Course Syllabus (Draft)
ECE3600 Computer Communications-QUP
Monday, Wednesday, and Friday 12:30 pm - 1:45 pm, Summer 2020

Prerequisites: ECE 2020 [min C] and ECE 2026 [min C]

Corequisites: None

Catalog Description: Basic concepts of the internet networking protocols.

Instructor: Fariborz Farahmand
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Office Hours: Mondays, 5:45-7:45 pm (EDT)

Textbook: J. F. Kurose, and K. W. Ross, *Computer Networking, A Top-Down Approach*, 7th Ed, Addison-Wesley, 2017 ISBN 978-0133594140, (Reqd).

Grading:
Homework: 20 %
First Exam: 25 %   Friday, June 12 (tentative)
Second Exam: 25 %   Friday, July 10 (tentative)
Final Exam: 30 %   Friday, July 24

Course Outcomes – Upon successful completion of this course, students should be able to:
1. Describe the theoritical fundamentals of how the internet works
2. Use a layered model to explain the primary functionalities of internetworking
3. Identify algorithms and functionalities to allow reliable data transport over an unreliable network
4. Explain the fundamental protocols in the internet and have the ability to apply them to new networks
5. Describe Software Defined Networking's fundamental concept and its impact on the internet
6. Explain the fundamentals of link layer protocols

Student Outcomes - In the parentheses for each Student Outcome, "P" for primary indicates the outcome is a major focus of the entire course, "M" for moderate indicates the outcome is the focus of at least one component of the course, but not majority of course material.
1. (P) an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. (M) an ability to apply engineering design to produce solutions that meet specified needs of public health, safety, and welfare, as well as global, social, environmental, and economic factors
6. (M) an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions

7. (M) an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Topical Outline
Introduction
        network edge
        end systems, access networks, links
        network core
        packet switching, circuit switching, network structure
        delay, loss, throughput in networks
        protocol layers, service models
Application Layer
        Web and HTTP
        Electronic mail
        Domain Name System
        video streaming and content distribution networks
        Socket programming with UDP and TCP*
Transport Layer
        multiplexing and demultiplexing
        connectionless transport: UDP
        principles of reliable data transfer
        connection-oriented transport: TCP
        principles of congestion control
        TCP congestion control
Network layer: The Data Plane
        data plane
        control plane
        Router architecture
        IP: Internet Protocol
        Generalized Forward and SDN
Network Layer: The Control Plane
        routing protocols
        intra-AS routing in the Internet: OSPF
        routing among the ISPs: BGP
        The SDN control plane
Link Layer and LANs
        error detection, correction
        multiple access protocols
        LANs
        data center networking
        day in the life of a web request

Wireless Networking*
        Wireless links, characteristics
        IEEE 802.11 wireless LANs ("Wi-Fi")

Network Security*

 Message integrity, authentication
 Securing e-mail
 Securing TCP connections: SSL
 Firewalls and IDS

 *Advanced materials which will be taught if time permits.

Attendance:
Close attention to the lectures is expected, particularly since some lecture topics are not covered in the textbook.

Homework and Exams:
Homework and exams will be submitted, graded, and returned electronically through Canvas. No proctor is required.

Makeup Exams and Incompletes:
As a rule, makeup exams will be offered at the discretion of the instructor and only for scheduled absences that are requested in writing at least one week in advance. Medical emergencies are the only exception to this rule, and in case of such an emergency, the student must provide documents and contact the instructor as soon as possible to discuss the makeup. Incomplete grades will be given only in extraordinary circumstances.

Academic Honesty:
Although students are encouraged strongly to communicate with each other to assist in learning the course material, all students are expected to complete course work individually, following all instructions stated in conjunction with exams and assignments. All conduct in this course will be governed by the Georgia Tech Honor Code. For information on Georgia Tech's Academic Honor Code, please visit http://www.catalog.gatech.edu/policies/honor-code/. Additionally, it is expected that students will respect their peers and the instructor such that no one takes unfair advantage of any other person associated with the course. Any suspected cases of academic dishonesty will be reported to the Dean of Students for further action.

Accommodations for Students with Disabilities:
If you are a student with learning needs that require special accommodation, contact the Office of Disability Services at (404)894-2563 or http://disabilityservices.gatech.edu/, as soon as possible, to make an appointment to discuss your special needs and to obtain an accommodations letter. Please also e-mail me as soon as possible in order to set up a time to discuss your learning needs.