

ECE 455/555 - Network Engineering and Design

Spring Semester 2009

COURSE OUTLINE

Instructor:	Manish Wadhwa
Office:	Kaufman Hall, Room 232
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Lectures:	Monday, Wednesday, Friday 10:00 – 10:50 am (OCNPS 200)
Office Hours:	MWF, 10:50 am – 12:10 pm (Kaufman Hall-232)
Prerequisites:	ECE 355 or an equivalent math or statistics course covering basic probability theory
Textbook:	“Computer Networking: A Top-Down Approach,” J.F.Kurose, K.W.Ross.
Reference Book:	“Computer Networking with Internet Protocols and Technologies,” William Stallings, Prentice Hall, 2004.
Class webpage:	www.blackboard.odu.edu

COURSE GOALS: To introduce students with technical backgrounds to the major concepts, evolution trend, architecture, standards, technologies, design, and performance evaluation of telecommunication and computer networks. Also, to open the students up to the new areas of research that are burgeoning rapidly.

COURSE OBJECTIVES: When a student completes this course, s/he should:

- Understand a broad range of telecommunication and computer network terminologies and technologies
- Understand the meaning and power of a layered architectural model.
- Understand different networking technologies that help in understanding the basic network engineering and designing.
- Understand major network performance issues and be able to analyze the performance of basic LAN
- Understand the network security issues.
- Understand the scheduling and policing mechanisms in networking.
- Learn the usage of network protocol analyzer Wireshark.

ASSESSMENT OBJECTIVES:

- An ability to identify, formulate, and solve computer engineering problems.
- An ability to communicate technical ideas effectively in writing and speaking.

Grading

The grading will be based on two written exams (one midterm, one final), several homework problem sets, lab one Wireshark assignment, presentations and term paper reports and overall participation. The final grade will be determined by weighing each component as follows:

- 1 Term Paper: 40 %
- Homework and 1 Wireshark Assignment 15 %
- 1 Final exam: 20 %
- 1 Midterm exam: 15 %
- 5 Presentations 10 %

Make-up Tests and Late Assignments

Late homework and papers and make-up exams will not normally be permitted. I will give appropriate consideration to documented emergencies, but such arrangements must be made *prior to the due date* in any situations where the conflict is foreseeable.

Honor Code

All students are expected to abide by the ODU Honor Code. This means that all exams and assignments are to be the exclusive work of the student. An honor pledge will be required on all work, which is to be graded. For more details on the ODU honor code, refer to the Honor pledge posted on the course web page.

Homework and Lab Assignment

There will be several assignments during the semester, each weighted equally. You will have one week to work on each of the assignments. While the students are encouraged to discuss the problems, each individual should prepare their own answers. Any violation of this rule will be considered as cheating and will be dealt with accordingly. Lab assignment involves using Wireshark, a network analyzer to experiment with networking protocols.

Presentations and Report

Since we are going to adhere to Assessment Objectives as given above, students will be asked to present relevant topics related to assessment objectives in the form of term paper. More information will be provided in class.

Class Participation

As a student enrolled in this class, you are expected to take an active role in the class. It does not necessarily mean that you ask questions frequently just to make your presence felt. However, when you do have a genuine question, or would like to share your networking experience in a related topic being discussed in the class, consider sharing your thoughts. Whenever I feel that a question being asked is irrelevant to the topic or if it will be answered in future, I shall postpone answering it to a later date. Sometimes, I may discourage questions or defer answering them due to time constraints. I will be monitoring your individual participation (in class and out of class) throughout the semester and allocate points at the end.

Tentative Schedule:

Week 1: Jan 12, 14 and 16

ECE 355: A Revision

- Switching – Packet and Circuit
- *TCP/IP* Protocol Architecture
- Internet Protocol - IP
- Routing Principles
- Term Papers are Assigned (Individual Work)

Week 2: Jan 19, 21 and 23

- TCP
- **Jan 21: Presentation of your term paper plan**
- **Jan 23: 2 Page term paper plans are due**

Week 3: Jan 26, 28 and 30

- TCP cont.
- Submit 20 references that will be studied; 15 will be recommended by the instructor.

Week 4: Feb 2, 4 and 6 (PRESENTATIONS-1)

- Presentation of your term paper progress.

Week 5: Feb 9, 11 and 13

- Ethernet
- Broadcasting and Multicasting

Week 6: Feb 16, 18 and 20

- Wireless and Mobile Networks

Week 7: Feb 23, 25 and 27 (PRESENTATIONS-2)

- Presentation of your term paper progress

Week 8: Mar 2, 4 and 6

- Wireless and Mobile Networks cont.
- **Mid-term exam: Mar 4**
- Wireshark Project will be Assigned

Week 9: Mar 9, 11 and 13

- No Class

Week 10: Mar 16, 18 and 20 (PRESENTATIONS-3)

- Presentation of your term paper progress

Week 11: Mar 23, 25 and 27

- Wireless and Mobile Networks cont.

Week 12: Mar 30, Apr 1 and 3 (PRESENTATIONS-4)

- Presentation of your term paper progress

Week 13: Apr 6, 8 and 10

- **(Apr. 6) - Wireshark Project Due**
- Network Security

Week 14: Apr 13, 15 and 17 (PRESENTATIONS-5)

- Presentation of your term paper progress
- **April 17 – Term Paper due (email submission before midnight)**

Week 15: Apr 20, 22 and 24

- Network Security cont.

Week 16: Apr 27, 29

- Scheduling and Policing Mechanisms

May 4

- **Final Exam (8:30-11:30 AM)**