TCOM 535 Section 2
Comprehensive TCP/IP

George Mason University
Fall 2019

ANNOUNCEMENTS

Welcome to TCOM 535!

FIRST CLASS MEETING and LOCATION

First Class: August 30, 2019
Last Class: December 14, 2018
Meeting Day: Friday
Meeting Times: 04:30-07:10 PM
Meeting Room: Nguyen Engineering Bldg, Room 1107

INSTRUCTOR/TA INFORMATION

Instructor: Scott Tran
E-mail: stran4@gmu.edu

TA: TBD
Office Hours: TBD

TA INFO & OFFICE HOURS

Name: TBD
E-mail: TBD

Office hours: TBD
Location: TBD

COURSE DESCRIPTION

FROM THE INSTRUCTOR: TCP/IP is a very large protocol suite, the most important set of protocols in networking today, and too large to squeeze into 7-8 weeks. We'll

cover as much as we can, with particular emphasis on thorough high-level understanding of this protocol suite and other practical issues concerning TCP/IP today.

FROM THE COURSE CATALOG: This course studies the Internet Protocol suite by building upon the LAN (TCOM 501) and WAN (TCOM 502) courses. It covers the basic principles and architecture of the Internet and then presents the IP protocol in-depth. It discusses routing algorithms. It provides a detailed treatment of TCP and UDP and traffic characteristics. It explores addressing and naming. The course covers networking applications and their specific application protocols (Telnet, Rlogin, FTP, NFS, SMTP, e-mail and directory services, HTTP), and also the management protocol (SNMP). Selected advanced topics on current and evolving Internet protocols, in particular IP multicasting, differentiated services and quality of service, virtual private networks, and IPv6, will also be studied. Where possible, implementation and practical use will be discussed.

REQUIRED TEXT AND READINGS

Internetworking With TCP/IP Volume 1: *Principles Protocols, and Architecture, 5th edition, 2006, by Douglas E. Comer*
ISBN 0-13-187671-6

Supplemental Readings: Relevant standards documents and articles as determined

COURSE GRADE COMPOSITION and REQUIRMENTS

Attendance:		-- 10%
IP:	**Mid-term**	– 20%
	Final	– 25% (Comprehensive)
TCP:	**Quizes**	– 20%
	Final	– 25% (Comprehensive)

Weightings may be adjusted slightly at instructor's discretion.

Homework assignments may consist of some questions from the text, some questions I hand out, and other tasks the instructor designates.

SCHEDULE/SYLLABUS/TOPICS/LECTURE NOTES

Schedule and syllabus will be adjusted according to topics of interest.

Week – Date	Topics
1 – 30 Aug	Introduction to Internet and its historical overview, the TCP/IP and OSI models, Layering/Encapsulation IP Checksum Tutorials: **http://netfor2.com/checksum.html;** http://en.wikipedia.org/wiki/Signed_number_representations Link Layer, IP Addressing (CIDR), Subnetting **IP Addressing Tutorial:** http://www.bradreese.com/3com-ip-addressing.pdf **CIDR Tutorials:** http://www.ralphb.net/IPSubnet/index.html
2 - 06 Sept	Link Layer, IP Addressing (CIDR), Subnetting **IP Addressing Tutorial:** 3com-ip-addressing.pdf **CIDR Tutorials:** **http://www.ralphb.net/IPSubnet/index.html**
3 - 13 Sept	**Subnetting/VLSM/CIDR:** Read/understand the answers from the following tutorial with solutions provided: http://www.kccommunications.com/public/VLSM%20answers.pdf
4 - 20 Sept	ARP, DHCP, ICMP protocols: packet format and inter-workings **ARP Tutorials:** **http://arpfaq.blogspot.com/** **http://www.comptechdoc.org/independent/networking/guide/netarp.html** **ARP Security Vulnerabilities:** **http://infosecwriters.com/Papers/AShrivastava_ARP.pdf** **ICMP protocols: packet format and inter-workings: Ping, Traceroute, MTU Size Determination, Port Unreacheability, Security Issues.** **Tutorial on ICMP and Its Associated Security Vulnerabilities:** **http://www.cis.syr.edu/~wedu/Teaching/cis758/LectureNotes_New/ICMP.pdf**
5 – 27 Sept	**IP – Midterm**
6 - 04 Oct	**Network Address Translation (NAT):** principles and deployment strategies: Please download tutorial **from Course Content** Additional required reading for NAT: **http://www.ciscopress.com/articles/article.asp?p=25273&seqNum=3** **Routing Protocols (part 1).** Distance Vector Routing **(**RIP Protocol) Packet format and internal workings. RIP Tutorial: http://www.ba-stuttgart.de/~schulte/htme/55024.htm#REF24371
7 – 11 Oct	**Routing Protocols (part 2). Link-State Routing Protocol (OSPF):** packet format, functionality and features.

	cons and design criteria; Dijkstra's algorithm and demo. OSPF Tutorial**:** http://www.cisco.com/en/US/tech/tk365/technologies_q_and_a_item09186a0080094704.shtm
8 – 18 Oct	**Advanced Topic: Internet Security-**IP security techniques/protocols such as IPSec, SSL. The protocol forma applications**.** IPSec tutorial: http://unixwiz.net/techtips/iguide-ipsec.html
9 - 25 Oct	**IP Final (Comprehensive)**
10 – 01 Nov	**TCP Performance:** TCP tuning and performance parameters such as Window size, Karn's algorithm, TCP co behavior and strategies. **Tutorial on TCP Performance** **http://www.cisco.com/web/about/ac123/ac147/ac174/ac196/about_cisco_ipj_archive_article09186a00800**
11 – 08 Nov	**TCP Performance:** TCP tuning and performance parameters such as Window size, Karn's algorithm, TCP co behavior and strategies. **Tutorial on TCP Performance** **http://www.cisco.com/web/about/ac123/ac147/ac174/ac196/about_cisco_ipj_archive_article09186a00800**
12 – 15 Nov	**Take-home Quiz (paper submission due 22 Nov)** **TCP Performance:** TCP tuning and performance parameters such as Window size, Karn's algorithm, TCP co behavior and strategies. **Tutorial on TCP Performance** http://www.cisco.com/web/about/ac123/ac147/ac174/ac196/about_cisco_ipj_archive_article09186a00800c841
13 – 22 Nov	**TCP Performance:** TCP tuning and performance parameters such as Window size, Karn's algorithm, TCP co **Tutorial on TCP Performance:** **http://www.cisco.com/web/about/ac123/ac147/ac174/ac196/about_cisco_ipj_archive_article09186a00800**
14 – 29 Nov	**No Class. Thanksgiving Recess**
15 – 06 Dec	**TCP Performance:** TCP tuning and performance parameters such as Window size, Karn's algorithm, TCP co behavior and strategies. **Tutorial on TCP Performance:** **http://www.cisco.com/web/about/ac123/ac147/ac174/ac196/about_cisco_ipj_archive_article09186a00800**
16 – 13 Dec	**TCP Final Exam (Comprehensive).**

This schedule is tentative. We will not cover the entire textbook. Coverage of topics may be adjusted slightly in response to questions on topics, progress, and instructor's discretion.