Computer Networks – CS3001

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Office Hours: Thursdays 9 a.m. to 11 a.m. (Block F, Office no. 45)   **Semester:** Fall 2025

About the Instructor

I (Abdul Qadeer) completed my Ph.D. from University of Southern California in May 2021. My broader area of interest is systems, that encompass subjects such as Computer Networks, Operating Systems and Distributed Systems. I also have extensive experience in Big Data processing, and High-Performance Computing. See my LinkedIn profile if you are interested to know more about me: https://www.linkedin.com/in/abdul-qadeer-15aab613/ If you want to learn more about my research see: https://www.researchgate.net/profile/Abdul-Qadeer-12

Course Objectives

As per Higher Education Commission of Pakistan (HEC)'s recommended curriculum, following are the learning objectives and outcomes (see for more details: https://nceac.org.pk/Documents/Curriculums/BS%20Curriculm%20Computing%20Disciplines-2023.pdf)

TL; DR: To understand the principles and practices of networking, protocols, and their implementations.

Class Learning Objectives (CLO) No.	Course Learning Outcomes	Bloom Taxonomy
CLO-1	Describe the key terminologies and technologies of computer networks	C2 (Describe)
CLO-2	Explain the services and functions provided by each layer in the Internet protocol stack.	C2 (Explain)
CLO-3	Identify various internetworking devices and protocols and their functions in a networking	C4 (Identify)
CLO-4	Analyze working and performance of key technologies, algorithms and protocols	C4 (Analyze)
CLO-5	Build Computer Network on various Topologies	P3 (Build)

Textbook

Mandatory reading will be assigned from the textbook. Therefore you must have it and start reading. We will use:

Computer Networks: A Top-Down Approach, by Jum Kurose, Keith Ross, 8th Edition.
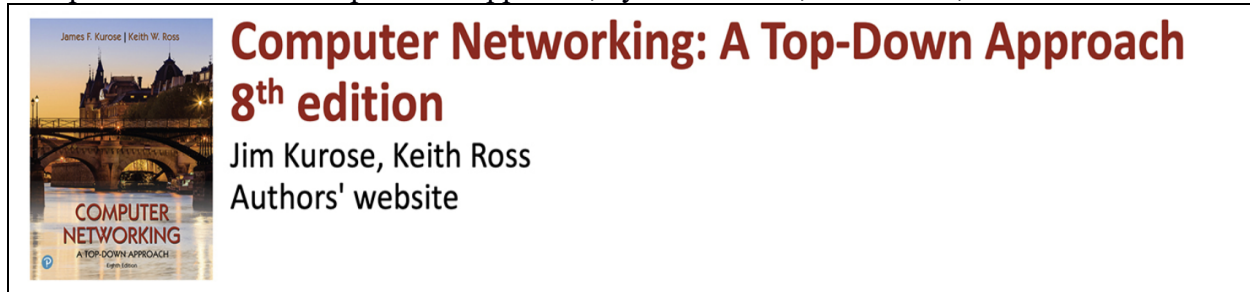
A lot of material (video lectures, slides, labs, test questions) are made available by the author free of charge. We will make good use of them. (see: https://gaia.cs.umass.edu/kurose_ross/index.php)

> **Reading textbook is MANDATORY in this class.** Lectures will be necessary but will often not be sufficient. Lectures will focus on the big, core ideas and leaving smaller details for students to read from the book. Students are highly encouraged to ask questions on the assigned reading in class. I will often start the class by asking if students have any questions from the previous lecture(s) or the assigned readings.
>
> We will occasionally assign readings from outside the textbook as well (for example a research paper). Expect to read 15 to 30 pages per week. While you should build your reading muscle, we can understand that at times you might be pressed for time. For those times, use *divide and conquer* strategy. In a small study group (of 2 to 5 students), divide the reading among you where one student studies some section in great depth and teaches it to the others. This way each student will have to read few sections in depth, while his/her study-mate will help them understand the other sections.
>
> Readings must be done before the next class. We will ensure you are reading the material by pop quizzes.

Auxiliary Books

Different books have different strengths and weaknesses. At times some topic is not clear in one book. That is an excellent opportunity to consult the same topic in another book. Following two books are for this purpose.

(1) Computer Networks: A Systems Approach by Larry Peterson and Bruce Davie (Freely available at: https://book.systemsapproach.org/)

(2) Computer Networks, 6th Edition, by Andere Tanenbaum, Nick Feamster, David Wetherall

Theme of the Course – Active Learning

Class will be highly interactive where students will substantially contribute to the class. A typical lecture will focus on the core ideas, and problem solving. Often leaving boring details for the homework reading. Such active learning enables students to digest the difficult concepts and to make connections with earlier knowledge.

Class attendance is highly recommended. (University demands that students be present in at least 80% of the lectures). For us attendance will not just means being present in the class, it will mean that a student is actively participating in the class and answers questions. You should stive to contribute at least once to each class! If a student leaves the class after attendance or comes late in the class, instructor reserves the right to mark such student as absent.

At least 80% attendance is necessary:

Every semester a few students come to the instructor telling a horrific incidence and demanding that they be marked as present, else all hell will break loose for them. You need to know that instructors are NOT authorized to mark any student present that was not in the class. For circumstances where your attendance becomes below 80% due to some unforeseen reason, please consult the CS academic department. They have a special procedure for such cases. Please don't come to the instructor for this purpose.

About Plagiarism & Other Unfair Means

All the work that you will do must be your own, done individually (unless explicitly specified to do in a group). You are welcome to discuss with your classmates to clarify a problem or to understand it better, and to understand class material. Though, for assigned work, it must be your only.

For assignments, avoid copying code (and text) from anywhere (including using ChatGPT and similar bots) because you will not learn doing so.

Note that academic dishonesty and plagiarism is a major offence, and the penalty can range from getting an F in the course to expulsion from the University. If you have any confusion if some activity violates this honor code, please contact the course instructor.

For class quizzes and anywhere else (sessional exams, final), when you are asked to stop writing, please DO STOP WRITING! Don't test the patience of your invigilator. Instructors can refer non-compliance of students to the disciplinary committee.

For in-class quizzes do your own work and never try to sneak something from your neighbors.

Grading Scheme

Grading scheme is as follows. We might tweak it a bit in the next few weeks. We will inform you in that case.

Midterm (2)	30% (15% each)
Quizzes	10%
Programming Assignments	10%
Cass Presentations (2)	5%
Final	45%

Expect one quiz in each class. These quizzes will be check-ins to make sure students are learning the subject. A larger quiz usually happens when we conclude a chapter.

Passing Criteria

Minimum requirement to pass this course is to **get at least 50% marks in the course**. The grading will be based on absolute scheme with no scaling.

Scaling policy and quiz dropping:

Each semester a few students come to the instructor asking to scale the grade because they are at 49.1% and passing is at 50%. First off, you should never be in that tight position. Second,

expect that there will be **no scaling** of any kind, nor any quiz will be dropped. Under extraordinary circumstances, instructor and CS department reserves the right to do minute adjustments to the grade but don't count on it.

Programming Assignments

We plan to have a multi-part programming project. The required language will be C++. At times student complain that the weight for assignments is not commensurate to the effort that goes into them. Due to departmental / university policies about giving sufficient weight to invigilated exams (mid and final), unfortunately, does not leave us with much room. Though these programming exercises are a crucial component for learning and achieving course goals. We encourage students to do them all to extract full benefit from the course.

8 permissible late days for your programming assignments:

We understand that life happens and at times you might not be able to submit your work on deadline. To accommodate such cases, we are giving you 8 late days to be consumed throughput the semester. You will need to update your remaining late days balance online in a sheet (that we will share later) and email your TA. You will need to decide before the official deadline of an assignment if you wish to use late days or not.

Tentative course outline and lecture plan

We will use few lectures for class presentations.

Topic	No. of Lectures	Section Reference
Course Motivation and Intro	4	Chapter 1
Application Layer	4	Chapter 2
First Sessional Exam		
Transport Layer	6	Chapter 3
Network Layer (Data Plane)	4	Chapters 4
Second Sessional Exam		
Network Layer (Control Plane)	4	Chapter 5
Link Layer	6	Chapter 6
Final Exam		

Class Communication

We will use GCR for class material dissemination while we will use Piazza for question and answers. I will add registered students to both.

Once again I welcome you to this fascinating subject of computer networking. Happy learning!