ECE 636-101 (Fall 2009)

Computer Networking Laboratory

Course: ECE 636, Computer Networking Laboratory

Section:	101
Time:	6:00-9:00 P.M.
Day(s):	Monday
Session period:	8/31/09 - 12/7/09
Prerequisites:	ECE 682 or ECE683 or equivalent, and ECE 637 or equivalent
Room:	FAC401C (4th floor, Faculty Hall)

Instructor: Nirwan Ansari

E-mail:	ansari@njit.edu
Office Hours:	to be announced
Office Room:	FAC401C

Required Textbook:

1. Lab Manual for ECE636
2. Richard Stevens, "TCP/IP Illustrated, Vol. 1: The Protocols," Publisher: Addison-Wesley Professional (US Ed edition - 1994), ISBN: 0201633469
3. Larry L. Peterson and Bruce S. Davie, "Network Simulation Experiments Manual: Computer Networks, A System Approach," Publisher: Morgan Kaufmann (2nd Edition – October 2007), ISBN: 0123739748

   OR

   Larry L. Peterson and Bruce S. Davie, "Network Simulation Experiments Manual: Computer Networks, A System Approach," Publisher: Morgan Kaufmann (1st Edition – May 2003), ISBN: 0120421712

Course Description:

This course provides students with hands on training regarding the design, troubleshooting, modeling and evaluation of computer networks. In this course, students are going to experiment in a real test-bed networking environment, and learn about network design and troubleshooting topics and tools such as: network addressing, Address Resolution Protocol (ARP), basic troubleshooting tools (e.g. ping, ICMP), IP routing (e,g, RIP), route discovery (e.g. traceroute), TCP and UDP, IP fragmentation and many others. Student will also be introduced to the network modeling and simulation, and they will have the

opportunity to build some simple networking models using the OPNET modeling tool and perform simulations that will help them evaluate their design approaches and expected network performance.

Course Assessment Scores:

Lab report:		**60**
	- Lab 1:	8
	- Lab 4 :	8
	- Lab 3:	8
	- Lab 4:	8
	- Lab 5:	13
	- Lab 6:	15
Lab 9 Presentation:		**15**
Project:		**20**
Attendance:		**5**
Total:		**100**

Grading Policy:

Scores	Grade
90 and Above	A
80-89	B+
70-79	B
60-69	C+
50-59	C
Below 50	F

Requirements & Instructions:

1. **Before coming to the lab, each student MUST have his/her AFS password ready to login to a machine in the lab.**

   - If one does not have the AFS password, or forgot it, please reset it at <u>mypassword.njit.edu</u> or go to Computer Held Desk, room 48, located in the parking deck to reset all passwords.

   - Also, UCID and AFS passwords are DIFFERENT. A student may merge them by visiting this <u>afspassword.njit.edu</u>.

   - The student should print out the manual before coming to the class.

2. **<u>Preview</u>** the corresponding sections of the **lab manual** and **reference book(s)** <u>before</u> each lab. The reading assignment is described in the following schedule.

3. Sign the attendance sheet every class.

   - Please note there will be a **<u>PENALTY</u>** for the 15-minute late attendance - 5% of the scores earned from the experiments conducted on that day.

4. Save your experiment results of each class in one file. You can send this file to your njit webmail account via *dtmail* or IE web browser. Please refer to sec. 2.2.6 on page 12 on the manual.

   - You can also use ftp to store it in your h: drive.

     The steps to store a file "p1" to your h: drive:

     - In the console, input "ftp afs1.njit.edu"

         - Input your username and password to access AFS

         - Use command "put p1" to transmit the file

     - Exit ftp

5. Lab report should include objectives, procedures, results and explanations.

   - You are encouraged to include all the necessary outputs (i.e., snapshots) that were observed and obtained during the lab experiments.

   - Relevant theory should be added "briefly" to explain observed results.

   - Answer ALL questions given in the "Lab Description" throughout each experiment section and in

the "Report Requirements" after the experiment.

- (occasionally) Answer ADDITIONAL questions raised by the instructor during the lab experiments.

6. Lab report is due at the beginning of next lab session (unless specified otherwise). Only turn in the hardcopy before the class, please see the schedule below for the due dates.

- **If a student submits the report after the due date without prior approval, 20% of the total scores will be deducted for EACH DAY LATE.**

7. If there is a real emergency, a student may inform the instructor via email or phone as early as possible. The instructor may require some proofing documents, if necessary.

- If the student neither informs the instructor nor produces the proofing documents, a make-up class will not be allowed, AND the report(s) for that missed experiment(s) will not be accepted.

8. **Academic integrity and honesty are of paramount importance in this class. Do not copy the reports.**

- Use only own outputs (snapshots), and do not include the outputs of others in the report (unless specified otherwise).

- **** 20-50% mark will be given per places if the reports are caught as copied. ****

9. **The NJIT Academic Honor Code will be strictly followed and any violations will be brought to the immediate attention of the Dean of Students.**

Note: Please turn off the monitor, but **DO NOT** shut down the computer, when you leave.

Tentative Schedule:

Day	Date	Experiments	Reading assignment[1]	Report(s) Due
1	8/31	Introduction (Part I) Lab 1: Experiment with ARP	Ch.4 & 7 [1][2]	
	9/7	No Class --- Labor Day holiday		
2	9/14	Lab 2: IP addressing and subnet masking Lab 3: Troubleshooting Experiments with ICMP	Ch.3& 6 [1]	
3	9/21	Lab 3: Troubleshooting Experiments with ICMP (Continued, if needed) Lab 4: IP routing Lab 5: Experiments with UDP	Ch.9 & 11 [1]	Lab 1 Lab 2 Lab 3
4	9/28	Lab 5: Experiments with UDP (Continued)		
5	10/5	Lab 6: TCP experiments	Ch.18 -20 [1]	
6	10/12	Lab 6: TCP experiments (Continued)	Ch.21 [1]	Lab 4 Lab 5
7	10/19	Lab 7: Introduction to OPNET Modeler & Modeling and simulation Small Internetworks & M/M/1 Queue	Lab. 0 & 1 [2][3]	
8	10/16	Lab 8: OPNET-based experiment		
9	11/2	Lab 8: OPNET-based experiment (Continued)		Lab 6
10	11/9	Lab 8: (Continued) Lab 9[4]: Exemplified Project: Modeling, Configuration and Performance Analysis of the Exemplified Lab Network using OPNET Modeler		Lab 9 - Report and Presentation
11	11/16	Lab 9: Exemplified Project: Modeling, Configuration and Performance Analysis of the Exemplified Lab Network using OPNET Modeler (Continued)		
12	11/23	Lab 10: Project (Continued)		
13	11/30	Lab 10: Project (Continued)		
14	12/7	Lab 10: Project (Continued)		
15	12/11			The project report dues
	12/18			Grade dues

Notes:

1. Students are strongly encouraged to read the related materials for each class.
2. [1] denotes the 2nd reference textbook, Richard Stevens, "TCP/IP Illustrated, Vol. 1: The Protocols."
3. [2] denote sthe 3rd reference textbook, Larry L. Peterson and Bruce S. Davie, "Network Simulation Experiments Manual: Computer Networks, A System Approach."
4. Please note that the topology as shown in Lab 8 manual is an example, but NOT the project topology. Every student will model and simulate on DIFFERENT topologies, approved by the instructor. Details will be further discussed on the 11st or 12nd week.