

ECE 355 Introduction to Networks and Data Communications

Fall Semester 2010

COURSE OUTLINE

Instructor:	Manish Wadhwa
Office:	Kaufman Hall, Room 232
Phone:	757-683-3470
Fax:	757-683-3220
E-mail:	mwadhwa@odu.edu
Lectures:	Monday, Wednesday, Friday 10:00 – 10:50 am (CONST 1008)
Office Hours:	MWF, 10:50 am – 12:10 pm (Kaufman Hall-232)
Prerequisites:	ECE 304 or an equivalent math or statistics course covering basic probability theory
Closely Related Courses:	ECE 455/555 and ECE 742/842
Textbook:	“Computer Networking with Internet Protocols and Technologies,” William Stallings, Prentice Hall, 2004.
Reference Book:	“Computer Networking, A Top - Down Approach,” J. F. Kurose, K.W. Ross, Addison Wesley, 4 th Edition.
Class webpage:	www.blackboard.odu.edu
Grader:	Changlong Chen
Grader Email:	cchen019@odu.edu
Grader Office Hours:	Tuesday, Thursday, 11:00 a.m.-12:30 p.m. (KH – 232)

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.

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

- Understand a broad range of telecommunication and computer network terminologies and technologies.
- Be equipped with the basic knowledge of data communication fundamentals critical for designing, selecting, or integrating these network technologies.
- Understand circuit switching and packet switching technologies and their pros and cons with respect to different traffic types.
- Be able to calculate transmission, propagation, and queueing delays.
- Understand the meaning and power of a layered architectural model.
- Be able to apply and implement different types of addressing and routing techniques to be able to build basic probability models of network phenomena.

- Understand major network performance issues and be able to analyze the performance of basic LAN.
- Be able to explain Internet addressing, naming, congestion control, and QoS.

ASSESSMENT OBJECTIVES:

- An ability to apply knowledge of mathematics, science, and engineering.
- An ability to identify, formulate, and solve electrical engineering problems.

Grading

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

- Final exam: 30%
- Midterm exam: 25%
- Homework: 15%
- Lab assignments: 10%
- Term Paper (Presentations + Report): 20%

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

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 own answers. Any violation of this rule will be considered as cheating and will be dealt with accordingly.

Lab

This involves using Wireshark, a network analyzer to experiment with networking protocols.

Term Paper (Presentations and Report)

Students are supposed to present a term paper and its progress in the form of three presentations spread out over the whole semester and 2 initial reports, and a final cumulative report along with own ideas. More details about the term paper are presented later.

Class Participation

As a student enrolled in this class, you are expected to take an active role in the class. Whenever you 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.

Course Outline

Tentative List of Topics to be Covered (Please note that we won't be covering all the sections of the following chapters. Within time constraints we will try to cover important sections from the following chapters.)

Chapter 1 Data Networks and Internet.

Chapter 2 Protocols and TCP/IP Protocol Suite

Chapter 3 Traditional Applications

Chapter 4 Modern Applications.

Chapter 5 Congestion and Performance Issues.

Chapter 6 Transport Protocols

Chapter 8 Internet Protocols

Chapter 11 Internet Routing Protocols.

Chapter 13 Wide Area Networks.

Chapter 14 Data Link Control.

Chapter 15 Local Area Networks

Data Communication

Term Paper Schedule

- **Sept 10: Presentation of your term paper plan**

(PRESENTATION-1) Sept 20, 22 and 24, 2010

- Presentation of your term paper progress (Present Paper 1).
- Report 1 due – Summarize Paper 1 in 2 pages. Cover all the important sections of the paper and summarize them according to your understanding.

(PRESENTATION-2) Oct. 25, 27 and 29, 2010

- Presentation of your term paper progress (Present Paper 2).
- Report 2 due – Summarize Paper 2 in 2 pages. Cover all the important sections of the paper and summarize them according to your understanding.

(PRESENTATION-3) Nov. 15, 17 and 19, 2010

- Presentation of your term paper progress (Present Comparative Analysis).
- Term Paper Report due – Summarize Paper 1 in 2 pages. Cover all the important sections of the paper and summarize them according to your understanding.
- **Nov. 19 - Term Paper due (Classroom hardcopy submissions and email submission before midnight).**

Guidelines

Presentation 1:

1. Select one IEEE paper (conf. or journal paper, equal to or more than 6 pages in length), published in 2006-2007.
2. Present an Overview of the paper.

Presentation 2:

1. Select one IEEE paper (conf. or journal papers, equal to or more than 6 pages in length), published in 2008-2010 on the same topic and similar

work as in paper presented in Presentation 1 with developments from previous papers.

2. Make sure that you select the two papers for presentations 1 and 2 carefully so that you may see developments in Paper 2 from Paper 1.
3. Present an Overview of the paper.

Presentation 3:

1. Present a comparative analysis of the papers presented in Presentations 1 and 2. Present as to how the research and development works, by comparing the two papers side by side. How the two papers are similar and where do they differ. What improvements have been made by paper 2 over paper 1.
2. Suggest as to what other improvements can be done over Paper 2. Suggest your own ideas and provide some reasonable supportive arguments, mathematical solution, protocol, or simulations. This is the most important part in all the presentations and must be carefully addressed.

Note again: When you research the two papers for comparison, make sure that you select papers that are v. closely related.

IMPORTANT DATES

EXAMS

Midterm Exam: October 18 (Monday – during class hours)

Final Exam: December 17 (Friday - 8:30 – 11:30 a.m.)

HOLIDAYS

September 6: Labor Day Holiday (Monday)

October 9-12: Fall Holiday (No Class on Monday)

November 24-28: Thanksgiving Holiday (No Class on Wednesday and Friday)

OTHER DATES

December 10: Last Day of Class (Friday)

Suggested Topics for Term Papers

1. Network Security
2. Wireless Sensor Networks
3. Wireless Ad Hoc Networks (and MANETs)
4. Mesh Networking
5. Cognitive Radio Networks
6. WLANs

Note: You may select other topics of your interest but make sure that you select a topic that directly relates to networking.

Power Point Presentations – Some Guidelines

Important

- **It is an independent work.**
- **Please make sure that you do not take more time than allotted. There are many students in the class, and all need to present within available time.**
- **Attendance during presentations (even if it is not your presentation day) is mandatory, and exceptions are allowed only in case of emergencies.**

Term Paper Plan

- Select two papers and present their abstracts.
- In case, after you find that some other paper matches more closely with the first paper or if you find that some other two papers match more closely, you may change that later, but if you select Paper 1 for Presentation 1 and present that, you cannot change that paper, though you are still free to change your Paper 2 for Presentation 2 before presentation 2. (If there is any confusion over this, you may ask me in the classroom.)
- **Presentation time: 2 min.**

Term Paper Progress Presentations

Presentation Format (Presentations 1 & 2)

Please present the progress of your term paper presentations as follows:

- Introduction
- Problem Statement

- Related Work
- Their Findings and Results
- Conclusions
- References (Please provide 5 references for each paper, as given at the end of each paper)

- **Presentation time: 8 min.**

Presentation Format (Presentation 3)

- Introduction
- Comparative Analysis of Paper 1 and Paper 2
- (Your New) Findings, Suggestions and Results
(This is the most important part of your term paper progress, so spend more time and slides on it)
- Conclusions
- References (Please provide 5 references for each paper, as given at the end of each paper)

- **Presentation time: 8 min.**