1 Administrative Information

- Instructor: Chien-Chung Shen
  Contact Information: 450 Smith Hall <cshen@udel.edu> 302-831-1951
  Office Hours: Friday 2 pm – 4 pm and by appointment
  (Any changes will be announced in class, and via UD POBox.)

- TA: Xuanzhang Liu <xzliu@udel.edu>
  Office Hours and Room: Wednesday 1 pm – 3 pm @ 102A Smith Hall

- Class Meeting Time and Room: TuTh 9:30 am – 10:45 am @ Purnell Hall (PRN) 328

- Course Website: http://www.cis.udel.edu/~cshen/650


- Recommended Texts:

2 Course Statement

Computer networks is an area of great practical importance. Nearly every one of us makes use of networks on a daily basis, often without a second thought about the details of operations, and the influence of computer networks on our lives is likely to continue growing over at least the next decade. Computer networks is also a very large subject, and no single course can make you an expert.

This course is an introduction to the principles and practice of computer networks. It intends to provide you with the background required for further study in the areas of networking and telecommunications, as well as practical understanding that will help you get a great job. The coverage is broad in scope, from end-to-end applications and services down to internetworking and medium access control.

A network is viewed as a hierarchy of layers, or abstract machines. Each layer uses services offered by lower layers to in turn provide enhanced service to the next higher layer. These layers form a protocol suite. Our focus is on protocols and mechanisms used in the Internet’s TCP/IP protocol suite, including the design and operation of both wide-area and local-area networks.

Specific topics include: introduction (Internet architectures, packet vs. circuit switching, multiplexing, delay/loss/throughput in packet-switched networks, protocol layering and service models);
application layer (Web and http, email, DNS, socket programming); transport layer (TCP, UDP, connection management, end-to-end reliable data transfer, sliding window protocols, flow control, congestion control); network layer (data plane and control plane, software-defined networking (SDN), IPv4, IPv6, internetworking, NATs, link-state vs. distance-vector routing, intra-AS routing, routing among ISPs, ICMP, network management); link layer (local area networks, Ethernet, switches, framing, error control, CRC checksums, data center networking). The course will also have hands-on assignments using Wireshark to ‘sniff’ and analyze real Internet traffic.

3 Student Background

- (required) programming skills (Python and C/C++) with a clear appreciation and understanding for modular, well-documented code.
- (recommended) undergraduate courses in computer architecture and operating systems
- (recommended) knowledge of basic probability and statistics
- (recommended) working familiarity with Unix
- (recommended) understanding of finite state machines

I expect that you are here to learn, and are willing to work hard on it.

4 Work Requirement

During the semester, you are responsible for completing the assigned readings, homework assignments, programming assignments, Wireshark assignments, the midterm exam, and the final exam.

1. Readings
   - It is highly advised that you purchase the textbook for the class.

2. Homework Assignments (in groups of at most two students)
   - Homework assignments are based on readings and class discussions. They should be submitted via Canvas. Late homework assignments will not be graded.

3. Programming and Wireshark Assignments (in groups of at most two students)
   - Programming and Wireshark assignments should be submitted via Canvas. They will be described in more detail in later handouts. Late programming and Wireshark assignments will not be graded.

4. Exams
   - Midterm exam - 3/26 (Thursday) in class
   - Final exam – May 26 (Tuesday), 1 pm - 3 pm, in PRN 328
   - Exams will be based on course readings, class discussions, homework assignments, Wireshark assignments, and programming assignments. All exams are open notes with one sheet of letter size paper. No smartphones, tablets, or laptops are allowed.
Attendance is not obligatory. However, important administrative information (about exams, assignments, and policies) may be communicated only in the lecture. Furthermore, the lectures may contain material not contained in the text, and the exams may test material covered both in the lecture and in the text. It is therefore recommended that you attend the lectures. If you do happen to miss a session, you are responsible for finding out what material was covered and if any administrative announcements were made.

5 Grading

- Final scores will be determined using the following formula:
  
  15% Homework Assignments  
  10% Programming Assignments  
  14% Wireshark Assignments  
  25% Midterm Exam  
  36% Final Exam

Final grades indicate absolute performance, and hence will be determined according to the following table.

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<th>Grade</th>
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<td>A</td>
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<td>A-</td>
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<td>B+</td>
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<td>B</td>
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- I will not assign incompletes unless it is for a documented medical reason.

6 Academic Honesty

The homeworks, Wireshark projects (except for the first Wireshark Introduction project), and the socket programming assignment in Python and C/C++ should be done in groups of at most two students. No groups of three are permitted. If your schedule does not permit you to work with a partner, or you cannot find a partner, then you will have to work alone. Students should not divide an assignment where one does half of the questions and the other does the other half. Students should not divide up the assignments where one does half of them and the other does the other half.

By putting your name on your submission, you are claiming that you were a full participant in doing the work that resulted in your submission. If your lab partner writes the solution without your participation, you are engaging in academic dishonesty by including your name on the submission. If your lab partner writes the solution without your participation, and it turns out that your lab partner engaged in academic dishonesty, you will also be liable for academic dishonesty if your name is included on the solution. Be sure to understand what is submitted, and have no doubts about its origin. If you did not participate in, or do not understand the solution being submitted, remove your name or do not submit it. To earn full credit on an assignment, each student is responsible for the full understanding of all group solutions.

Discussion with others to better understand material from class or the text, or to better understand general programming concepts is encouraged. Those discussions should end when writing your specific solutions. Prior to submitting an assignment, students in one pair are prohibited from accessing or comparing assignment answers with those of any other people. Students may
not use any web site that contains answers. Comparing answers before submitting one’s work, or getting answers off the web is considered academic dishonesty. Anyone that provides answers to another group is also guilty of academic dishonesty. Both will be prosecuted in accordance with the University’s Policy on Academic Honesty.

If you do not have time to complete an assignment, submit a partial solution.

7 Laptops, Tablets and Cell Phones

I love my job teaching at UD, and promise to work extremely hard to make this class exciting and challenging. In return, I expect your full attention in class. I believe cell phone texting and the use of a laptop or tablet for doing other class assignments, reading email, playing video games, visiting Facebook, etc., while someone is working to educate you is as rude as it gets, and I will be personally offended. At the beginning of class, turn off your cell phone, and close unrelated applications on your laptop. If you believe this policy is too severe, please take the course from another professor. Thank you.