Syllabus - Introduction to Computer Networking (EC 441 - Fall 2021)

Department of Electrical and Computer Engineering

Boston University

Contents

1 General Information

Time & Location: Tuesday and Thursday, 9-10:45am, PHO 117, and live-streamed on zoom. All class sessions will be recorded and available for viewing/reviewing.

Instructor: Professor Jeff Carruthers (jbc@bu.edu)

Course Web Site: *href="https://curl.bu.edu:9999/ec441/fall2021/*

Required Textbook:

J. Kurose and K. Ross, Computer Networking: A Top-Down Approach (8th edition), Pearson, 2021.

ISBN 978-0-13-668155-7

Prerequisites:

1. EC 381 (ECE Probability)
2. EC 401 (Signals and Systems)
3. Familiarity with programming (MATLAB, Python, etc.)

2 List of Topics

This course is an introduction to the foundations and design of computer networks, at an advanced-undergraduate level. We expect to cover the following topics:

Networking Foundations: Network elements and architectures, packet and circuit switching, performance measures (delay, throughput), OSI and TCP/IP protocol suites, layering.

Applications: World Wide Web (HTTP), the domain name system (DNS), E-mail (SMTP), Internet socket programming.

Transport Protocols and Reliable Data Transfer: Connectionless transport: UDP, Connection-oriented transport: reliable transfer, sliding window protocols (Stop & Wait, Go-Back-N, Selective Repeat), TCP, congestion control, time-out computation.

Internetworking: Internet protocol (IP), IP addressing, subnetting, forwarding, routing algorithms (Dijkstra, Bellman-Ford), distance-vector routing, link-state routing.

Link Layer, LANs, and MAC Protocols: Framing, error detection and correction, multiple access protocols, Aloha, CSMA, Ethernet (IEEE 802.3), Ethernet switches, address resolution protocol (ARP).

Networking Tools: Wireshark, Python sockets, ns-2, Mininet, OpenFlow, ping, traceroute, nslookup, ifconfig, iPerf.

Special Topics: Software-defined networking, network security, peer-to-peer networks, wireless LANs (IEEE 802.11).

3 Course Components and Grading

- Assignments: homeworks, labs, and projects (35%)
- Quizzes and Participation (inclass and online) (5%)
- Midterm One (15%)
- Midterm Two (15%)
- Final Exam (30%)

4 Class and University Policies

1. **Attendance & Absences.** Please also see the university Policy on Religious Observance.

2. **Assignment Completion & Late Work**. All assignments will be submitted on the course website. Each assignment will have a late work policy. If a single exam is missed, the remaining exams will be scaled to make up for the missing component.

3. **Collaboration and Academic Conduct** The collaboration policy for each assignment will be posted with the assignment. By signing your name(s), you attest that you have read and followed the rules of the assignment. All exams will have a printed list of rules which must be agreed to before beginning the exam. Here is the URL for Academic Conduct Code: *https://www.bu.edu/academics/policies/academic-conduct-code/*

4. **COVID 19 & BU Community Health Expectations:**
   Masks are required and face coverings must be worn over the mouth and nose at all times when in public spaces on campus, including classrooms. Students should be prepared to show proof that they are compliant with health attestations and testing in order to attend class. All students are expected to follow all university guidelines with respect to daily symptom checks, testing, social distancing, and mask wearing when they leave their dorm or home. For a detailed description of official BU policies regarding COVID, please visit: *http://www.bu.edu/dos/policies/lifebook/covid-19-policies-for-students/*

5. **Inclusion:** I consider this classroom and its associated online spaces to be a place where you will be treated with respect, and I welcome individuals of all ages, backgrounds, beliefs, ethnicities, genders, gender identities, gender expressions, national origins, religious affiliations, sexual orientations, ability – and other visible and nonvisible differences. All members of this class are expected to contribute to a respectful, welcoming and inclusive environment for every other member of the class.

6. **Accommodations for Students with Documented Disabilities**: If you are a student with a disability or believe you might have a disability that requires accommodations, requests for accommodations must be made in a timely fashion to Disability & Access Services, 25 Buick St, Suite 300, Boston, MA 02215; 617-353-3658 (Voice/TTY). Students seeking academic accommodations must submit appropriate medical documentation and comply with the established policies and procedures *http://www.bu.edu/disability/accommodations/*