CSCE 462/862 – Communication Networks

Fall 2018, MWF 2:30PM – 3:20PM
Room 19, Avery Hall

Instructor

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Teaching Assistant

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Description

This course will introduce the students to the architecture of communication networks, a voyage to the heart of our cyber society, revealing the under-the-hood secrets of one of the largest and most complex systems ever engineered: the Internet. We will delve into the fascinating world of the latest internet applications (VoIP, YouTube, Netflix) and see how they actually work. We will uncover the secrets of a transport protocol: how two entities can communicate reliably over a medium that may lose and corrupt data. Then, we will look at how a piece of information (packet) from your home can take an intricate route around the world to go to your friend down the road. We will then study how a many computers connected to the same link can diligently transmit messages without interfering, and how a corrupted message can be restored to its original state through both simple and sophisticated techniques. We will finish by studying how a message is physically propagated between a transmitter and a receiver, and some of the principles of Wireless, Mobile, and Sensor Networks (WiFi, 3G, and 4G), keeping always an eye to everyday practical use cases.

Prerequisites

- Data Structures and Algorithms (CSCE 310/310H) or Data

Structures and Algorithms for Informatics (CSCE 311) or Foundations of Computer Science (RAIK 283/283H, JDEP 283/283H)
- Computer Organization (CSCE 230/230H) or Foundations of Computer Systems (RAIK 284/284H, JDEP 284/284H)
- Statistics/Probability: STAT 380 or ELEC 305 or RAIK 270H

Or consult with the course instructor by email or appointment.

Required Textbook **Computer Networking: A Top-Down Approach**
6th Edition, by James F. Kurose and Keith W. Ross
(ISBN-10: 0132856204 • ISBN-13: 9780132856201)

Optional Textbooks Communication Networks: Fundamental Concepts and Key Architectures
by Alberto Leon-Garcia and Indra Widjaja

Computer Networks
by Andrew S. Tanenbaum, David J. Wetherall

Computer Networks: A Systems Approach
by Larry L. Peterson and Bruce S. Davie

Course Topics
1. Introduction to Communication Networks and the Internet
2. The Application Layer
3. The Transport Layer
4. The Network Layer
5. The Link Layer
6. The Physical Layer
7. Advanced Communication Network Topics
   a. Wireless Networks
   b. Multimedia Networking

Course Organization
- **TWO Exams**
  o Midterm Exam
  o Final Exam
- **4 Homework Assignments**
  o To be solved individually
- **2 Programming assignments**
  o Based on the ns-3 simulation environment
  o To be solved individually
  o Will help you consolidate the concepts seen in class in a more practical and engaging way
- **Course Project (optional for undergrads)**
  o Create small projects using simulators, code etc. applying the theory learned in class

<div align="center">**or**</div>

- o Term papers on a hot topic of recent interest in the field
- o To be worked on by **groups of 2-3 people (for project)** and **individually (for term paper)**
- o Will help you consolidate the concepts seen in class in a more practical and engaging way

Grade Distribution	**Graduate Students:** • **Pretest and Quizzes (in class):** 10% • **Homeworks Assignments**: 30% • **Project or Term Paper**: 15% • **Midterm Exam**: 20% • **Final Exam**: 20% • **In-class Participation and Professionalism**: 5% **Undergraduate Students:** • **Pretest and Quizzes (in class):** 10% • **Homeworks Assignments**: 35% • **Midterm Exam**: 25% • **Final Exam**: 25% • **In-class Participation and Professionalism**: 5% For undergraduate students who turn in the course project, the final grade will be the best between the two distributions
Attendance Policy	Although attendance is not strictly enforced, the instructor will periodically check the class attendance with an attendance sheet. If not properly justified, repeated absence from the class lectures will impact the "In-class Participation and Professionalism" scores.
Additional Materials	All the following additional materials will be available in Blackboard Learn: • Lecture notes • Additional reading resources • Homework assignments • Laboratory Project task assignments and software
Homeworks	Homework submissions will be through **Canvas**. Late homework is penalized 10% per day, and no homework will be accepted after the solution is posted online
Attendance	Attendance at all officially scheduled class meetings (class and lab sections) is expected. Students are responsible for knowing

all material discussed in class meetings. Changes to class and lab schedules and assignments will be announced in class or lab.

Academic Integrity	All homework assignments, quizzes, exams, etc. must be your own work. No direct collaboration with fellow students, past or current, is allowed unless otherwise stated. The Computer Science & Engineering department has an **Academic Integrity Policy**:

http://cse.unl.edu/ugrad/resources/academic_integrity.php

All students enrolled in any computer science course are bound by this policy. You are expected to read, understand, and follow this policy. Violations will be dealt with on a case-by-case basis and may result in a failing assignment or a failing grade for the course itself. |
Students with Disabilities	Students with disabilities are encouraged to contact the instructor for a confidential discussion of their individual needs for academic accommodation. This includes students with mental health disabilities like depression and anxiety. It is the policy of the University of Nebraska-Lincoln to provide individualized accommodations to students with documented disabilities that may affect their ability to fully participate in course activities or to meet course requirements. To receive accommodation services, students must be registered with the Services for Students with Disabilities (SSD) office, 232 Canfield Administration, 472-3787.
Suggestion Box	The CSE Department has an **anonymous suggestion box** (http://cse.unl.edu/department/suggestion.php) that you may use to voice your concerns about any problems in the course or department if you do not wish to be identified.
Stay Up-to-date	It is CSE Department policy that all students in CSE courses are expected to regularly check their email so they do not miss important announcements.
CSE Resource Student Center	The CSE Student Resource Center (Avery Hall 13A) is intended to provide UNL Computer Science and Computer Engineering majors who are new to the program with a set of resources that will help them assimilate to college life and encourage them to continue their study of Computer Science and Computer Engineering (http://cse.unl.edu/src).

This syllabus will be updated and expanded as the semester progresses.