CS 4251 Syllabus

Computer Networking II – 3 Credits
Fall 2026

Instructor Information

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General Course Information

Description

This is a "second", advanced, course in networking. The course goes beyond introductory material to examine the design rationale behind key networking protocols and technologies, as well as how these mechanisms can be specialized for different classes of networks, such as private wide-area networks and data center networks. The goal is to provide students with the foundation needed to evaluate existing systems and reason about potential improvements. The course assumes prior exposure to core networking concepts, such as those covered in an introductory course (e.g., CS 3251).

Course Learning Outcomes

By the end of this course students will be able to:

- Explain how fundamental networking problems arise in different environments and how context (e.g., private Wide Area Networks vs. datacenter networks) shapes design trade-offs and solution spaces.
- Characterize desirable network behavior and systematically evaluate alternative solutions to networking problems within a given operational context.
- Analyze network performance using mathematical and analytical models.
- Design, implement, and rigorously evaluate network protocols.

Required Course Materials

No textbook is required for this class. Most covered material will be based on research papers. However, either of the following textbooks will be useful as refreshers:

- "Computer Networks: A Systems Approach" by Larry Peterson and Bruce Davie available for free at https://book.systemsapproach.org/.
- Other Systems Approach books will also be useful as references https://systemsapproach.org/books-html/
- The 8th Edition of "Computer Networking: A Top-Down Approach" by Kurose and Ross.

Grading Policy

A>=90; 90>B>=80; 80>C>=70; 70>D>=60; 60>F

- Syllabus and Diagnostic Quiz - 2%
- Homework Assignments (2) – 5% each
- Semester-long Group Project 40%
- In-class Quizzes (3) – 15% each
- Attendance and Participation – 3%

Description of Graded Components

Syllabus and Diagnostic Quiz: A take-home quiz that familiarizes students with the course syllabus and serves as a self-assessment of their familiarity with the prerequisite networking concepts.

Homework Assignments: Problem sets that allow students to practice and demonstrate their understanding of core concepts. Use of AI tools is permitted (and even expected), provided students clearly and comprehensively describe how they were used.

Semester-long Group Project: Students, in groups of up to five, will work on a project in computer networking. Each project must articulate a clear, even if simple, hypothesis to be evaluated. The project is assessed through a sequence of incremental deliverables distributed throughout the semester.

In-class Quizzes: All quizzes will be administered in person during class and completed with pen and paper. Quizzes are open book and open notes, but use of the Internet or AI tools is not permitted. Only the final quiz will be cumulative.

Attendance and Participation: Regular attendance and active participation are expected, as in-class discussions and activities are an integral part of the course.

Course Policies

Attendance and/or Participation

All lectures will be delivered in person and recorded. Nevertheless, in-person attendance and participation are expected. Absences due to illness or emergencies will not be penalized if appropriately documented through the Office of the Dean of Students. Absences will also be excused for conflicts with religious observances, career fairs, or off-campus interviews.

Academic Integrity

Georgia Tech aims to cultivate a community based on trust, academic integrity, and honor. Students are expected to act according to the highest ethical standards. Review Georgia Tech's Honor Code and the student Code of Conduct.

Any student suspected of cheating or plagiarism on a quiz, exam, or assignment will be reported to the Office of Student Integrity, who will investigate the incident and identify the appropriate penalty for violations.

Accommodations for Students with Disabilities

If you are a student with learning needs that require special accommodation, contact the Office of Disability Services (404-894-2563) as soon as possible to make an appointment to discuss your special needs and to obtain an accommodations letter. Please also e-mail me as soon as possible in order to set up a time to discuss your learning needs.

Student-Faculty Expectations Agreement

At Georgia Tech, we believe that it is important to strive for an atmosphere of mutual respect, acknowledgement, and responsibility between faculty members and the student body. The Student-Faculty Expectations articulate some basic expectations that you can have of me and that I have of

you. In the end, simple respect for knowledge, hard work, and cordial interactions will help build the environment we seek. Therefore, I encourage you to remain committed to the ideals of Georgia Tech while in this class.

Prerequisites

CS 3251 or an equivalent class are required prerequisites.

Collaboration and Group Work

Feel free (indeed, you are encouraged) to ask questions on Ed about homework questions and. Feel free (indeed, you are encouraged) to answer each other's questions (on Ed Discussion or through any other mode of communication).

Write the answers to the homework and do the programming assignments yourself.

Specifically, the following is not allowed:

- Copying, with or without modification, someone else's work when this work is not meant to be publicly accessible (e.g., a classmate's program or solution).
- Submission of material that is wholly or substantially identical to that created or published by another person or persons, without adequate credit notations indicating authorship (plagiarism). Note that solutions that involve cutting and pasting from public sources (including AI output) with appropriate citation are legal. However, since they do not involve work on the student part beyond searching or prompting, they may receive a significantly diminished grade or zero.

Any public material that you use (open-source software, help from a text, material you find on the web, material from a paper, substantial help from a friend, etc...) should be acknowledged explicitly in anything you submit to us.

If you have any doubt about whether something is legal or not, please do check with us.

You are strongly urged to familiarize yourselves with the Student Honor Code and Policies (see https://osi.gatech.edu).

All suspected violations of the Honor Code will be investigated and will need to be reported to OSI

Use of Generative AI

Feel free (indeed, you are encouraged) to use generative AI tools to help you with homework assignments and the class project. However, expectations for each use case differ.

Homework assignments: You may use AI tools to help you brainstorm or explore ideas. If you do, include a short summary of your AI usage under the following headings:

- Prompts used
- Ideas the AI provided correctly with minimal guidance
- Ideas the AI provided that were incorrect or misleading

You should also clearly separate your answer from the AI summary.

Project: You are encouraged to use AI tools to improve the quality of your writing and to enhance your coding productivity throughout the project. However, you remain fully responsible for all submitted work. In particular, you should be able to clearly explain and defend any content included in your reports, as well as any code you submit as part of the project.

Extensions, Late Assignments, & Re-Scheduled/Missed Exams

"No questions asked" late policy: There is a grace period of one hour after the deadline of any deliverable where no penalties are applied. Deliverables that are more than 1 hour and less than 24 hours late will receive a 10% penalty. Deliverables that are 24 hours to 48 hours late will receive a 20% penalty. No assignments will be accepted more than 48 hours late.

We will consider requests for a makeup exam (midterm or final) as well as request to waive the penalty for late deliverables or requests to extend the submission of deliverables on a case-by-case basis. **Generally, documented illness, a note from the Dean of Students, and/or established ODS accommodation is required for the request to be viewed favorably.**

Campus Resources for Students

Undergraduate Student Academic Success Resources

Academic Support: Academic Success and Advising (a unit in the Office of Undergraduate Education & Student Success) provides free support for your courses. Students can attend scheduled supplemental review (PLUS) sessions, stop by Drop-In Tutoring, or schedule a one-on-one appointment through Knack. To explore what options work best for you, please visit us online at success.gatech.edu/tutoring, email us at tutoring@gatech.edu, or come see us at Clough Undergraduate Learning Commons, Suite 283.

Graduate Student Academic and Professional Success Resources

A list of resources for graduate students is given on the Office of Graduate and Postdoctoral Education website. Specific information for current graduate students includes

- Academic Resources such as the Communications Center, Language Institute, Library, Catalog, Registrar, resources for conducting research, Advocacy and Conflict Resolution resources, and how to manage unexpected situations that may impact your academic performance;
- Student Resources such as Campus Services, Child Care/Family programs, Health & Wellness, Career Services, and the Student Resource Guide; and
- *Professional Development such as the programming from the Career Center and other professional development resources and events"*

Student Well-Being

At Georgia Tech, we are concerned about your overall physical, social, and mental well-being. A comprehensive list of wellness related resources has been compiled and maintained by the Office of the Vice President for Student Engagement and Well-being (student-resource-guide (gatech.edu)