exam. A make-up exam will be given at the discretion of the instructor when a student misses an exam with an excused absence with appropriate

documentation/evidence. Unexcused absences on the date of an exam may result in a grade of 0 for the missed exam, so every effort should be made to attend class on the day of a scheduled exam.

Project : There will be 1-2 projects assigned to you in the semester to evaluate the comprehension of course concepts, implement them, and perform documentation. These will be group assignments. More instructions will follow when the project assignments are available to you on Canvas.
Final Exam: There will be a final examination at the end of the course as per the schedule given on the website https://www.csus.edu/academic-affairs/_internal/_documents/2024-2025-final-exam-schedule-dates.pdf.

Grading Breakdown

Letter Grade	Percentage
A	93-100%
A-	90-92%
B+	87-89%
B	83-86%
B-	80-82%
C+	77-79%
C	73-76%
C-	70-72%
D+	67-69%
D	60-66%
F	0-59%

Submission Policies
Each submission needs to be in an electronic version (through Canvas). The assignments associated with programming will require you to submit the program code on Canvas with zip files. Please also write your class section number in the document (otherwise, you will lose points). Additionally, you are required to follow the instructions given on the assignment on Canvas.

Due Date and Late Submission Policies
Students are responsible for submitting the correct assignments (i.e., uploading the proper files) for each assignment submission on Canvas. In certain cases, when an assignment is verified to be completed on time but either was submitted to an incorrect assignment location (e.g., submitting Homework 4 to Homework 5 location on Canvas) or a wrong assignment was submitted instead, the assignment may be assessed a reduction penalty as per the deduction policy if the due date has passed. You must submit your assignments by the due date mentioned on Canvas. Late submissions will be penalized by the following rules.

- Assignments submitted one day past the due date will result in a 10% deduction of total points.
- Assignments submitted two days past the due date will result in a 20% deduction of total points.
- Assignments submitted three days past the due date will result in a 30% deduction of total points.
- Anything submitted from the 4th day onwards will receive a 0 grade.

University or Department Policies

Prerequisite Proof (if the course has specific prerequisites listed above):

The Department of Computer Science has a policy that each instructor needs to verify the student's transcript and ascertain that the student has the prerequisites. You can log on to My Sac State, go to "Student Center," and select "Unofficial Transcripts" to print. You also can select and print "Transfer Credit Report" if you have transferred from another institution. You must submit your transcript for verification. Any student who has completed one or more prerequisites at another school must provide similar verification to the instructor. Any student who has not submitted their transcript for verification by the end of the second week will be dropped from the class.

Repeat Policy:

The department has a policy specifying that students may not repeat a computer science course more than once. Any student who wishes to repeat a course more than once (that is, take a course for a third time) must submit a petition requesting permission to do so. Student records will be reviewed to determine whether a student is taking this course three or more times. Any such student must return an approved petition to the instructor within the first two weeks of class. Any student who does not submit an approved petition will be dropped from the class. Petitions are available in the department office (RVR 3018) and require the signature of both the instructor and the department chair.

Drop Policy

If you plan to drop this course, please make sure you understand the following information.

- There is no such thing as an "automatic drop ."The instructor can drop you from the course, but this does not happen automatically. If you plan to drop the course, make sure to use MySacState.
- After the 2nd week, you cannot drop the course through MySacState. At this point, you must provide written verification of a compelling reason. Both the instructor and the Department Chair must approve.
- After the 4th week, you must fill out a "Petition to Drop after Deadline" form and collect all the necessary signatures. This must be turned into Admission and Records in Lassen Hall.

Attendance Policies

Class attendance is regarded as an obligation as well as a privilege. All students are, therefore, expected to attend each class meeting. A student who misses class is still responsible for finding out what was discussed to learn the material that was covered and

obtain the homework that was assigned on the missed day. The instructor is not responsible for re-teaching material missed by a student who did not attend class. Therefore, each student is accountable for and will be evaluated on all material covered in this course, regardless of attendance. If there are extenuating circumstances preventing you from attending the class, please notify your instructor so that you can work together to ensure your success in learning the material.

Acceptable Student Behavior

Student behavior that interferes with an instructor's ability to conduct a class or other students' opportunity to learn is unacceptable and disruptive and will not be tolerated in any instructional forum. Students engaging in unacceptable behavior will be directed to leave the classroom, and the instructor may refer the student to the Student Conduct Officer. The university's expectations for student conduct apply to all instructional forums, including university and electronic classrooms, labs, discussion groups, field trips, etc. The student conduct policies can be found at https://www.csus.edu/student-affairs/student-conduct/policies.html.

Other Course Policies

- You are expected to check emails and Canvas regularly to check materials, assignments, due dates, and announcements.
- Make-up exams will only be given under extreme circumstances. The instructor reserves the right to reject make-up requests. There will be no make-up for unannounced quizzes (if any) under any circumstances.
- Please refer to the university policy for drops and incomplete.
- The syllabus may be modified as the course progresses should the instructor deem it necessary. Notice of changes to the syllabus shall be made through Canvas and/or class announcements.

Students with Disabilities

If you have a disability and require accommodations, you need to provide disability documentation to DAC (Disability Access Center, formerly Services to Students with Disabilities), Lassen Hall 1008, (916) 278-6955 (More resources are available at this link https://www.csus.edu/student-affairs/centers-programs/disability-access-center/).
Please discuss your accommodation needs with me after class early in the semester.

Academic Honesty

Any work submitted is a contractual obligation that the work is the student's and for which he/she could be quizzed in detail. Discussion among students in assignments and projects is part of the educational process and is encouraged. No discussion among students is allowed in any exams/quizzes. However, each student must make an effort to do his/her own work in all assignments and exams. No type of plagiarism will be tolerated except in the case of group work. In that case, each student should indicate the part of the work that was their major responsibility in their final joint submission. Nevertheless, I emphasize any work submitted is a contractual obligation that the work is the student's and for which

he/she could be quizzed in detail. The minimum penalty for even a single incident of cheating brought to the attention of the instructor in this course is automatic failure of the course; additional, more severe penalties may also be applied. Please refer to the Computer Science Dep. document entitled "Policy on Academic Integrity" (available online via the Computer Science department, https://www.csus.edu/college/engineering-computer-science/computer-engineering/_internal/_documents/academic-integrity-form.pdf) and to the student conduct policies (available here https://www.csus.edu/student-affairs/student-conduct/) for additional information. IT IS THE RESPONSIBILITY OF EACH STUDENT TO BE FAMILIAR WITH AND COMPLY WITH THE POLICIES STATED IN THESE DOCUMENTS. In addition, unless otherwise stated, the use of the following devices during exams/quizzes is prohibited: cell phones, pagers, laptops, and PDAs.

Tentative Class Schedule

Week	Date	Materials to Cover	Remarks	Textbook Chapters
1	8/26 – 1/30	Computer Networks and The Internet	-	1
2	9/2 – 9/6	Computer Networks and The Internet	ASSIGNMENT 1	
3	9/9 – 9/13	Application Layer	-	2
4	9/16 – 9/20	Application Layer	ASSIGNMENT 2	
5	9/23 – 9/27	Application Layer	-	
6	9/30 – 10/4	Transport Layer	LAB 1	3
7	10/7 – 10/11	Transport Layer	MID-TERM EXAM	
8	10/14 – 10/18	Transport Layer	LAB 2	
9	10/21 – 10/25	Network Layer: Data Plane	ASSIGNMENT 3	4
10	10/28 – 11/1	Network Layer: Data Plane	-	
11	11/4 – 11/8	Network Layer: Control Plane	ASSIGNMENT 4	5
12	11/11 – 11/15	Network Layer: Control Plane	-	
13	11/18 – 11/22	Link Layer	LAB 3	6
14	11/25 – 11/29	Link Layer	PROJECT SUBMISSION	
15	12/2 – 12/6	Network Security	-	8
16	12/9 – 12/13	-	FINAL EXAM	-

Important Dates

Date	**Event/Occasion**
September 2, 2024	Labor Day (Holiday)
September 23, 2024	Census Date
November 11, 2024	Veteran's Day (Holiday)
November 28-29,2024	Thanksgiving Holiday
December 6, 2024	Last Day of Instruction