ECE361H1 F/S	Computer Networks I	

3/1.50m/1m/0.50

III,IV-AECPEBASC, III,IV-AEELEBASC,
IV-AEESCBASER

Layered network architectures; overview of TCP/IP protocol suite. Introduction to sockets; introduction to application layer protocols. Peer-to-Peer Protocols: ARQ; TCP reliable stream service; flow control. Data Link Controls: Framing; PPP; HDLC. Medium access control and LANs: Aloha; Ethernet; Wireless LANs; Bridges. Packet Switching: Datagram and virtual circuit switching; Shortest path algorithms; Distance vector and link state algorithms.

Prerequisite: STA286H1 or ECE302H1
Corequisite: ECE302H1. (Students must take the co-requisite, ECE302H1 in the same term as ECE361H, OR in a term before taking ECE361H1.)

Course objective: The objective of this course is to teach the basic concepts of computer network architectures and techniques for solving problems and designing protocols that arise in computer engineering practice.

Required textbook: A. Leon-Garcia and I. Widjaja, *Communication Networks: Fundamental Concepts and Key Architectures*, Second Edition, McGraw-Hill 2004.

Instructors: A. Leon-Garcia (BA 4120; alberto.leongarcia@utoronto.ca) and Hamid Timorabadi (LP371) .

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Lectures: LEC101: TuWF 1pm, GB248
LEC102, TuThF, 9am, GB248

Labs: PRA101/102, Mon. 3-6pm; PRA103/104, Mon. Noon-3pm, GB243.

Tutorials: TUT 101/103 Th 11am-noon, MY315/MY360; TUT102 Tu noon-1 pm MY330

Evaluation scheme: term test, 35%; final, 50%; labs 15%.

ECE 361	Computer Networks	Winter 2019		
Professor	A. Leon-Garcia, Bahen 4120, alberto.leongarcia@utoronto.ca (LEC 101) Hamid Timorabadi LP371, lh.timorabadi@utoronto.ca (LEC 102)			
TAs	Sayed Ehsan Etesami (mailto:ehsan.etesami@mail.utoronto.ca), Pooyan Habibi (mailto:pooyan.habibi@mail.utoronto.ca), Yihuan Huang (yihuan.huang@alum.utoronto.ca), Simona Marinova (mailto:simona.marinova@mail.utoronto.ca), Morteza Moghaddassian (mailto:m.moghaddassian@mail.utoronto.ca), Beibei Zhang (benjamin.zhang@mail.utoronto.ca)			
Textbook	*Communications Networks: Fundamental Concepts and Key Architectures, McGraw-Hill, Second Edition,* by Leon-Garcia & Widjaja			
Mark Distribution	Term Test (February 14, 2019 8-10 pm, Exam Centre, Room 10(	35%	Closed Book; Formulas Provided	
	Labs (Labs 3 pts each)	15%		
	Final Exam	50%	Closed Book; Formulas Provided	
Tutorial	TA guides students through selected homework-related exercises; Homework solutions will be posted weekly			
Lab	Students will work in teams of 2; students are free to form teams from the same lab section.			
Time & Place	LEC101: TuWF 1pm, GB248; LEC102, TuThF, 9am, GB248 PRA101/102, Mon 3-6pm , PRA103/104, Mon noon-15:00am, GB243; TUT 101/103 Th 11am-noon, MY315/MY360; TUT102 Tu noon-1 pm			

Date	Lecture Topic (MWF)	Reading	Tutorial	Lab
The schedule is subject to change because of unexpected events such as class cancellations, snowstorms, etc.				
January 7, 2019	**WEEK 1**			
January 8, 2019	Introduction to Message & Circuit Switching; Course Overview		No Tutorial	No Lab
January 9, 2019	Introduction to Packet Switching Networks			
January 11, 2019	Layered Network Architectures			
January 14, 2019	**WEEK 2**			
January 15, 2019	TCP/IP Architecture Overview		Layered Architectures: Encapsulation;	PRA02 Lab #1 WireShark Exercises
January 16, 2019	HTTP			
January 18, 2019	Voice over IP; RTP and UDP			
January 21, 2019	**WEEK 3**			
January 22, 2019	Berkeley Sockets		TCP & UDP	PRA01/03/04 Lab #1 Wireshark Exercises
January 23, 2019	Digital Transmission			
January 25, 2019	Communications Media			
January 28, 2019	**WEEK 4**			
January 29, 2019	Error Detection: Check Sums & Polynomial Codes		Bit Rates, Propagation Delay, Message Delays	PRA02 Lab #2 TCP/IP Utilities Read Section 2.5
January 30, 2019	Stop-and-Wait ARQ			
February 1, 2019	Selective ARQ			
February 4, 2019	**WEEK 5**			
February 5, 2019	TCP Reliable Stream Service and Flow Control		ARQ Performance	PRA01/03/04 Lab #2 TCP/IP Utilities Read Section 2.5
February 6, 2019	TCP Congestion Control			
February 8, 2019	Review for Midterm			
February 11, 2019	**WEEK 6 Midterm on February 14, 2019 8-10 pm, Exam Centre, Room 100**			
February 12, 2019	Packet Buffering and Statistical Multiplexing		Review Questions	
February 13, 2019	Packet Delay and Packet Loss Models			
February 15, 2019	Framing: HDLC, PPP, and Ethernet			
February 18, 2019	**WEEK 7 Reading Week**			
February 25, 2019	**WEEK 8**			
February 26, 2019	Aloha Random Access		Statistical Multiplexing	PRA01/03/04 Lab #3 UDP Sockets
February 27, 2019	CSMA/CD & CSMA/CA			
March 1, 2019	Ethernet LANs			
March 4, 2019	**WEEK 9**			
March 5, 2019	Spanning Tree Protocol & VLANs		MAC & Ethernet	PRA02 Lab #3 UDP Sockets
March 6, 2019	WIFI LANs			
March 8, 2019	LTE Cellular Mobile Networks			
March 11, 2019	**WEEK 10**			
March 12, 2019	Router and Switch Design		WIFI & LTE	PRA01/03/04 Lab #4 TCP Sockets
March 13, 2019	Routing Tables: Datagrams & Virtual Circuits			
March 15, 2019	Packet Scheduling and Quality of Service			
March 18, 2019	**WEEK 11**			
March 19, 2019	Distance Vector Routing		Routers & Switches	PRA02 Lab #4 TCP Sockets
March 20, 2019	Link-State Routing			
March 22, 2019	MPLS and SDN			
March 25, 2019	**WEEK 12**			
March 26, 2019	Segment Routing		Routing Protocols	PRA01/03/04 has Lab #5 OpenFlow Pt-Pt & Multipoint
March 27, 2019	IPv6 and CIDR			
March 29, 2019	DHCP, NAT, and IP mobility			
April 1, 2019	**WEEK 13**			
April 2, 2019	Cryptographic Algorithm Overview		IP Topics	PRA02 has Lab #5 OpenFlow Pt-Pt & Multipoint Circuits
April 3, 2019	Private Key and Public Key Cryptography			
April 5, 2019	TLS , HTTPS, SSH			
April 8, 2019	**WEEK 14**			
April 9, 2019	Course Review		Review Questions	
April 10, 2019	Course Review			
April 12, 2019				