USC

Course ID and Title: EE 450 Introduction to Computer Networks
Units: 4
Term—Day—Time: Fall 24—TR—2:00PM-3:50PM
Location: SOS B46

Instructor:
Office: EEB 342
Office Hours: TR, 9:30-10:30
Contact Info: **coreybak@usc.edu**

Teaching Assistant:
Office:
Office Hours: MW, 3:00-4:00
Contact Info: teyikan@usc.edu

IT Help: N/A
Hours of Service: N/A
Contact Info: N/A

Course Description
Network architectures; layered protocols, network service interface; local, wide area, wireless networks; Internet protocols; link protocols; addressing; routing; flow control; software defined network; multimedia networks.

Learning Objectives
Students will learn fundamentals of computer networks, main protocols and applications of the Internet, design and analysis of networks, and use of software tools for understanding workings of the Internet. Writing socket programming to learn about protocols and applications and use simulation and emulation for performance evaluation.

Prerequisite(s): Students who have not completed the pre-requisites should contact the Professor immediately in order to receive clearance to take the course or else the student will be removed from the course.

Co-Requisite(s): N/A
Concurrent Enrollment: N/A
Recommended Preparation: Open only to junior standing and above

Course Notes
Cross listed as CSCI 353

Technological Proficiency and Hardware/Software Required
Students are required to have basic familiarity of programming and elementary probability theory.

Required Readings and Supplementary Materials

Main textbook, "Computer Networking: A Top Down Approach" by James Kurose and Keith Ross, 8th Ed., Pearson Publishers.

Physical layer from: Data Communications and Networking Information Center: (mheducation.com)
Supplementary materials are tutorial notes on Unix, C, C++, and Mininet user guides.

Optional Readings and Supplementary Materials
• Slides
• Interactive End-of-Chapter Exercises
• Interactive Animations

Description and Assessment of Assignments
Assignments, Submissions, and Additional Material
• Brightspace
• GitHub Organization
• GitHub Classroom

Homeworks

This course is based on established materials from a widely used textbook. There will be weekly homework with problems on materials covered in class.

Projects

The objective of the projects are to familiarize students with networking concepts in-vivo. These projects will consist of subjects such as: UNIX socket programming, UDP/TCP clients, and web servers using network simulations platforms like OPNET and NS-3, and Wireshark.

Participation
Please post all questions in the Brightspace/Slack discussion board first as other students may have a similar question. Posting in Brightspace/Slack allows all questions/answers to be centralized and easily viewed by all classmates. Other students enrolled in the course are encouraged to answer questions and provide suggestions.

With regard to questions directly related to code, provide inline comments and post the repo on the course GitHub. The question should still be posted in the Brightspace/Slack with links to your GitHub repository. These type of questions should point out the problem, the line number where the problem occurs, and different steps taken to attempt to remedy the problem.

If your question is not answered in Brightspace/Slack, please contact the instructor via email or office hours. Note that private questions to the TA's or the professor can be posted in Brightspace/Slack if needed.

Note: Most questions should be asked in Brightspace/Slack discussions (can ask direct questions to the professor or TAs within Brightspace/Slack). If for some reason you need to email the professor or TAs **always include "EE 450: " in the subject line**.

Grading Breakdown

Table 1 Grading Breakdown

Assessment Tool (assignments)	Points	% of Grade
Homework		20%
Programming Projects		20%
Quizzes		10%
Midterm Exam		25%
Final Exam		25%
TOTAL		100%

Grading Scale
Course final grades will be determined using the following scale:

Table 2 Course Grading Scale

Letter grade	Corresponding numerical point range
A	95-100
A-	90-94
B+	87-89
B	83-86
B-	80-82
C+	77-79
C	73-76
C-	70-72
D+	67-69
D	63-66
D-	60-62
F	59 and below

Assignment Submission Policy
All assignments and project submissions will be submitted by 1:30 pm (or a designated time by the Professor) of the deadline through BrightSpace or Github Classroom. **Late homework will not be accepted under any conditions.**

Grading Timeline
Assignment grades are expected to be given to students within 1.5 weeks of assignment due date unless otherwise specified by the professor.

Course Specific Policies
N/A

Attendance & Quizzes

Students are responsible for knowing the material provided in the lectures as well as being able to apply the concepts to develop the project. Quizzes will be given randomly during the first 10 minutes of class via Brightspace, paper, or other means. Students must complete quizzes in their respective sessions. If a student is late for class, they will have the remaining time up until 2:10 to complete the quiz. If a student arrives after 2:10, or is absent for class, the student will receive a zero(0) on the quiz. The lowest three(3) quiz scores will be dropped at the end of the semester (assuming 10+ quizzes given, or else 20% of quizzes given) and the remaining scores will be counted as the final quiz grade. Quiz grades cannot be made up if a student is absent, but the dropping of the lowest three(3) scores are intended to help with missed classes.

Classroom norms

Active class participation will count towards a student's participation grade. Discussion sessions will be used to assist students with understanding key concepts. Attending discussions is mandatory.

The units within the tracks are arranged so new information is presented via brief lectures and reinforced through learning activities like labs and mini projects. A lecture and either a lab or other learning activity make up a single unit within a track. To mimic work flows students are likely to experience in the industry, a mix of individual and group-based work is utilized within each track.

Zoom etiquette
N/A

Academic Integrity

The University of Southern California is foremost a learning community committed to fostering successful scholars and researchers dedicated to the pursuit of knowledge and the transmission of ideas. Academic misconduct is in contrast to the university's mission to educate students through a broad array of first-rank academic, professional, and extracurricular programs and includes any act of dishonesty in the submission of academic work (either in draft or final form).

This course will follow the expectations for academic integrity as stated in the USC Student Handbook. All students are expected to submit assignments that are original work and prepared specifically for the course/ section in this academic term. You may not submit work written by others or "recycle" work prepared for other courses without obtaining written permission from the instructor(s). Students suspected of engaging in academic misconduct will be reported to the Office of Academic Integrity.

Other violations of academic misconduct include, but are not limited to, cheating, plagiarism, fabrication (e.g., falsifying data), knowingly assisting others in acts of academic dishonesty, and any act that gains or is intended to gain an unfair academic advantage.

Academic dishonesty has a far-reaching impact and is considered a serious offense against the university. Violations will result in a grade penalty, such as a failing grade on the assignment or in the course, and disciplinary action from the university itself, such as suspension or even expulsion.

For more information about academic integrity see the student handbook or the Office of Academic Integrity's website, and university policies on Research and Scholarship Misconduct.

Please ask your instructor if you are unsure what constitutes unauthorized assistance on an exam or assignment or what information requires citation and/or attribution.

Using Generative AI and Large Language Models
This course aims to develop creative, analytical, and critical thinking skills. Therefore, all assignments should be prepared by the student working individually or in groups (if allowed on respective assignment). Students may not have another person or entity complete any substantive portion of the assignment. Developing

strong competencies in these areas will prepare you for a competitive workplace. Therefore, using AI-generated text, code, or other content is prohibited in this course, will be identified as plagiarism, and will be reported to the Office of Academic Integrity.

Using Stack Overflow, Opensource, or Code Found Online
All assignments should be prepared by the student working individually or in groups (if allowed on respective assignment). Students may not have another person or entity complete any substantive portion of the assignment. Small snippets of code may be used to assist with solving small parts of the assignments, but this code **MUST** be documented with the original link and author in the comments directly above the respective code. The respective code will be evaluated by the TAs and the Professor to determine if the documented code is feasible to not impact the students grade.

Course Content Distribution and Synchronous Session Recordings Policies

USC has policies that prohibit recording and distribution of any synchronous and asynchronous course content outside of the learning environment.

Recording a university class without the express permission of the instructor and announcement to the class, or unless conducted pursuant to an Office of Student Accessibility Services (OSAS) accommodation. Recording can inhibit free discussion in the future, and thus infringe on the academic freedom of other students as well as the instructor. (Living our Unifying Values: The USC Student Handbook, page 13).

Distribution or use of notes, recordings, exams, or other intellectual property, based on university classes or lectures without the express permission of the instructor for purposes other than individual or group study. This includes but is not limited to providing materials for distribution by services publishing course materials. This restriction on unauthorized use also applies to all information, which had been distributed to students or in any way had been displayed for use in relation to the class, whether obtained in class, via email, on the internet, or via any other media. Distributing course material without the instructor's permission will be presumed to be an intentional act to facilitate or enable academic dishonestly and is strictly prohibited. (Living our Unifying Values: The USC Student Handbook, page 13).

Course Evaluations

Course evaluation occurs at the end of the semester university-wide. It is an important review of students' experience in the class. The process and intent of the end-of-semester evaluation should be provided. In addition, a mid-semester evaluation is recommended practice for early course correction. Contact CET for support in creating a mid-semester evaluation.

Course Schedule

Table 3 Course schedule

Week	Topic	Readings	Assignments
1	Networks and the Internet	Chap 1	Intro to Github
2	Networks and the Internet	Chap 1	
3	HTTP, SMTP, DNS	Chap 2.1-2.4	HW 1

4	P2P and Socket Programming	Chap 2.5-2.7	HW 2
5	UDP and Reliable Data Transfer	Chap 3.1 - 3.4	Project 1
6	TCP	Chap 3.5 - 3.7	HW 3
7	Router and IP	Chap 4.1 - 4.4	HW 4
8	Routing Algorithms Midterm Review (Discussion)	Chap 4.5 - 4.7	Project 2
9	SDN's - Control Plane Midterm (During Quiz)	Chap 5.1 - 5.7	HW 5
10	Error-detection and Multiple Access	Chap 6.1 - 6.3	HW 6
11	ARP and Virtual Networks	Chap 6.4 - 6.7	HW 7
12	WiFi	Chap 7.1 - 7.3	Project 3
13	Cellular Networks	Chap 7.4 - 7.7	HW 8
14	Network Security	Chapter 8.1 - 8.3, 8.5, 8.6, 8.8	HW 9
15	Advanced Topics and Final Review		Proj 4

Final			Date: For the date and time of the final for this class, consult the USC Schedule of Classes at www.usc.edu/soc.

Statement on University Academic and Support Systems

Students and Disability Accommodations:
USC welcomes students with disabilities into all of the University's educational programs. [The Office of Student Accessibility Services](#) (OSAS) is responsible for the determination of appropriate accommodations for students who encounter disability-related barriers. Once a student has completed the OSAS process (registration, initial appointment, and submitted documentation) and accommodations are determined to be reasonable and appropriate, a Letter of Accommodation (LOA) will be available to generate for each course. The LOA must be given to each course instructor by the student and followed up with a discussion. This should be done as early in the semester as possible as accommodations are not retroactive. More information can be found at osas.usc.edu. You may contact OSAS at (213) 740-0776 or via email at osasfrontdesk@usc.edu.

Student Financial Aid and Satisfactory Academic Progress:
To be eligible for certain kinds of financial aid, students are required to maintain Satisfactory Academic Progress (SAP) toward their degree objectives. Visit the [Financial Aid Office webpage](#) for [undergraduate](#)- and [graduate-level](#) SAP eligibility requirements and the appeals process.

Support Systems:
[Counseling and Mental Health](#) - (213) 740-9355 – 24/7 on call
Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

[988 Suicide and Crisis Lifeline](#) - 988 for both calls and text messages – 24/7 on call
The 988 Suicide and Crisis Lifeline (formerly known as the National Suicide Prevention Lifeline) provides free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week, across the United States. The Lifeline consists of a national network of over 200 local crisis centers, combining custom local care and resources with national standards and best practices. The new, shorter phone number makes it easier for people to remember and access mental health crisis services (though the previous 1 (800) 273-8255 number will continue to function indefinitely) and represents a continued commitment to those in crisis.

[Relationship and Sexual Violence Prevention Services (RSVP)](#) - (213) 740-9355(WELL) – 24/7 on call
Free and confidential therapy services, workshops, and training for situations related to gender- and power-based harm (including sexual assault, intimate partner violence, and stalking).

[Office for Equity, Equal Opportunity, and Title IX (EEO-TIX)](#) - (213) 740-5086
Information about how to get help or help someone affected by harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants.

[Reporting Incidents of Bias or Harassment](#) - (213) 740-2500

Avenue to report incidents of bias, hate crimes, and microaggressions to the Office for Equity, Equal Opportunity, and Title for appropriate investigation, supportive measures, and response.

The Office of Student Accessibility Services (OSAS) - (213) 740-0776
OSAS ensures equal access for students with disabilities through providing academic accommodations and auxiliary aids in accordance with federal laws and university policy.

USC Campus Support and Intervention - (213) 740-0411
Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

Diversity, Equity and Inclusion - (213) 740-2101
Information on events, programs and training, the Provost's Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students.

USC Emergency - UPC: (213) 740-4321, HSC: (323) 442-1000 – 24/7 on call
Emergency assistance and avenue to report a crime. Latest updates regarding safety, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

USC Department of Public Safety - UPC: (213) 740-6000, HSC: (323) 442-1200 – 24/7 on call
Non-emergency assistance or information.

Office of the Ombuds - (213) 821-9556 (UPC) / (323-442-0382 (HSC)
A safe and confidential place to share your USC-related issues with a University Ombuds who will work with you to explore options or paths to manage your concern.

Occupational Therapy Faculty Practice - (323) 442-2850 or otfp@med.usc.edu
Confidential Lifestyle Redesign services for USC students to support health promoting habits and routines that enhance quality of life and academic performance.