

CS455 Computer Communications and Networking

M+W 3:00pm-4:15pm, L008

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Office Hours: Monday 10:00am - 11:30am, or by appointment

OVERVIEW

The course will present data communications fundamentals and computer networking methods, using the ISO 7-layer reference model to organize the study. Attention will be focused on the protocols of the physical, data link control, network, and transport layers, for local and wide area networks, security, and Internet infrastructure. Emphasis will be given to the Internet Protocol Suite and operational Internet infrastructure. Homework, measurement, and programming assignments will help the students learn how the Internet works and how to measure, diagnose, design, and implement Internet applications. You *must* read the assigned material and you will be responsible for all material covered in class. If a discussion in class extends beyond the slides and beyond the reading assignments, students will *still be responsible for that material* (i.e. it may appear on an exam, project, etc.).

PREREQUISITES

Grade of C or better in STAT 344, CS 310 and CS 367.

TEXTBOOKS

- Required:
 - Tanenbaum and Wetherall, Computer Networks, 5th edition

TENTATIVE TOPICS

- OSI 7-layer model
- Signal encoding, modulation and multiplexing
- Flow/error control
- Medium access control

- Ethernet
- Routing
- Internet architecture
- TCP/UDP protocols
- Internet applications
- Security, multimedia networking

COURSE OUTCOMES

1. Explain basic electrical engineering principles that enable communication at the physical layer
2. Demonstrate an understanding of wired and wireless data link layer protocols for shared medium and point-to-point communication
3. Demonstrate an understanding of the graph theory concepts required for unicast and multicast routing
4. Demonstrate an understanding of distributed routing protocols
5. Describe how protocols and applications use ARQ algorithms for distributed reliability
6. Demonstrate an understanding of end-to-end transport layer protocols
7. Explain basic concepts in cryptography and networking security protocols
8. Demonstrate a basic understanding of measurement and performance analysis for computer networking
9. Demonstrate a basic working vocabulary of data communications and networking terminology

HOMEWORK ASSIGNMENTS AND PROJECTS

Homework and project assignments are on a semi-regular basis. Both homework assignments and projects are individual efforts. The official platforms for projects are the VSE systems, meaning that the TA will grade your projects on them. Currently, details of these can be found at the link: <https://labs.vse.gmu.edu/index.php/Systems/Systems>

NOTE

- If your code does not compile, you get no credit.
- Assignments and Projects are individual efforts.
- We reserve the right to use tools to detect plagiarism.

GRADING POLICY

Your grade will be calculated as follows:

- 20% Homework
- 25% Projects
- 25% Midterm exam
- 30% Final exam

No credit if your project does not compile. No projects or assignments will be accepted after the last day of classes (December 8th). Without exception to the previous statement: every student is granted only three “tokens” for late home assignments/projects. Each token grants one day grace-period. After spending all three tokens, no accommodations will be made for late work (unless previously arranged).

No early exams will be given. Missed/make-up exams are not permitted unless previously arranged with the instructor (i.e. BEFORE the exam date with an official and verifiable excuse).

MISC

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