Network Engineering

CMPE210   3 Credits

Weekly Schedule:

Face-to-Face, Thu 12:30p 1:45p, MCT164[1]

On-line lectures will be available through D2L and can be viewed asynchronously

Instructor:

Dr. Thomas Briggs

Office Hours: Mon 1-2, Tues 2-4, Wed & Thu 9-10.

All office hours through Zoom: https://ship.zoom.us/j/5554771354

Phone: (717) 477-1354   Email: tbriggs@engr.ship.edu Google Hangouts & Zoom Chat

Textbook & Materials:

- Kurose & Ross, Computer Networking

Course Objectives:

Students who complete the course will be able to:

Objective
Use network analysis tools to capture, dissect, and analyze network traffic to determine overall characteristics and individual stations.
Identify the different network layers, their characteristics and limitations; and how different applications make use of those layers.
Describe congestion management protocols and how to determine that they are being used
Describe important network protocols for local (LAN) and wide-area (WAN) communications
Determine the proper internet subnetting and critical addresses for a set of specifications
Implement a firewall, router, and switch to meet a given set of rules
Describe how wireless protocols such as WiFi, CDMA, and GPRS enable multiple devices to communicate while sharing bandwidth
Describe how different classic encryption algorithms are used, how they protect data, and what their critical vulnerabilities are.
Build a windows file server and determine performance bottlenecks due to the network, operating system, and hardware.
Describe relevant IEEE standards; as well as FCC and PA building codes that apply to installation of physical networks
Perform requirements analysis for a given network engineering problem,

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[1] If the situation changes and we move to fully on-line classes, this time will remain synchronous, but will be through Zoom.

Design a solution using hardware and software to meet those requirements,
Implement the network, including a gateway/router, switches, and stations,
Analyze the performance to verify that the designed solution meets the initial requirements

ABET Program Educational Objectives Supported in This Course

Student Outcomes (Engineering)

Out-come	Goal
2	70% of students will earn 70% or higher on the final project that demonstrates their ability to analyze, design, build, and test a network. The requirements will include health and safety (applicable codes), environmental factors (physical installation and security), and economic factors (costs)
4	Goal: 70% of students will earn 70% or higher on a paper describing the role of ethics in network engineering on topics such as including back doors in networks, using network encryption that has government backdoors, or Google's zero-firewall approach.

Tentative (optimistic) Schedule

Week	Dates	Topics	Activity
1	**8/17**	Intro	Read Ch 1
2	**8/24**	Application Layer	Read Ch 2
3	**8/31**		
4	**9/7**	Transport Layer	Read Ch 3
5	**9/14**		
6	**9/21**	Network Layer	Read Ch 4
8	**9/28**		Read Ch 5
9	**10/5**		
10	**10/12**	**Link Layer**	Read Ch 6
11	**10/19**		
12	**10/26**	Wireless & Mobile	Read 7
13	**11/2**	Security	Read 8
14	**11/9**		
15	**11/16**	**Multimedia**	Read 9

Schedule is tentative, and is a major departure from previous years due to the COVID pandemic. This schedule will certainly change in response to conditions.

Grading

I use a *weighted average* to calculate my grades. Here are the categories and weights:

  Homework - 30%
  Projects - 30%
  Midterms - 25%
  Final Exam - 15%

I follow the standard letter grade assignment:
  A – 90%-100%
  B – 80%-89%
  C – 70% - 79%
  D – 60% - 69%
  F – 0 – 59%
  +/- assigned based on overall performance within grade category

Any curves will not be assessed until the end of the semester, and will be applied based on relative performance of the whole class. Grades will never be curved downwards.

Course Policies

As a general statement of intent: I want to provide an experience that is as close to "normal" as possible while preserving everyone's safety. If you have <u>any concerns</u> please talk to me, I am trying to err on the side of caution, and if I've missed something I do not want you to feel like you are taking risks to complete this class – and I certainly do not want you to actually suffer actual harm!

<u>COVID Policy</u> - In-person attendance is **optional for all students**. Every synchronous meeting will have a Zoom option. Students who wish to attend in-person need to follow all University mandated safety precautions. We have been advised that we cannot record the synchronous Zoom sessions(!), so plan to attend in one way or another. Let me repeat and be clear: This class can be completed 100% remotely.

<u>Late Work</u> - Work must be submitted into a designated drop box by the published due-date. Work that is late will be accepted with the following penalty: within 24 hours of due date: 10% penalty, 24-48 hours after due date: 30%, after 48 hours, not accepted. **THERE WILL BE NO EXCEPTIONS.** *I will not accept any paper assignments from students – no exceptions.*

<u>Plagiarism</u> – Students are expected to do their own on each assignment (unless the assignment is explicitly a group project). Plagiarism will not be tolerated and will result in failing grades for the assignment or other penalty according to the University's policy described in the student handbook. If you

are so desperate to pass a class that you resort to cheating, why don't you turn that desperation into motivation and try knocking on a professor's ~~door~~ zoom room and asking for help and learning instead.

<u>Office Hours / Open Door Policy</u> – All faculty are contractually obligated to offer 5 hours of office hours on three different days per week. In a normal semester, I would offer my "open door" policy and invite you to drop in whenever you have a question. Instead, I will offer my Zoom session, certainly, during office hours, but also outside of office hours, I'll try to keep my Zoom session turned on and available for questions. This was one of the best aspects of remote learning from last spring – there were days I was helping students from 8am – 8pm. I really like being able to share screens and talk about your code – its helpful that I can see what you're seeing or even take control of your keyboard and fix the problem for you. If we put some effort into this, we can have a productive semester. The one caveat I have is that I have 4 courses and about 120 students across them this semester. Just remember that I'm trying to help everyone!

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Code of Conduct

Civil classroom behavior is demonstrated as part of our shared classroom culture. Your active participation is needed to establish and maintain a positive classroom climate for the success of all students in this course. These positive behaviors are reflective of the University's core values of respect, responsibility, and integrity.

Below are some examples of productive and disruptive classroom behavior. To ensure a civil and engaging environment for everyone in this course, please do your part to demonstrate the productive behaviors and avoid the disruptive behaviors. Disruptive behavior can have negative consequences for students, including a referral to the Office of Student Conduct for disciplinary action. Information related to the Office of Student Conduct can be found at <u>dean of students</u>. Please review the information below and the behavior standards outlined in the <u>student code of conduct</u>.

(cont'd)

Productive behavior in this class includes:
- Wearing your mask, observing social distancing protocols, and following all provisions of the <u>COVID-19 Policy</u>
- Regular class attendance
- Arriving to class on time
- Completion of readings or other assignments on time
- Thoughtful participation and active involvement during class time
- Engaging with classmates about class material
- Respectfully interacting with professor and your classmates

- Engaging in conversation in a civil manner when contested issues are discussed
- Following all university and classroom expectations, including behaviors outlined in the <u>student code of conduct</u>

Disruptive behavior in this class includes:

- Sleeping
- Using a phone
- Disrespectful, abusive, or intimidating comments
- Interruptions of the professor or your classmates
- Blatant cheating, particularly during an examination or quiz
- Personal conversations between classmates
- Non-compliance with university expectations, <u>COVID-19 policy</u>, expectations outlined in the syllabus, <u>student code of conduct</u>, and/or expectations verbally covered in class

Title IX (mandatory syllabus statement)

Shippensburg University and its faculty are committed to assuring a safe and productive educational environment for all students. In order to meet this commitment and to comply with Title IX of the Education Amendments of 1972 and guidance from the Office for Civil Rights, the University requires faculty members to report incidents of sexual violence shared by students to the University's Title IX Coordinator.

The only exceptions to faculty member's reporting obligations are when incidents of sexual violence are communicated by students during classroom discussions, in writing assignments for class, or as part of University-approved research projects.

Faculty members are obligated to report allegations of sexual violence or any other abuse of a student who was, or is, a child (a person under 18 years of age) when the abuse allegedly occurred. Such reporting must be made to the Shippensburg University Police (717) 477-1444, the Department of Human Services (DHS) at 800-932-0313, and the University's Office of the Vice President of Enrollment Management, Student Affairs and Student Success (717) 477-1235. Information regarding the reporting of sexual violence and the resources that are available to victims of sexual violence is set forth at the following <u>Equity, Inclusion and Compliance.</u>