New York University Tandon School of Engineering
Computer Science
Course Outline CS-GY-6843 Computer Networking
Spring 2020
Professor Rafail Portnoy
Live Lectures Wednesdays 6pm – 8pm

To contact professor: rp1912@nyu.edu

Office hours: on Request only

Course Pre-requisites

CS 2134 (CS2134 Data Structures and Algorithms) or equivalent
Knowledge of binary addition and multiplication system.

Course Description

This course takes a top-down approach to computer networking. After an overview of computer networks and the Internet, the course covers the application layer, transport layer, network layer and link layers. Topics at the application layer include client-server architectures, P2P architectures, DNS and HTTP and Web applications. Topics at the transport layer include multiplexing, connectionless transport and UDP, principles for reliable data transfer, connection-oriented transport and TCP and TCP congestion control. Topics at the network layer include forwarding, router architecture, the IP protocol and routing protocols including OSPF and BGP. Topics at the link layer include multiple-access protocols, ALOHA, CSMA/CD, Ethernet, CSMA/CA, wireless 802.11 networks and link-layer switches. The course includes simple quantitative delay and throughput modeling, socket programming and network application development and Ethereal labs

Course Objectives

Understand state-of-the-art in network protocols, architectures, and applications
Process of networking research - Constraints in thought process of networking research

Course Structure

The Class will be comprised of recorded lectures and online discussions. The lectures will focus on the OSI Model Layers in detail.

Readings

The required text for the course is: Computer Networking, Kurose and Ross, 7th edition, Pearson (Addison Wesley), 2017, ISDN: 978-0-13-359414-0

You can access NYUøs central library here: http://library.nyu.edu/

You can access NYU Tandonøs Bern Dibner Library here: http://library.poly.edu/

Course requirements

You will typically have something due every week

Online Access

All students are required to have access to the http://newclasses.nyu.edu online environment.

Moses Center Statement of Disability

If you are student with a disability who is requesting accommodations, please contact New York Universityøs Moses Center for Students with Disabilities (CSD) at 212-998-4980 or mosescsd@nyu.edu. You must be registered with CSD to receive accommodations. Information about the Moses Center can be found at www.nyu.edu/csd. The Moses Center is located at 726 Broadway on the 2nd floor.

NYU School of Engineering Policies and Procedures on Academic Misconduct *(from the School of Engineering Student Code of Conduct)*

A. Introduction: The School of Engineering encourages academic excellence in an environment that promotes honesty, integrity, and fairness, and students at the School of Engineering are expected to exhibit those qualities in their academic work. It is through the process of submitting their own work and receiving honest feedback on that work that students may progress academically. Any act of academic dishonesty is seen as an attack upon the School and will not be tolerated. Furthermore, those who breach the Schooløs rules on academic integrity will be sanctioned under this Policy. Students are responsible for familiarizing themselves with the Schooløs Policy on Academic Misconduct.

B. Definition: Academic dishonesty may include misrepresentation, deception, dishonesty, or any act of falsification committed by a student to influence a grade or other academic evaluation. Academic dishonesty also includes intentionally damaging the academic work of

others or assisting other students in acts of dishonesty. Common examples of academically dishonest behavior include, but are not limited to, the following:

1. Cheating: intentionally using or attempting to use unauthorized notes, books, electronic media, or electronic communications in an exam; talking with fellow students or looking at another person's work during an exam; submitting work prepared in advance for an in-class examination; having someone take an exam for you or taking an exam for someone else; violating other rules governing the administration of examinations.
2. Fabrication: including but not limited to, falsifying experimental data and/or citations.
3. Plagiarism: intentionally or knowingly representing the words or ideas of another as one's own in any academic exercise; failure to attribute direct quotations, paraphrases, or borrowed facts or information.
4. Unauthorized collaboration: working together on work that was meant to be done individually.
5. Duplicating work: presenting for grading the same work for more than one project or in more than one class, unless express and prior permission has been received from the course instructor(s) or research adviser involved.
6. Forgery: altering any academic document, including, but not limited to, academic records, admissions materials, or medical excuses.

Access the entire School of Engineering Student Code of Conduct here:
engineering.nyu.edu/academics/code-of-conduct

Collaboration

Students are allowed (encouraged) to discuss the homework and programming assignments with each other. However, except for team projects, your written solutions must be your own work. Furthermore, if you worked with other people you must write down with whom you worked. The first violation of this policy will result in a 0 on that assignment and a reduction in your final grade (for example, from B+ to B). A second violation will result in an F. For additional information see the CIS policy on Collaboration and Programming Assignments.

Learning Time Rubric

You may choose your own weekly breakdown, such as live webinar sessions.

Learning Time Element	Asynchronous* / Synchronous**	Time on Task for Students (weekly)	Notes
Reading Assignments / Recorded Lecture	Asynchronous	2.5 hours	Video format. Expect quizzes throughout the module or weekly chapter readings

Weekly Discussion Board	Asynchronous	1.5 hours	Students are expected to post initial response to weekly topic questions. See Interaction Policy.
Assessment (Labs and Programming assignments)	Asynchronous	2 hours	Students submit their assignment by [the end of the week]
Reading Assignment	Asynchronous	2 hours	Reading assigned textbook chapters and journal articles.
Live webinars	Synchronous	2 hours	Group discussion in class, live, overly weekly chapter

*Asynchronous learning is defined as any non-real time student learning, such as recorded lecture, podcast, interactive module, articles, websites, etc. This also includes any student-to-student or faculty-to-student communication that may happen with an asynchronous tool, such as discussion board, chatroom, e-mail, text, etc.

**Synchronous learning is defined as any real-time student-to-student and/or faculty-to-student learning, such as a live webinar session or other video/audio communication service.

Course Communication

Announcements -

Announcements will be posted on NYU Classes on a regular basis. You can locate all class announcements under the *Announcements* tab of our class. Be sure to check the class announcements regularly as they will contain important information about class assignments and other class matters.

Email –

You are encouraged to post your questions about the course in the Forums discussions on NYU Classes. This is an open forum in which you and your classmates are encouraged to answer each other's questions. But, if you need to contact me directly, please email me at rp1912@nyu.edu. All homework, labs or programming assignments related questions must be researched first on own time, then posted on forums, then discussed with TAs during weekly reviews, and then can be forwarded to me. Typically, you can expect a response within 48 hours.

__Weekly Virtual Meetings__ –

Once a week, we will hold a virtual class meeting through the *Zoom* tool on NYU Classes. This weekly meeting is an opportunity for you to ask questions and gain clarification about the course content from myself and your peers. You are highly encouraged to attend these meetings. I understand that not all students will be available to attend these virtual meetings. Due to this fact, the meetings will be recorded so you can watch them when you are available.

Interaction Policy

You are required to be an active online learner in this course and expected to participate in the Active Learning Modules, weekly discussion boards, weekly virtual meetings, etc.

Syllabus and Schedule of Lectures and Assessments

Topics

We'll be covering Chapters 1 through 6 of the 7th edition of the textbook:

- Overview of computer networking
- Application layer
- Transport layer
- Network layer ó Data Plane
- Network layer ó Control Plane
- Link layer

Extra Credit

All homework questions should be directed to the class forum online. Everyone is encouraged to participate. Top 2 most active students with most correct responses to questions will receive 2 additional points towards their Final course grade.

GRADING:

Quiz Assignments, (10% of final grade)
There will be a quiz after completion of each chapter and will be based on that chapter

Wireshark Assignments, (15% of final grade)

Programming assignments, (15% of final grade)

Midterm, (30% of final grade)
This will be a timed examination which will cover the materials of the first 3 chapters of required reading.

Final Examination, (30% of final grade)

Grade Minimum %

Grade	Minimum %
A	95
A-	90
B+	87
B	83
B-	80
C+	77
C	73
C-	70
D+	67
D	63
F	0

Lecture and Assignment Schedule

Week	Date	Chapter	Assessment is due by end of day Saturday of the lecture week		
			Homework	Wireshark	Programming Projects
1	1/28 (Tuesday Class)	1	Ch. 1 R4, R12, R18, R19		
2	2/5	1	Ch. 1 R20, P6, P25, P27, P28	Getting Started	
3	2/12	2	Ch. 2 R4, R10, R11, P1, P4		
4	2/19	2	Ch. 2 R12, R18, R21, R25, P6	HTTP	Web Server
5	2/26	3	Ch. 3 R3, R4, R7, R13		SMTP Mail Client
6	3/4	3	Ch.3 R5, R10, R14, P4	UDP	
7	3/11	Midterm Chapters 1,2,3 Assessments		TCP	
8	3/18	No class (Spring Break)			
9	3/25	4	Ch.4 R3, R4, R7, R13		
10	4/1	4	Ch.4 21, R22, R27, R31, P15	IP	
11	4/8	5	Ch.5 R4, R6, R13, P3		Traceroute
12	4/15	5	Ch.5 R16, R17, R19, R23	Ethernet	
13	4/22	6	Ch.6 R7, R8, R9, R11, R15		
14	4/29	6		NAT	
15	5/6	8			
16	5/13	Final Examination			

Note: The assignments (Wireshark and Programming Projects) must be submitted on NYU Classes latest by 11:55 PM as a single PDF on their respective due dates.