CMSC 711 — Computer Networks
Spring 2024

1 General

Instructor:	Bobby Bhattacharjee (`bobby@cs.umd.edu`)

Class meets:	12:30pm – 1:45pm Tuesdays and Thursdays, KEB 1200
	https://umd.zoom.us/j/94431624927?pwd=ZUVuNS9CN3ZCRm52UHVDM1dEcnZkUT09
Office Hours:	By Appointment

Class web site:	`http://www.cs.umd.edu/class/spring2024/cmsc711`
Forum:	`https://piazza.com/class/lrqlsy8h9jb5no/`

2 Course Summary

This course will cover the principles of wide-area networking with a focus on protocols, implementations, and issues specific to the Internet. We will emphasize distributed protocols that scale to Internet-wide deployment. We will cover papers in a variety of topics including user privacy, wireless protocols, peer-to-peer protocols, network coding, and network security.

As a part of the course, you will selectively implement new protocols and network services. This course *will* have a substantial programming component. As part of your final project, you will have to produce a document that resembles a research paper. You will be graded on your execution of the work, as well as your presentation.

3 Expectations: Background

The pre-requisite for this course is full graduate standing and CMSC 417/412, the senior undergraduate-level computer networks and OS courses. As such, **I expect you to (a) already understand the basics of computer networks and (b) have experience in implementing non-trivial systems projects.** If you have not taken CMSC 417, then, minimally, you should have taken a course that has introduced you to the basics of internetworking: protocol layering and peering; the ISO seven-layer model; rudiments of IP and related protocols such as TCP, UDP, and ICMP; routing protocols and the domain-naming system. You should already know what RFCs and Internet-Drafts are, and have some practice in the art of reading and getting information out of RFCs and Internet-Drafts.

The subject matter covered by this course is broad and it will be impossible to lecture on every topic in detail in class. Thus, along with material covered in class, you will be responsible for material not covered in class as well. I expect you to be able to read and assimilate substantial amounts of material outside class. Exams will emphasize material covered in class, but will also include assigned reading (not explicitly covered in class).

Expectations: Postcondition

This is a course that is designed prepare you for systems research in networking. If you are not interested in networking research, you might still want to take this course if you want to get a broad systems background, and understand current research issues in this area.

After attending the course, I expect you to be able to:

- Read a research paper in networking and systems and understand the bulk of its content

- Understand the principles behind the Internet protocols

- Understand the limitations of the current Internet and its service model

- Understand the main ideas behind some of the current innovations in networking, including overlay protocols, and network security protocols

- Design, implement, and test substantial parts of network protocols

4 Reading

There is no required textbook for this course. You can look at any computer networking textbook for background and reference. These include (but are not restricted to):

- *Computer Networks: A Systems Approach* by Larry Peterson and Bruce Davie, Morgan Kaufman, 5th Edition, 2011. ISBN 978-0123850591

- *Computer Networking: A Top Down Approach Featuring the Internet* by Jim Kurose and Keith Ross, Addison-Wesley, 5th edition, 2009. ISBN: 978-0136079675.

- *TCP/IP Illustrated volume 1* by W. Richard Stevens. Addison-Wesley. ISBN: 0-201-63346-9.

- *TCP/IP Sockets in C: A Practical Guide for Programmers* by Jeff Donahoo and Ken Calvert, Morgan Kaufmann, 2nd edition, 2009. ISBN 978-0123745408.

I will also ask you to look at classic RFCs and current Internet-Drafts. These are available from `http://www.rfc-editor.org` and `http://www.ietf.org` respectively.

The majority of the class will be taught using papers in the reading list available off of the class web site.

The initial reading list on the web is a good approximation of the papers we will cover. However, I expect the reading list to morph during the semester. So, please don't print out all (any) of the papers right in the beginning unless you intend to read them all.

> Please understand that you will have to read a *lot* of papers for this course. Please get in the habit of reading papers early and coming to class prepared with questions. The reading assignment is substantial, and papers often build on each other, so if you fall behind, it will be difficult to catch up.
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> I expect you to read the *Required* papers completely, and have good working knowledge of the material in those papers. There will typically be two or three *Required* papers per lecture. I expect you to skim the *Optional* papers, know the

basic ideas and how they differ from the *Required* papers. You do not need to know the details of the proposed algorithm or system for the *Optional* papers. Finally, the *Active* papers will change over the semester, and mark the papers we're currently discussing.

I am not going to grade you every lecture on whether you've read a paper or not; nor will I make you write comments on every paper you've read. However, this is not a license for you to not read the papers. This is a graduate course, and reading the papers is your primary responsibility. I expect you to keep up with, and indeed be ahead of, the material I cover in class.

5   Getting Help

You are welcome to come by at my office any time after making an e-mail appointment. Please remember to put the string `CMSC 711:` in the subject line of your e-mail.

6   Grading

The grading allocation is given below and *is subject to change.*

Project	35%
Homeworks, Midterm(s) and Final	40%
Class Participation	25%

This allocation is subject to change. Any extra credit will only apply to its *category*, i.e., project extra credits cannot make up for poor exam scores.

Class attendance is not mandatory. You will, however, be responsible for all material covered and assigned in class. The class participation points are to motivate you to speak up in class and to post on the course blog.

7   Policy and Academic Honesty

- Please turn assignments in *on time*. Unless previously negotiated, you will receive no credit for work that is not turned in on the *day and time* it is due. The only exception is for excused absences as defined by the university (Section V-1.00(G) of the Consolidated USMH & UMCP Policies and Procedures Manual).

- Do not miss exams. Unless previously negotiated, you will receive zero credit for missed exams. Once again, the only exception is for excused absences as defined by the university.

- Please read and understand the UMCP code on academic integrity (Section III-1.00(A) of the Consolidated USMH & UMCP Policies and Procedures Manual `http://www.president.umd.edu/policies/iii100a.html`.) Do not violate it. It is not worth your time (or mine) to be here if you do.