EEE 459/591: COMMUNICATION NETWORKS

EEE459-67586; EEE591-67587

INSTRUCTOR: PROF. MARTIN REISSLEIN

Goldwater Center (GWC) 411A
School of Electrical, Computer, and Energy Engineering
Arizona State University
Tempe, AZ 85287 – 5706

Office: (480) 965-8593
Fax: (480) 965-8325
E-mail: reisslein@asu.edu

OFFICE HOURS
TTH 8:30 – 9:15 am in https://asu.zoom.us/my/mreissl, Passcode: 853331, or e-mail for appointment

UGTA: TBD

Grader: TBD

ENROLLMENT

- On-campus course, TTH 3:00 – 4:15 PM, SCOB 228

COURSE DESCRIPTION
Have you ever wondered how the Internet really works? How is e-mail delivered and how are web pages downloaded? If so then this course may be for you. In this course we will take a careful look "under the hood" of the Internet. We will study the protocols and mechanisms that make the Internet work and will learn about the performance bottlenecks in the Internet.

The topics covered in the course include:
- Internet structure and design philosophy
- Application layer protocols: HTTP, SMPT, FTP, SMTP, P2P
- Transport layer mechanisms and protocols: reliable data transfer, congestion control, TCP, UDP
- Network layer protocols and mechanisms: routing principles, RIP, OSPF
- Medium access: Aloha, Ethernet, WiFi
- Local area network design with hubs, bridges, and routers

PREREQUISITES
Elementary probability theory from EEE 350 Random Signal Analysis (this class is a co-requisite).
This course is relatively "light" in math compared to other EEE courses and requires only very basic calculus. The focus throughout is on concepts and understanding instead of equation manipulations.

RECOMMENDED COURSE TEXT
James F. Kurose and Keith W. Ross. *Computer Networking: A Top-Down Approach Featuring the Internet*, 7th edition, 2017, Pearson (ISBN -13: 9780133594140).

COURSE OUTLINE / READING SCHEDULE

Class	Date	Section
1		Class Overview 1.1 What is Internet 1.2 Network Edge, 1.3 Network Core
2		1.3 Network Core, cont'd 1.4 Delay, Loss, and Throughput
3		1.4 Delay, Loss, and Throughput, cont'd 1.5 Protocol Layers and Their Service Models
4		1.6 Networks under Attack 1.8 History of Computer Networking and Internet Practice and Review: Computer Networks and the Internet
5		PnR: Computer Networks and the Internet
6		2.1 Principles of Network Applications 2.2 The Web and HTTP
7		2.3 FTP 2.4 SMTP 2.5 DNS
8		2.6 P2P Applications 2.7, 2.8 Socket Programming PnR: Application Layer
9		PnR: Internet Overview, Application Layer
10		3.1 Intro to Transport Layer Services 3.2 Multiplexing and Demultiplexing 3.3 Connectionless Transport: UDP
11		Review for MT1
12		MT1
13		3.4 Principles of Reliable Data Transfer

14		3.4 cont'd 3.5 Connection-Oriented Transport: TCP
15		3.6 Principles of Congestion Control 3.7 TCP Congestion Control
16		PnR: Transport Layer
17		4.1 Intro to Network Layer and Routing 4.2 Virtual Circuit and Datagram Networks 4.3 What's inside a Router?
18		4.4 IP 4.5 Routing Algorithms
19		PnR: Transport and Network Layers
20		Midterm 2
21		4.5 cont'd 4.6 Routing in the Internet
22		PnR: Network Layer and Routing
23		5.1 Intro to Link Layer 5.3 MAC
24		5.3 cont'd, EPONs, time premitting
25		5.4 LAN Addresses, ARP 5.5 Ethernet
26		5.6 Link-Layer Switches 5.8 Link Virtualization 5.9 Web Page Request PnR: Link Layer
27		PnR: Link Layer 6.1 Wireless Intro 6.2 Wireless Links 6.3 Wi-Fi
28		Review Session
29		Review Session

ONLINE RESOURCES

The course web site on Canvas. The Canvas course shell contains all class materials nd has an Ed Discussion board for questions regarding the course administrative and logistics and questions regarding the course material. If you have a question please first check whether the question has already been addressed on the discussion board, if not,

please e-mail the instructor. (For questions that are personal in nature please e-mail the instructor.)

Note:
(1) You must check the Canvas course and your ASU email regularly, as updates on the course, e.g., changes in the course schedule, are announced.
(2) The enrollment to the Canvas course shell is done automatically by the registrar's office.

GRADING POLICY
The course grade is determined by:
- Weekly homework assignments 30%
- Better of the two Midterm Exams 40% + 4% Extra Credit
- One Final Exam 30%

Homework Assignments
Homeworks will be assigned from the course text. The assignments will be announced in class and on my.asu under Assignments. Homeworks are due at 12:00, noon, (i.e., at the beginning of class) on the due date. Late submissions will NOT be accepted. Graded homeworks will be returned and discussed in class.

Midterm Exam
The midterm will cover the material discussed in class from the first class/preceding midterm through the class immediately preceding the test date. The midterm is closed-book and closed-notes. The graded tests will be returned and discussed in class. You may expect the test back about a week after the test date.

Final Exam
The final exam is cumulative; it covers all the material discussed in class from the first day of classes through the last day of classes. The exam is closed-book and closed-notes, a one-page one-sided 8.5 x 11 in cheat sheet is permitted. Final exams will not be returned. You may view the official solution and your graded exam during the grader's first regular office hour following the posting of the final exam score (see schedule below).

EEE 591 Course Credit and 459 Honors Credit Research Paper
Credit for the EEE 591 course registration requires the completion of an added course component in comparison to the undergraduate level EEE 459 course registration. This added course component is the completion of a research paper review. There are no extra points or grades for the research paper. Instead, the completion of the research paper is a requirement for earning the EEE 591 course credit and grade (that has been earned from all the other components of the course, i.e., homeworks, midterms, and final exam).

Honors Credit for EEE 459 for the Barett Honors College at ASU requires the completion of a research paper review.

Academic Integrity

ASU and the Fulton School of Engineering expect the highest standards of academic integrity of all students. Failure to meet these standards may result in suspension or expulsion from the university or other sanctions as specified in the University Student Academic Integrity Policy. Please take some time to read the policy at http://www.asu.edu/studentlife/judicial

In addition, ASU adheres to a university-wide Student Code of Conduct. The philosophy behind this policy states: The aim of education is the intellectual, personal, social, and ethical development of the individual. The educational process is ideally conducted in an environment that encourages reasoned discourse, intellectual honesty, openness to constructive change and respect for the rights of all individuals. Self-discipline and a respect for the rights of others in the university community are necessary for the fulfillment of such goals. The Student Code of Conduct is designed to promote this environment at each of the state universities.

Note: For all homeworks and exams a strict non-cheating policy is enforced. Any cooperation among students is not permitted. However, you are encouraged to form study groups and study the class material in groups!