Old Dominion University
College of Sciences
Department of Computer Science
CS 455/555: Introduction to Networks and Communications
Syllabus – Fall 2025

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Office Hours: Check my office hours on Canvas

Required Text Book: *Computer Networking: A Top-Down Approach*, 8th edition, by James F. Kurose and Keith W. Ross, Pearson, 2021. ISBN 9780136681557

Catalog Course Description:
CS 455/555. Introduction to Networks and Communications. 3 Credits.
Internet and the 5-layered protocol architecture for the Internet, applications built on top of data networks, specifically the Internet, the web, the transport layer, TCP and UDP protocols, the network layer, the data link layer, also some of the technologies for the physical layer.
Prerequisites: CS 252, CS 270, and a grade of C or better in any one of: CS 250, CS 251, CS 253, ECE 250

Course Objectives: This is a split undergraduate/graduate-level course in computer networking, focusing on the applications and protocols that run on the Internet. The main objective of this course is to introduce the students to the basic concepts of networks and data communications. We will take a top-down approach to the layered network architecture, studying application layer first and then proceeding down the network "stack" towards the physical link. The summary of the contents is as follows.

- The course begins with an introduction to the Internet and the 5-layered protocol architecture for the Internet and then discusses some day-to-day **applications** built on top of data networks, specifically the Internet. The worldwide web and its relationship to the concepts discussed in class are also covered. HTTP, SMTP, POP3, IMAP, DNS protocols are discussed in detail. Video streaming and content distribution networks are also introduced.
- At the **transport** layer, TCP and UDP protocols are discussed in great detail. In addition, general performance issues in computer networks are discussed.
- At the **network** layer, the data plane and the control plane functions will be discussed. Software-defined networking (SDN) explicitly separates these two interacting parts. We discuss different types of routing algorithms and congestion control schemes. The intricacies of internetworking and the IP protocol are also discussed.
- At the **data link** layer, we discuss error detection and correction procedures, we discuss ALOHA, Ethernet, and wireless LANs. We also discuss some of the technologies for the **physical** layer.

Grading Criteria: Your grade will be based on the following:

Midterm Exam	20%
Final Exam	20%
Assignments	50%
Class presentation	10%
Total	**100%**

Grading Scale for *Undergrad* Students (CS 455):

Points	Letter Grade
92-100	A
90 - <92	A-
88 - <90	B+
82 - <88	B
80 - <82	B-
78 - <80	C+
70 - <78	C
68 - <70	C-
60 - <68	D
0 - <60	F

Grading Scale for *Graduate* Students (CS 555):

Points	Letter Grade
95 -100	A
90 - <95	A-
88 - <90	B+
84 - <88	B
80 - <84	B-
78 - <80	C+
72 - <78	C
69 - <72	C-
0 - <69	F

Canvas: You should check Canvas for announcements concerning course assignments. Grades will be posted on Canvas. It is the student's responsibility to inform the instructor of misreported grades within **three days** after they are posted on Canvas.

Exams: Exams will be open book. The Final exam time will be based on the university final exam schedule (Fall 2025 EXAM SCHEDULE)
https://www.odu.edu/academics/calendar/exams/fall
There are no 'make-ups' for the exams.

Assignments: These are questions and problems generally assigned from the textbook. You will have one week to work on each of the assignments. Assignments will be turned in through the **Canvas**. Late submissions of assignments or presentation and make-up exams will not normally be permitted.

While the students are encouraged to discuss the homework assignments, each individual should prepare their own answers. Any violation of this rule will be considered as cheating and will be dealt with accordingly.

Presentation: The main purpose of this item is to keep you up-to-date on the latest developments in the networking and communications area. Since the textbook may not cover many of these aspects, the students are made responsible to gather material, understand the material, and make a 15-minutes presentation in the class.

Course Outline:
In addition to the chapters listed below, additional readings may be made available via the course web page or through handouts in the class.

Lecture Schedule (*Tentative***):**

Month	**Activity**
August 23 – August 31	Overview & Chapter 1: What is the Internet? What is a protocol? Chapter 1: The network edge Chapter 1: The network core
September 1 – September 7	Chapter 1: Delay, Loss, and Throughput Chapter 1: Protocol Layers and Their Service Models Chapter 1: Network under attack
September 8 – September 15	Chapter 2: Principals of Network Applications Chapter 2: The Web and HTTP Chapter 2: Electronic Mail in the Internet
September 22 – September 28	Chapter 2: DNS Chapter 2: P2P Applications Chapter 2: Video Streaming and Content Distribution Networks
September 29 – October 5	Chapter 2: Socket programming Chapter 3: Multiplexing and Demultiplexing Chapter 3: UDP
October 6 – October 19	Chapter 3: Principles of reliable data transfer Chapter 3: TCP Chapter 3: TCP Congestion control
October 11 - October 14	Fall Holiday (no classes)
October 20 - October 26	Chapter 4: Network Service Models Chapter 4: What's inside a router Chapter 4: IPv4
October 27 - November 2	Chapter 4: NAT Chapter 4: IPv6 Chapter 4: Generalized Forwarding and SDN
November 4	Election Day Holiday (no classes)

November 6	Midterm Exam
November 10 - November 16	Chapter 5: Link-State Routing Algorithm Chapter 5: Distance- Vector Routing Algorithm Chapter 5: OSPF
November 17 - November 23	Chapter 5: BGP Chapter 5: SDN Control Plane Chapter 5: ICMP and Network Management
November 24 - November 25	Chapter 6: Error detection and correction Chapter 6: Multiple Access Links and Protocols Chapter 6: ARP
November 26 - November 30	Thanksgiving Holiday (no classes)
December 1 – December 5	Chapter 6: VLANs Chapter 6: Link Visualization Chapter 6: Data Center Networking
December 11	Final Exam (based on the university final exam schedule)

Make-up Tests and Late Assignments:
Late homework and make-up exams normally will **not** be permitted. I will give appropriate consideration to documented emergencies, but such arrangements must be made with the Student Ombudsperson Services Office. Please follow the university rules at the following links:
https://www.odu.edu/about/monarchcitizenship/class-attendance/absences

https://www.odu.edu/content/dam/odu/offices/student-ombudperson-leadership/docs/sos-extended-absence-notification-revised-04-23-2013.pdf

Attendance:
I expect you to attend class and to arrive on time. Your grade may be affected if you are consistently tardy. If you have to miss a class, you are responsible checking the course website to find any assignments or notes you may have missed. Students may leave after 15 minutes if the instructor or a guest lecturer does not arrive in that time.

Computer Account and Email:
Students should have and use an ODU account. This is the account associated with your@odu.edu email. It will allow you to log into the course's Canvas site. All ODU students automatically receive this account, though you may need to activate yours, particularly if you are new to ODU.
Students should activate their @odu.edu e-mail accounts and check them every day. If a student chooses to have his/her messages forwarded to another account, it is the student's responsibility to take the necessary steps to have them forwarded.
All students in this course are responsible for making sure they have working accounts prior to the first assignment.

Getting Help:
If you have a question or you need more clarifications about the course materials, please feel

free to talk with me in the office hours. Also, you can send me an email (**sfibrahi@odu.edu**), but do not wait until the last minute, it may take time to receive a response (do not expect or rely on an immediate response).

Course Disclaimer:
Every attempt is made to provide a syllabus that is complete and that provides an accurate overview of the course. However, circumstances and events may make it necessary for the instructor to modify the syllabus during the semester. This may depend, in part, on the progress, needs, and experiences of the students.

Academic Integrity
Old Dominion University is committed to students' personal and academic success. In order to achieve this vision, students, faculty, and staff work together to create an environment that provides the best opportunity for academic inquiry and learning. All students must be honest and forthright in their academic studies. Your work in this course and classroom behavior must align with the expectations outlined in the Code of Student Conduct, which can be found at www.odu.edu/oscai. The following behaviors along with classroom disruptions violate this policy, corrupt the educational process, and will not be tolerated.
Cheating: Using unauthorized assistance, materials, study aids, or other information in any academic exercise.
Plagiarism: Using someone else's language, ideas, or other original material without acknowledging its source in any academic exercise.
Fabrication: Inventing, altering or falsifying any data, citation or information in any academic exercise.
Facilitation: Helping another student commit, or attempt to commit, any Academic Integrity violation, or failure to report suspected Academic Integrity violations to a faculty member.

Academic dishonesty will be reported to the Office of Student Conduct & Academic Integrity and may result in sanctions up to and including expulsion from the University.

Students may still provide legitimate assistance to one another. You are encouraged to form study groups to discuss course topics. *Students should avoid discussions of solutions to ongoing assignments and should not, under any circumstances, show or share solutions for an ongoing assignment.*
Please see the ODU Honor Council's webpage for other concrete examples of what constitutes cheating, plagiarism, and unauthorized collaboration. All students are responsible for knowing the rules. If you are unclear about whether a certain activity is allowed or not, please contact the instructor.

Important Notes:
a) Use of ChatGPT and similar such tools is strictly prohibited.
b) Use of ChatGPT and such tools may be used to get some ideas, but the work submitted must be students' own.
c) Use of ChatGPT and such tools is permitted, but students must properly cite the sources of that, and any other code found on the Internet, according to the guidelines provided below. [followed by examples of using comments in code to cite sources of both quoted and paraphrased sections].

Special needs: Old Dominion University is committed to ensuring equal access to all qualified students with disabilities in accordance with the Americans with Disabilities Act. **The Office of Educational Accessibility (OEA)** is the campus office that works with students who have disabilities to provide and/or arrange reasonable accommodations.

- If you experience a disability which will impact your ability to access any aspect of my class, please present me with an accommodation letter from OEA so that we can work together to ensure that appropriate accommodations are available to you.
- If you feel that you will experience barriers to your ability to learn and/or testing in my class but do not have an accommodation letter, please consider scheduling an appointment with OEA to determine if academic accommodations are necessary.

The Office of Educational Accessibility is located at 1021 Student Success Center and their phone number is (757)683-4655. Additional information is available at the OEA website: http://www.odu.edu/educationalaccessibility/

Students are encouraged to self-disclose disabilities that have been verified by the Office of Educational Accessibility by providing Accommodation Letters to their instructors early in the semester in order to start receiving accommodations. Accommodations will not be made until the Accommodation Letters are provided to instructors each semester.

Office of Counseling Services
ODU's Office of Counseling Services (OCS) is a university agency with competent, diverse, and multidisciplinary professional staff. We are committed to supporting the emotional well-being, social development, and academic progress of all students at Old Dominion University.

College life can be a wonderful time of self-discovery, but for many, it is also a time when the awareness of mental health conditions increases. OCS services are available to assist with addressing mental health concerns that a student may be experiencing. You can learn more about the broad range of confidential mental health services available on campus via our website at http://www.odu.edu/counselingservices. All services are free to ODU students.

Hybrid and Online Learning
This course may have to modify its in-person instruction based on guidance from ODU and the Virginia Department of Health. It may entail moving to an online format if COVID-19 infections require such a move. Students should pay close attention to class announcements on Canvas for changes to course delivery.

NOTICE/disclaimer: This syllabus is intended to give the student guidance in what may be covered during the semester and will be followed as closely as possible. **However, the instructor reserves the right to modify, supplement and make changes as course needs arise**.