

CS 425: Computer Networks
2025 (2nd Semester)
Instructor: Adithya Vadapalli

When? Monday 8:00 AM – 9:00 AM, Wednesday 8:00 AM – 9:00 AM, Thursday, 2 PM to 3 PM

Where? L19

Instructor:

[Adithya Vadapalli, avadapalli@cse.iitk.ac.in](mailto:avadapalli@cse.iitk.ac.in)

Computer Science and Engineering Department, IIT Kanpur

Room: KD317

Office Hours: Each TA will hold one hour of office hours every week. The day/time/office information for each TA's office hours will be announced soon. The instructor will also hold three hours of office hours per week, and the timings for that will be announced soon.

Makeup Class Rule: If the instructor is traveling on an official trip on a class day, a makeup class will be held on a Saturday either before or after the trip.

Outline of the Course Content

Section I: Computer Networks and the Internet

1. What is the Internet?
2. The Network Edge
3. The Network Core
4. Performance: Delay, Loss and Throughput in Computer Networks
5. Protocol Layers and Their Service Models
6. Networks under attack

Section II: The Application Layer

7. Principles of Network Applications
8. The Web and HTTP
9. Email
10. DNS
11. Peer-to-Peer File Distribution
12. Video Streaming and Content Distribution Networks
13. Socket Programming

Section III: The Transport Layer

14. Introduction to Transport-layer services
15. Multiplexing and Demultiplexing
16. UDP
17. TCP

18. Congestion Control

Section IV: The Network Layer: The Data Plane

19. Network Layer Overview
20. What is inside a router?
21. The Internet Protocol

Section V: The Network Layer: The Control Plane

22. Introduction to Network-layer control plane
23. Routing Algorithms
24. OSPF
25. BGP
26. SDN Control Plane
27. ICMP

Section VI: The Link Layer

28. Introduction to the Link Layer
29. Error-Detection and Correction Techniques
30. Multiple Access Links and Protocols
31. Switched Local Area Networks

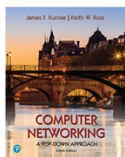
Section VII: The Link Layer

32. Wireless Links and Network Characteristics
33. WiFi
34. Cellular Networks

Section VIII: Network Security

35. Introductory Cryptography
36. Securing Communication Protocols
37. Inter-domain Routing Security

Text Book:



Computer Networking: A Top-Down Approach 8th edition

Jim Kurose, Keith Ross
Authors' website

Prerequisites and Co-requisites

Prerequisites for this course is a very strong programming background with knowledge of program run-time environment.

Communication: Students should join piazza: <https://piazza.com/iitk.ac.in/secondsemester2025/cs425>.

All the class material would be shared via Mootkit (Hello IITK)

Grading

Semester grades will be based on the following weights:

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|-------------------------|-----|---|
| Weekly Quizzes | 15% | There will be a quiz every week online. The quiz will be based on the material that was covered that week and it will mostly comprise of multiple-choice questions. |
| Programming Assignments | 30% | There will be around 4-6 programming assignments. They will do in groups of three or less |
| Midterm Exam | 25% | Students are allowed to bring one A4 sized, hand-written cheat sheet to the exam. The sheet should not be printed. It should be written by hand with a pen on a piece of paper. |
| Final Exam | 30% | Students are allowed to bring one A4 sized, hand-written cheat sheet to the exam. The sheet should not be printed. It should be written by hand with a pen on a piece of paper |

- A minimum of 33% is required for a D grade.
- A minimum of 40% is required for a D+ grade.
- A minimum of 50% is required for a C grade.
- The remainder of the grades will be relative.

Late Submissions:

- Unless otherwise stated in the class, **all graded assignments must be submitted by 11:55 pm on the specified due date.**
- There will be a 10% penalty for submitting an assignment within the first 24 hours (or a fraction of that) and a 30% penalty for delays between 24 and 48 hours.
- There is a 50% penalty for delays between 48 and 72 hours; between 72 and 96 hours, the penalty is 75%.
- Thereafter, no submissions will be allowed.

If you feel that an error is made in grading an assignment or an exam, **you must present a written appeal within one week after the assignment or exam is returned to you.** **Verbal appeals are not allowed,** and **grades will not change after one week.** Your appeal should be specific. Submit all appeals to the instructor.

Missed Midsem Exams Policy: If a student misses a mid-semester exam and has a valid medical certificate, then the marks of the endsem would be prorated.

Anti-cheating Policy:

The course will have a very strict anti-cheating policy. Any cheating would result in the students getting a ZERO for that assessment. Further, their overall grade will be downgraded by one point.

