ECE 636 (Fall 2024)

Computer Networking Laboratory

Course section: *101*
Room: *FMH 401A*
Instructor: *Navid Heydarishahreza*
Email: *nh323@njit.edu*

Prerequisites: ECE 637 or CS 656.

Course description and learning outcomes: This course provides students with hands-on training regarding the design, troubleshooting, modeling, and evaluation of computer networks. In this course, students conduct experiments 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 others. Students are also introduced to network modeling and simulation, and they have the opportunity to build some simple networking models and perform simulations that help them evaluate their design approaches and expected network performance.

Textbooks:

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.

Grading:

Lab reports: 60%
- Lab 1: 10%
- Lab 2: 10%
- Lab 3: 10%
- Lab 4: 10%
- Lab 5: 10%
- Lab 6: 10%

Mini Project: 5%
Main Project: 15%

Quizzes: 15%

Attendance: 5%

Course Schedule:

Introduction to Linux (Section B) and Experiments with ARP (Lab 1)	Week 1
IP addressing and subnet masking (Lab 2)	Week 2
Troubleshooting Experiments with ICMP (Lab 3)	Week 3
Understanding the IP packet routing and forwarding (Lab 4) **Quiz 1 (from Labs 1-3)**	Week 4
Understanding *sock* as a traffic-generating software package and experiments with UDP/TCP (Lab 5)	Week 5
Understanding TCP connection establishment and terminations, TCP timeout, and retransmission mechanism (Lab 6)	Week 6 - Week 7
Self-design experiment (Lab 7) **Quiz 2 (from Labs 4-6)**	Week 8
Introduction to NS3 and network modeling (Lab 8)	Week 9
Experiments with NS3: building a bus network topology and wireless network topology (Lab 9)	Week 10
Mini project: A TCP sender design	Week 11
Final Project	Week 12
Final Project	Week 13
Final Project	Week 14

Lab Guidelines:

1. **AFS Password Requirement:**
   - Every student must have their AFS password ready to log in to the lab computers before coming to the lab.
   - If you do not have an AFS password or forget it, you can reset it at mypassword.njit.edu or visit the Computer Help Desk (Room 48, located in the parking deck/student mall) to reset all passwords.
   - Note: Your UCID and AFS passwords are different. You can merge them by visiting afspassword.njit.edu.
   - Please print the lab manual before attending the class.
2. **Preparation:**
   - Review the relevant sections of the lab manual and reference books before each session.
3. **Attendance:**
   - Sign the attendance sheet at the start of each session.
   - If you are 30 minutes late or more, you will lose attendance points.
   - Save all experiment results from each class in a single file and send it to your NJIT webmail account for safekeeping.
4. **Lab Reports:**
   - Each lab report must include objectives, procedures, results, and explanations.
   - Include necessary outputs (e.g., snapshots) obtained during the experiment.
   - Provide a brief theoretical explanation of the observed results.
   - Answer all questions in the "Lab Description" and "Report Requirements" sections.

- Respond to any additional questions raised by the instructor during the lab.

5. **Report Submission:**
   - Lab reports are due at the beginning of the next lab session unless stated otherwise.
   - Submit both a hard copy and a soft copy of the report before class. Refer to the schedule for exact due dates.
   - Late submissions without prior approval will incur a 20% deduction per day.
6. **Emergencies:**
   - In case of an emergency, inform the instructor via email as early as possible and provide proof.
   - If you fail to notify the instructor or provide proof, no make-up class will be allowed, and the missed experiment reports will not be accepted.
7. **Academic Integrity:**
   - Do not copy lab reports. Use only your own outputs (e.g., snapshots) and words.
   - If reports are copied, all involved students will receive a zero and face disciplinary action according to the NJIT Honor Code.
8. **Honor Code Compliance:**
   - The NJIT Academic Honor Code will be strictly enforced. Any violations will be reported to the Dean of Students.

Note: When leaving the lab, **do not** shut down the computer.