

# Northeastern University

## Graduate School of Engineering

### TELE5330 Data Networking – Fall 2025

#### Course Syllabus

Instructor:	Prof. Rajiv Shridhar
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Phone:	(617) 324-6632 (office)
Office Hours:	Wed 5 pm-6 pm, Sat 5PM+, or by appointment
Lecture Information:	Wednesdays 6 pm - 9:30 pm (location TBD)
Teaching Assistants:	TBD

#### Course Description

This course provides the basics of data networking protocols and architectures. Topics include overall protocol architecture of the internet; application protocols such as FTP, SMTP and HTTP, web caching, DNS, CDNs, and P2P applications; use of TCP and UDP socket programming to develop network applications in Python; transport protocols, including TCP, UDP, and TCP congestion control; IP protocol, addressing, IPv4 and v6, NATs, ICMP, and tunnels; routing algorithms – RIP, OSPF and BGP; data link protocols include CSMA/CA and CSMA/CD, encoding, framing, error control; switched LANs, ARP, Ethernet, and VLANs; wireless LANs and 802.11 protocols.

#### Prerequisites

Recommended knowledge of data structures and operating systems/computer architecture. We assume that the student is familiar with general computer organization, with basic microprocessor architectures, and UNIX system calls (though this last will be covered again if required).

#### Corequisites

All students enrolled in this course must also enroll in, and satisfactorily complete, the co-requisite TELE5331 Data Networking Laboratory course in order to be eligible to complete the TELE5330 course.

#### Prescribed Text

Kurose, J.F. and Ross, K.W., *Computer Networking – A Top-Down Approach Featuring the Internet*, (8<sup>th</sup> edition, Pearson, 2021 is the current version)

#### Other Recommended Reference Materials

There are several textbooks, both in the library and online, that tackle the fundamentals of data networking. Most of them do a good job of illustrating the technology and concepts behind data networking functions. Interested students might also find it useful to consult Northeastern's site licensed video training service – LinkedIn Learning (accessible from the student portal) for online self-service tutorials on data networking and a host of other related topics. Some books that I have found useful myself and still occasionally refer to are listed below. (I know these might appear to be really old... but they're by some of the best authors in their areas)

- Bertsakas, D. and Gallager, R., *Data Networks, 2<sup>nd</sup> Edition*, Prentice Hall, 1992 (or later)
- Tanenbaum, A.S., *Computer Networks, 6<sup>th</sup> Edition*, Pearson, 2021 (or later)
- Stevens, W.R., *Unix Network Programming, 2<sup>nd</sup> Edition*, Prentice Hall, 1998
- Stevens, W. R., *Advanced Programming in the UNIX Environment*, Addison Wesley, 1992

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\* Email is the preferred means of communication. We also set up Teams or Slack channels for each semester, but you can always reach me by email at any of my contact email addresses.

## Course Website

<https://canvas.northeastern.edu/login/> (the course site is typically activated after the first lecture of the course)

## Grading

Regular homework assignments, midterm and final exams, and a term paper will serve as the basis for grades assigned in this course. Homework will be due at the end of the lecture during the week for which it is due. The evaluation criteria are (tentatively):

Exams (midterm and finals)	45%
Homework Assignments	20%
Projects / Labs (TELE5331)	35%

*Class Participation is important. Though a percentage of your grade is not directly attributed, it is considered as appropriate.*

### NOTE:

- (1) Reinforced by university guidance and Graduate School of Engineering policy, the **average** course grade is expected to be **B**. Therefore, grade distribution may be from A through C depending on performance of the student. **The teaching team will enforce this policy.**
- (2) Beginning Fall 2024, the program focuses on your attendance as a critical prerequisite for participation. Attendance will be taken at the beginning of each lecture and lab session. No more than two unexcused absences are allowed throughout the semester.
- (3) There are no individual make-ups for any of the grading elements.

## Assignments

Homework assignments will be assigned regularly except during the weeks immediately before exams. The goal of assignments is to reinforce understanding of the in-class material through alternating written answer questions and practical assignments.

## Projects / Labs

The goal of the projects and lab assignments is to provide students with the opportunity to put the in-class learning into practical implementation through simulation or reproduction of real-life scenarios. These labs are run through the co-requisite TELE 5331 lab course. Students must gain a satisfactory grade in the lab in order to pass it, and their actual project/lab scores are used in calculating the overall grade in the 5330 course as listed above. The TELE5330/TELE5331 course is a unique one in the university, as it demonstrates the willingness and interest of a large volunteer group composed of past students of the course and MGEN program to help provide continued involvement in data networking education as a field.

## Academic Integrity

A commitment to the principles of academic integrity is essential to the mission of Northeastern University. The promotion of independent and original scholarship ensures that students derive the most from their educational experience and their pursuit of knowledge. Academic dishonesty violates the most fundamental values of an intellectual community and undermines the achievements of the entire University.

As members of the academic community, students must become familiar with their rights and responsibilities. In each course, they are responsible for knowing the requirements and restrictions regarding research and writing, examinations of whatever kind, collaborative work, the use of study aids, the appropriateness of assistance, and other issues. Students are responsible for learning the conventions of documentation and acknowledgment of sources in their fields. Northeastern University expects students to complete all examinations, tests, papers, creative projects, and assignments of any kind according to the highest ethical standards, as set forth either explicitly or implicitly in this Code or by the direction of instructors.

Go to <https://osccr.sites.northeastern.edu/academic-integrity-policy/> to access the academic integrity policy.

## Student Accommodations

Northeastern University and the Disability Resource Center (DRC) are committed to providing disability services that enable students who qualify under Section 504 of the Rehabilitation Act and the Americans with Disabilities Act Amendments Act (ADAAA) to participate fully in the activities of the university. To receive accommodations through the DRC, students must provide appropriate documentation that demonstrates a current substantially limiting disability.

For more information, visit <https://drc.sites.northeastern.edu/>.

## Diversity and Inclusion

Northeastern University is committed to equal opportunity, affirmative action, diversity and social justice while building a climate of inclusion on and beyond campus. In the classroom, members of the University community work to cultivate an inclusive environment that denounces discrimination through innovation, collaboration and an awareness of global perspectives on social justice.

Please visit <https://www.northeastern.edu/oidi/> for complete information on Diversity and Inclusion.

## Title IX

*Title IX of the Education Amendments of 1972 protects individuals from sex or gender-based discrimination, including discrimination based on gender-identity, in educational programs and activities that receive federal financial assistance. Please visit <https://www.northeastern.edu/titleix/> for a complete list of reporting options and resources both on- and off-campus.*

Northeastern's Title IX Policy prohibits Prohibited Offenses, which are defined as sexual harassment, sexual assault, relationship or domestic violence, and stalking. The Title IX Policy applies to the entire community, including male, female, transgender students, faculty and staff. In case of an emergency, please call 911.

## Student Responsibilities

- Studying all material covered in class, in assigned reading and through external assignments, whether formally or informally assigned.
- Reviewing, in advance, material to be covered in each lecture, and being prepared to participate in discussions about the material in class.
- Checking Canvas regularly and frequently (preferably morning and evening) to receive communication about the course, including assignments etc.
- Maintaining strict adherence to the Northeastern University rules and regulations for proper student conduct. Among others, cheating, fabrication, facilitating academic dishonesty, and plagiarism are considered violations that may result in immediate dismissal from the Graduate School of Engineering, or at minimum a discussion with OSCCR.

## Safety and Health

While we are back to the new normal after the pandemic and will endeavor to maximize an in-person learning experience, there continue to be periodic concerns from new COVID-19 variants and other viruses.

- We abide by the safety protocols currently in place, including those governing testing, masking, eating, etc., while attending in-person lectures. **If you feel unwell, please stay home. I will do my utmost to support your learning in cases where someone needs to attend remotely due to medical reasons.**
- Let me know **in advance** if you are unable to come to a lecture. Also, if you're missing the lecture because of an interview or other non-health related concern, please do let me know. If you're going to miss the lecture because you're not feeling well, you don't need to give me (or anyone else other than medical staff at Northeastern) any details about the medical issue but you **MUST** let me know you are unable to attend.
- We'll discuss this more in class, and we can adjust our mode of teaching and learning as warranted.

## How We Will Work Together

Course instruction includes weekly lectures, held in person. In addition, the associated lab is conducted by TAs, along with any other practical sessions that the TAs and instructor might schedule.

## How We Will Communicate

Here is how I plan to use the Canvas communication tools:

- **Announcements:** The TAs and/or I will post announcements regularly and frequently. We will also use the announcements tool to communicate any important or time sensitive updates in the course. Please turn your [announcement notifications on in your Canvas settings](#) so you also receive announcements in email. This will help you keep on top of late-breaking developments.
- **If you have questions about content or assignments:** We have set up a discussion called "General Course Q&A". Please post questions about content and assignments here, so your classmates can benefit from the answers. I recommend that you Subscribe to the forum so you also receive forum messages in email.  
NOTE that we might switch to using an external environment such as Slack or Piazza for this communication.
- **Email:** Feel free to email me with questions of a personal nature. You can reach me at [add your email here] through your NU email account, or you can click **Inbox** in the course menu, search for our course and locate me. [See Instructions for how to use the Canvas Inbox here](#). You can expect a response within 24 hours on weekdays, 48 hours on weekends. Please check your Northeastern email daily or forward it to an email address that you do check.
- **"Office Hours":** I am available for consultations over the phone or through video-conference such as Zoom. Please email me to schedule an appointment. Also see my office hour times above.

## Technology Requirements and Support

Our learning management environment is based on Canvas. I recommend bookmarking <https://canvas.northeastern.edu/> for easy access. Prior to taking this course, review the [basic computer specifications for Canvas Links to an external site.](#) You can access Canvas on the go using the [Canvas Student app](#). Not all features work on the mobile app, I recommend completing essential course work using your computer and a web browser.

If you need help to using Canvas, online chat and phone support are available 24/7 by clicking on the help menu in the left-hand navigation. For additional help, around-the-clock Northeastern tech support is still available students. For technology questions or assistance, contact the IT Service Desk 24 hours a day, 7 days a week, [learn about ways to contact ITS Service Desk here](#).