CS 355 Computer Networks • 3 credits • Fall 2017
CRN: 68348 • MW 10:00-11:15 • Dana 318
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Office Location Dana Hall 335 and Skype • Office Hours MW 2:30-3:30 and by appointment

Course Description
This course provides a solid foundation in the design and implementation of a computer network. Topics will focus on network standards and standardization bodies; a layered network architecture; circuit and packet switching; streams and datagrams; physical media and network access; media access and LAN addressing; internetworking and routing; and transport layer services. Also presented are application layer protocols used on the web, file transfer, and electronic mail; and network security including cryptography, encryption, and authentication protocols.

Course Objectives
The goal of the course is to study the fundamentals of interconnecting computers to share 'resources'. We will cover topics such as the OSI reference model, the Internet model, the role of a layered networking architecture, application layer protocols such as http and ftp, transport protocols such as TCP and UDP, congestion control techniques, and error detection and correction at the link layer.
What this course is not - this course is not a course on network administration or network programming. Although we will experiment with packet sniffing and socket programming, we will not be physically connecting computers and will not be doing any extensive network programming. This course focuses on the fundamentals of computer networks which would explain "how things work."

Course Pre-requisites
CS 114 and CS 211

Expectations
Each student is expected to attend classes and take notes. Read the textbook(s) before attending class. Turn in homework, and other assignments on time. Take quizzes and exams as scheduled. The instructor is available for help during scheduled office hours (check "Instructor Information") and also by appointment. Please do not wait until a test to get help. Seek help as soon as possible.
You will need to allocate about **12 hours of your week** towards this course. This time will be used for the following:
* reading the chapters in the text book assigned
* completing activities assigned
* completing homework assignments
* studying for your tests and exams
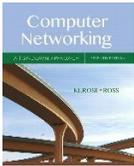
Textbook
Computer Networking: A Top-Down Approach, 7th Edition
James F. Kurose and Keith W. Ross

E-book ISBN: 9780134310954
Hardbound ISBN: 9780133594140
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Software
Download latest version of:
* Python - https://www.python.org/
* Wireshark - http://www.wireshark.org/

CS Computer Account
All CS students have been given a "CS Account". This computer account works in Dana 230 (CS lab) and Dana 318 (CS classroom). The software required for this course are available in these rooms.
* Account credentials:
  o Usernames = First name initial + first 8 characters of last name (ex. John Doe is "jdoe")
  o Passwords = 123456
* If you cannot login, contact the CS system administrators (admins@cs.hartford.edu) with your:
  o First name, Last name, your CS instructor name, and CS course
* There is also a temporary account which is only functional for a couple of weeks into the semester. Please do not store any files in this account and should not be used past the first week of school.
  o Username = 318guest
  o Password = 318guest
The Department Computer Science, as custodian of all information stored on the network, may inspect and/or close an account without prior notice upon any indication of abuse. Account owners must adhere to the computer use policies established by the University of

Hartford. These policies can be found in the conduct section of The Source student handbook. Each account owner is responsible for his or her own account. If any abuse originates from your account you will be held liable.

Reading Assignment Schedule
Subject to Change

			Subject to Change
Week #	**Week Day**	**Date**	**Topics - Read before class**
1	Wed	Aug-30	Syllabus
	Mon	Sep-4	**Labor Day - No Class**
2	Wed	Sep-6	Chapter 1 Computer Networks and the Internet - The Internet; Network edge and network core; Delay, loss, throughput in networks; Protocol layers and service models; Network security; History
	Mon	Sep-11	Chapter 1 continued
3	Wed	Sep-13	**Test 1**
	Mon	Sep-18	Chaper 2 Application Layer - Principles of newtork applications; Web and HTTP; Electronic mail and SMTP, POP3, IMAP; DNS; P2P applications; Video streaming and content distribution networks; Socket programming with UDP and TCP
4	Wed	Sep-20	Chapter 2 continued
	Mon	Sep-25	Chapter 2 continued
5	Wed	Sep-27	**Test 2**
	Mon	Oct-2	Chapter 3 Transport Layer - Transport layer services; Multiplexing and demultiplexing; Connectionless transport: UDP; Principles of reliable data transfer; Connection-oriented transport: TCP; Principles of congestion control; TCP congestion control
6	Wed	Oct-4	Chapter 3 continued
	Mon	Oct-9	Chapter 3 continued
7	Wed	Oct-11	**Test 3**
	Mon	Oct-16	Chapter 4 The Network Layer: Data Plane - Overview of the network layer; Inside a router; Internet Protoco: IPv4 and IPv6; Generalized forward and SDN
8	Wed	Oct-18	Chapter 4 continued
	Mon	Oct-23	Chapter 4 continued
9	Wed	Oct-25	**Test 4**
	Mon	Oct-30	Chapter 5 The Network Layer: Control Plane - Routing protocols (link state and distance vector); Intra-AS routing: OSPF; Routing among ISP: BGP; The SDN control plane; Internet Control Message Protocol (ICMP); Network management and SNMP
10	Wed	Nov-1	Chapter 5 continued
	Mon	Nov-6	Chapter 5 continued
11	Wed	Nov-8	**Test 5**
	Mon	Nov-13	Chapter 6 The Link Layer: Links, Access Networks, and LANs - Link layer services; Error detection and correction; Multiple access protocols; Local area networks: addressing, ARP, Ethernet, switches, VLANs; Link Virtualization with MPLS; Data center networking; A day in the life of a web request

12	Wed	Nov-15	Chapter 6 continued
	Mon	Nov-20	Chapter 6 continued
13	Wed	Nov-22	Chapter 6 continued
	Mon	Nov-27	**Test 6**
14	Wed	Nov-29	Chapter 7 Wireless and Mobile Networks - Wireless links and characteristics; CDMA; IEEE 802.11; Cellular Internet Access
	Mon	Dec-4	Chapter 7 continued
15	Wed	Dec-6	Chapter 7 continued
	Mon	Dec-11	**Review**

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Final Exam - Friday, Dec. 15, 11AM-1PM

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UH Academic Honesty Policy: Strictly Enforced

University of Hartford Academic Honesty Policy

The purpose of the academic honesty policy is to provide a clear statement to students and faculty of the University's expectations regarding academic honesty and to set forth procedures for the enforcement of that policy. The procedures in this academic honesty policy are administrative functions and are not subject to the same rules as in criminal or civil proceedings. Throughout the following policy, the term college refers to any one of the schools or colleges of the University. The term University-wide program refers to programs such as multimedia Web design and development or the Bachelor of University Studies, which do not reside in a college. The term department chair refers to a department chair or, in the case of colleges that do not have departments, the equivalent of a department chair.

- All students are expected to observe generally accepted principles of scholarly writing in all examinations, compositions, papers, essays, tests, quizzes, reports, and dissertations whether written in the class room or outside. Sources of information used by a student in the preparation of work submitted as a basis for credit, or for a grade, or to satisfy graduate or undergraduate thesis requirements shall be clearly indicated in some conventional manner, such as by the use of quotation marks, footnotes, and bibliography.
- Students are forbidden to submit as their own any project, paper, or creative work that is in whole or part the work of another.
- The use of a term-paper writing service is prohibited. Also prohibited is the use of term papers obtained from the Internet, in whole or in part.
- All examinations and quizzes are to be completed without reference to books or notes except when the instructor of a course shall have given explicit authorization for an "open-book examination" or some other specified sort of assistance. Except as authorized by the instructor, no student is to give or receive assistance in the completion of an examination or a quiz.
- Other examples of academic dishonesty include, but are not limited to, the falsification of academic documents, such as transcripts, registration materials, withdrawal forms, or grade reports, as well as the unauthorized reading, removing, or copying of any academic document or record maintained by any member of the faculty or administration.

Your work for this course (assignments, labs, quizzes, tests, exams) must be completed by you - the student - without the help of external sources such as the Internet or a friend. Googling answers online is NOT ACCEPTABLE and constitutes academic dishonesty.

At the first violation of academic dishonesty, the student receives a 0 for the work. On second offense, the student receives an F for the course.

Academic Misconduct: In the event that it is determined that you violated the Academic Honesty Policy, found in "the Source," the dean of your college will be notified and a note will be placed in your permanent file. If previous violations have been filed, any penalty that may be assigned for the offense may be more severe than for a first time offense. If this is the first recorded offense, subsequent violations of the honesty policy may then incur a steeper penalty.

Email & Blackboard

Course materials (announcements, homework assignments, etc.) will be made available through Blackboard at http://blackboard.hartford.edu. Blackboard is to be used as a supplement to class lectures. All important announcements will be made in class. Routine announcements will be made available on Blackboard. However, you are responsible for all announcements and expectations explained in both Blackboard and during class. You are not to rely solely on Blackboard.

Your Blackboard account allows you to personalize your information, including your preferred email account. In your "Blackboard Home Page" on the left frame, there is a "Personal Information" link which allows you to edit your information. It is your responsibility to make sure that the email account set here is the one you check regularly and that the Inbox for that email is not rejecting incoming mail.

Student Illness

The instructor recognizes that students may occasionally become incapacitated by a brief illness or injury and will be unable to attend class or complete a graded assignment or test on time.   In the latter case, you are expected to notify your instructor (in advance if at all possible) that you cannot complete the work due to illness or injury. Following the University of Hartford's Policy of Student Illness as listed on The Source, the student must:

1. visit the University Health Center, a doctor, or hospital for treatment on the day that you are sick and get documentation of the visit,

2. email the instructor in advance (or if not possible, within 24 hours of missed class, test, or assignment) to tell her that you cannot attend (and/or complete work) and that you are seeking or have sought treatment, and

3. as soon as you are able to come to class, bring your documentation of your doctor's visit to your instructor and arrange to make up missed work.

Allowing you to make up missed tests and assignments is at the instructor's discretion. For extended illness (a week or more), email the academic services office of YOUR college or school. Documentation of treatment is required. Do not visit the University Health Center after the day you are sick. They will not issue documentation that you were sick on the previous day.

Participation and Attendance
Students are expected to attend ALL classes and are responsible for missed classes and lecture materials. Again, you are expected to attend every single class during the semester. Additional material will be provided and covered in class as the instructor deems appropriate. Any material and information you miss is your responsibility. No excuses will be accepted for poor grades. If you must be absent from a class, you must let me know either by phone or e-mail and you are responsible for any material covered or homework assigned. Informing me of your absence does NOT excuse you from any work due that day nor permit you to makeup an exam.

Computer and Other Electronic Equipment-use Policy
When classes meet in a room equipped with computers, students are expected to use the computers for the purposes of completing assigned work only. At no circumstances will a student be allowed to surf the Internet, check email during a class, or use the computers for any other purpose. In violation, a student will face serious consequences.
Use of any electronic equipment (or otherwise) that is annoying or disrupting is not allowed in class. Such devices include mobile phones, beepers, PDAs, laptops, among others.

Students with Special Needs
Student athletes and students registered with Access-Ability must inform the instructor of their special needs as soon as possible. This also applies to other students with any other concerns. The instructor will accommodate the student based on their special needs.

Grading
All oral and written work submitted must be of the highest quality. You will be graded on your performance and quality of the work required and not on the amount of time spent nor amount of effort. Any piece of work turned in for a grade is subject to an oral examination and the grade for the work hinges on the result of the student's knowledge, not what is submitted.
Final Grade:
Expect one homework assignment for each chapter covered. With the exception of Chapter 1, expect a test after each chapter. A project will be assigned at the end of the semester to allow students to research and present a topic relating to computer architecture. Final letter grades are assigned as follows:

Assignments - roughly 1 per week	40%
Tests	60%

Final letter grades are assigned as follows:

	87 to 89.99 = B+	77 to 79.99 = C+	67 to 69.99 = D+	
100 to 94 = A	84 to 86.99 = B	74 to 76.99 = C	64 to 66.99 = D	0 to 59.99 = F
90 to 93.99 = A-	80 to 83.99 = B-	70 to 73.99 = C-	60 to 63.99 = D-	

Due Dates: Due dates are to be watched carefully! If you miss an assignment (after 3rd day - see **Homework Policy**) or exam, you are not able to submit the work anymore. This means that you receive a 0 for any missed work.
Pass/No Pass Option Students: Students who are registered with a PASS/NO PASS option must receive a final grade of **65** or better to receive a P.

"My Grades"
Up-to-date grade information is available 24/7 under "My Grades". It also shows your "Weighted Total". This is your up-to-date, cumulative, weighted grade.

Class Participation

Level of participation	Rubric
A	• Actively supports, engages and listens to peers (ongoing) • Arrives fully prepared at every class • Plays an active role in discussions (ongoing) • Comments advance the level and depth of the dialogue (consistently) • Group dynamic and level of discussion are consistently better because of student's presence
B	• Makes a sincere effort to interact with peers (ongoing) • Arrives mostly, if not fully, prepared (ongoing)

	- Participates constructively in discussions - Makes relevant comments based on the assigned reading material (ongoing) - Group dynamic and level of discussion are occasionally better (never worse) because of the student's presence
C	- Limited interaction with peers - Preparation, and therefore level of participation, are both inconsistent - When prepared, participates constructively in discussions and makes relevant comments based on the assigned material - Group dynamic and level of discussion are not affected by the student's presence
D	- Virtually no interaction with peers - Rarely prepared - Rarely participates - Comments are generally vague or drawn from outside of the assigned material - Demonstrates a noticeable lack of interest (on occasion) - Group dynamic and level of discussion are harmed by the student's presence
F	- No interaction with peers - Never prepared - Never participates - Demonstrates a noticeable lack of interest in the material (ongoing) - Group dynamic and level of discussion are significantly harmed by the student's presence

Assignments Guidelines

Expect one or two homework assignments every week.

Work independently All homework assignments are to be worked on independently by each student. Discussions as to what the problem is and very general, top-level solutions are allowed between students. Work may not be copied from another source and will constitute cheating if done so. Any work, or part of your work, that is borrowed from another source must be stated so in the assignment and must be pre-approved by the instructor or preceptor. Failure to do so will constitute plagiarism.   All assignment submitted is subject to an oral examination. Upon the request of the instructor, the student will explain (in person) the work submitted. The grade of the assignment hinges on how well the student knows and understands what was submitted.

Submission Each assignment must be submitted by following instructions posted on Blackboard.   Electronic submissions are due at the end of the day (11:59 pm) on the date due. All assignments must be submitted through Blackboard (View/Complete... link). Do not email your assignment to the instructor; no homework is accepted via email. Similarly, no assignment will be submitted through the Digital Dropbox unless it is pre-approved by the instructor.

Late Penalty Any assignment that is late will receive a deduction of 10% every 24 hours (a day). Work that is more than **3 days late will not be accepted**. Assignments of which answers have been given will also not be accepted. For example, if an assignment is due Friday evening and if you turn it in anytime on Sunday, the grade is deducted 20%; any work turned in after the following Monday will receive a grade of 0.

Test and Examination Guidelines

All tests and exams are closed book exams and typically take the entire class period. Make up exams will not be given except in cases of extremely extenuating circumstances and are pre-arranged.