Data Communications/Internetworking
CS 444 (4802) - CS 544 (4840)
Spring 2011/2012

Class Meetings:

Mon, Tue, Thu, Fri: 2:10pm – 3:00pm
ARC 315

Instructor:

Dr. Shawn Ostermann

Office:	Stocker 153 – 59-31482
Office hours:	Mondays at 3-4 (tentative) Many times by appointment (email hanningj@ohio.edu or phone 59-31482) Any time through email
Email address:	`ostermann@ohio.edu`
WWW class information:	`http://ace.cs.ohiou.edu/~osterman/class/cs544.html` `http://blackboard.ohio.edu`

Examinations:

We will have 2 exams; each exam is cumulative and closed book. My exams consist of short answer, long answer, short (easy) programming, and long (hard) programming. The exams are scheduled as follows:

Midterm Exam	**Thursday, April 26, in class (tentative)**
Final Exam	**Wednesday, June 6th, 2:30pm**

Other Important Dates:

Monday, April 9	Last day to add, change a class
Monday, April 30	Last day to drop a class
Monday, May 28	Memorial Day observed, no class
Friday, June 1	Last day of class

Required Text:

"Internetworking with TCP/IP - Volume I - Principles, Protocols, and Architecture (Fifth Edition)"
Douglas E. Comer
Prentice-Hall, Inc. 2006

Helpful References:

Networking

"Data and Computer Communications - Any Recent Edition
William Stallings
"TCP/IP Illustrated, Volume 1 - The Protocols - Any Recent Edition"
W. Richard Stevens

Operating Systems

"Operating System Concepts - Any Edition"
Silberschatz and Galvin, Addison Wesley

Email:

I will often send important announcements, project updates and corrections via electronic mail. To simplify mail list management, all email will go through your oak email accounts. If you don't regularly use that machine, I recommend that you have your email forwarded from there to a department machine. Please get into the habit of checking your email regularly.

Attendance:

I expect students to attend each class and I hold them responsible for all material discussed. Some of the class material will not be in your textbook. In addition, class participation is included as part of your final grade. You will only be allowed to make up work missed due to participation in authorized University activities or due to other legitimate absences as defined in the Undergraduate Catalog.

Course Material:

This class will cover material from the first half of the text and assorted later chapters as time permits. The emphasis in the class will be on TCP/IP protocols, which are the most widely used protocols on current networks; other protocols may be discussed as appropriate.

Grading:

Grades for this class will be based upon examinations, quizzes, homework, and programming projects. Because this is a dual-level class, graduate students will be held to higher standards. Grade weightings are as follows:

50% Examinations (25% Midterm, 25% Final)

50% Programming projects (4-6 projects)

To **earn** an "A" you need 90%, to **earn** a "B" you need 80%, to **earn** a passing grade ("C") you need at least 70%. I reserve the right to curve this scale downward *iff* necessary at the end of the quarter; undergraduates will be graded on a lower curve than graduate students. In addition, **to receive a passing grade, you must turn in <u>all</u> programming projects.**

Late Policy:

I always try to provide an adequate amount of time in which to complete assigned class projects, typically 1 to 2 weeks. Because assignments that are turned in late interfere with grading, allow students to fall behind in class, and interfere with my ability to discuss the projects in class, I discourage late assignments with a late penalty, as follows:

1. All projects are due at the **beginning** of class on the due date.
2. Projects that are turned in one day late (defined as the first class period following the class period in which they were due) will have 10% of their total value deducted as a late penalty.
3. Projects which are turned in two classes late will have 25% of their total value deducted as a late penalty.
4. Projects which are turned in three classes late (or later) will have 50% of their total value deducted as a late penalty.

The key to passing this course is to complete all projects and turn them in on time!!!

Programming Environment:

Projects for this class will use the Unix environment. Your most convenient access to the project environment may be to use the Sun workstations in Stocker 301, or the lab in Stocker 107. Because the machines that you need to access are all on the network, however, you can work from any location with Internet access.

Copyright:

Academic Conduct:

All work is to done individually unless specific team projects are assigned. Cheating on examinations, submitting work of others as your own, or plagiarism in any form will result in penalties ranging from loss of credit for a project to expulsion from the University, depending on the severity of the offense. **I am very serious about this continuing problem problem in my classes and promise that I will deal harshly with cheaters with no further warning.**

Student Outcomes vs. Course Learning Outcomes:

In this course, you will learn:

A: An Ability to Apply Knowledge of Math, Science and Engineering

- A basic understanding of the "host to router to router to host" forwarding model.
- A detailed understanding of Ethernet.
- An understanding of CSMA/CD details.
- A detailed understanding of RIP
- A detailed understanding of the concept of a routing table and how it is used.
- A fundamental conceptual understanding of grouping physical networks to build virtual networks.
- A basic understanding of other internet technologies and the ability to compare and contrast with IP.
- A detailed understanding of hardware addresses.
- A detailed understanding of IPv4 addresses, subnet masks, and addressing notations.
- A detailed understanding of the causes of packet un-reliability.
- A detailed understanding of the mechanics of the UDP protocol.
- A detailed understanding of the mechanisms used to provide reliability over an unreliable infrastructure.
- A detailed understanding of the port-based addressing model.
- A detailed understanding of the TCP protocol.
- A general understanding of congestion control.
- A general understanding of OSPF, BGP, hello, and other routing protocols.
- A general understanding of sliding-window protocols.
- An ability to design experiments concerning the TCP protocol and congestion control algorithms and to analyze and interpret the resulting data.
- An ability to debug a complex computer network coded by the student and to find and solve routing problems
- An ability to design data structures and algorithms to efficiently analyze, correlate, and search a large number of network packets to group them into various levels of granularity.
- An ability to understand dynamic data structures by creating ARP tables, Routing tables, and CAM tables
- A detailed understanding of electronic mail.
- A detailed understanding of the FTP protocol.
- A detailed understanding of WWW protocols.
- A general understanding of TELNET/RSH/SSH.
- A thorough appreciation for the security implications of using the Internet unsafely.
- A thorough grounding in the ethical responsibilities involved when one debugs and monitors networks.