COMSATS Institute of Information Technology Islamabad
Department of Computer Science
Syllabus FALL/SPRING 2017

I. Course code and Title

CSC339	**Data Communication and Computer Networks**

II. Course Prerequisites

Course Code	Title
Nil	Nil

III. Instructor's Information

Full Name:	Dr. Abdul Wahid
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Contact Number	0331-9661140
Office Hours & Location	2nd floor, ABII, Computer Science department, COMSATS Institute of Information Technology Islamabad
Teaching Assistant (if any)	Mr. Yahya Yousaf

IV. Course Composition

	Credit Hours	Weekly	Duration (hrs)	Contact Hours
Lectures	3	3	1.5	3.0
Laboratories	1	1	3.0	3.0

V. Course Description

This course covers an introduction to computer networks and layered architectures: connectivity, topology, circuit and packet switching; TCP/IP and ISO models; Application layer: C/S model, DNS, SMTP, FTP and WWW; Socket programming and network security; Transport layer: TCP and UDP; Network layer: internetworking, addressing and routing algorithms and protocols; Data link layer: framing, flow and error control protocols, PPP, MAC and LANs; Physical Layer: circuit switching, coding, multiplexing and transmission media; Wireless and Mobile Networks: Characteristics, CDMA, WiFi: 802.11 Wireless LANs, Mobile IP and Cellular communication and Security in Computer Networks.

VI. Text book

1. Computer Networking: A Top-Down Approach, 6th Edition by James F. Kurose and Keith W. Ross, 6/E, Addison-Wesley 2013.

VII. Reference books & Material

1. Data Communications and Networking, 5th edition, Behrouz Forouzan, 2012.
2. Computer Networks (5th Edition) 5th Edition by Andrew S. tenanbaum (Author), David J.Wetherall

VIII. Course Assessment

Evaluation methods	Theory Weight (%)[T]	Lab Weight(%)[L]
Quizzes	15	-
Assignments	10	10
Sessional Exam(I and II)	10+15	10+15
Terminal Exam	50	50
Total	100	100
Total =T+L	**T=(T/100)*67**	**L=(L/100)*33**

The course teacher may select any one of the above weightage as per the course credit hours.

IX. Course Outline and Contents

Lecture	CDF Unit #	Topics Covered	Textbook Section
1.	1	Introduction and overview: What is internet, Network edge: Client Server Programs	Kurose: Chap 1
2.	1	Access Networks and Physical Media , Network Core: Circuit Switching vs. Packet switching	Kurose: Chap 1
3.	1	How do the packets make their way through, ISPs and internet backbones, Concepts of Delay Loss and Throughput; Queuing delay, End to End delay, Throughput in Packet switched Networks	Kurose: Chap 1
4.	2	Protocol layers and their service models: Layered Architecture, Messages, Segments, Datagrams and Frames	Kurose: Chap 1
5.	3	**Application Layer**: HTTP: Persistent vs. Non Persistent connections, Message format, Cookies, Web Caching, Conditional GET	Kurose: Chap 2
6.	3	FTP, Electronic mail: SMTP, Mail Access Protocols, Message Format	Kurose: Chap 2
7.	3	DNS: How it works	Kurose: Chap 2
8.	3	P2P file distribution; DHT (distributed Hash table)	Kurose: Chap 2
9.	3	Socket Programming with TCP: Client Server Application in Java	Kurose: Chap 2
10.	4	**Transport Layer**: Transport Layer Services, Multiplexing, De-multiplexing; UDP: segment structure, Checksum	Kurose: Chap 3
11.		**Sessional 1**	
12.	4	Principles of reliable data transfer: Building a reliable data transfer protocol, rtd 1.0,2.0,3.0	Kurose: Chap 3
13.	4	Pipelined reliable data transfer protocol	Kurose: Chap 3
14.	4	Go Back N, Selective Repeat Protocol	Kurose: Chap 3
15.	4	Connection Oriented TCP: Connection, segment structure, RTT estimation and timeout, reliable data transfer, Flow Control	Kurose: Chap 4

16.	5	**The Network Layer**: Virtual Circuits and datagram networks, what's inside a router, IP protocol: Datagram format	Kurose: Chap 4
17.	5	IPv4 Addressing: sub netting	Kurose: Chap 4
18.	5	Routing algorithms: Distance Vector and Link state routing protocols	Kurose: Chap 4
19.	5	ICMP (Internet Control Message Protocol), Routing in the internet, broadcast and multicast routing. Intro to IPv6	Kurose: Chap 5
20.	6	**Link Layer** and Local area networks: Introduction, Link layer services, Where is Link Layer implemented, Adaptors communicating	Kurose: Chap 5
21.	6	Link Layer error detection techniques: Parity Check, Check summing methods, CRC	Kurose: Chap 5
22.	6	Multiple access protocols: Channel Partitioning protocols, LANs,	Kurose: Chap 5
23.		**Sessional 2**	
24.	7	Random Access Protocols slotted ALOHA, ALOHA, CSMA, CSMA/CD, CSMA/CA, Taking Turns Protocols	Kurose: Chap 5
25.	7	link layer addressing (ARP), Ethernet: Frame structure	Kurose: Chap 5
26.	7	link layer switches: Forwarding and Learning, Self-Learning, Switches vs. Routers	Kurose: Chap 5
27.	8	**Physical Layer:** Analog and Digital Data, Analog and Digital Signals, Periodic and non-periodic Signals,	Behrouz: Chap 3
28.	8	Transmission Impairments: Attenuation, Distortion, Noise Nyquist Bit Rate, Shannon Capacity	Behrouz: Chap 3
29.	8	Wireless and Mobile Networks: Characteristics, CDMA,WiFi: 802.11 Wireless LANs	Behrouz: Chap 4
30.	9	Mobility management principles, Mobile IP, Cellular technologies (3G, 4G, Edge, GPRS).	Kurose: Chap 6
31.	**9**	Security in Computer Networks: Principles of Cryptography, Message Integrity and End Point Authentication,	Kurose: Chap 8
32.		**Terminal Examination**	

X. Course Learning Outcomes (CLO)and Program Learning Outcomes

Upon completion of the course, students will be able to:

CLO	Description	PLO
C1	Describe the basic network components, services, technologies and layered network architecture.	a-1
C2	Demonstrate the functionality of each layer using networking tools.	i-2
C3	Develop simple network applications	c-2
C4	Describe the basic issues in Mobile Networks and Network Security.	e-2

Program Learning Outcomes (PLOs)

PLO	Description
a-1	Use knowledge of computing to solve problems
i- 2	Ability to use current tools necessary for computing practice
c- 2	Implement a computer-based system, process, component, or program to meet desired needs;
e- 2	Demonstrate an understanding of IT security issues

XI. Assessment Schedule - Tentative

Give your tentative assessment plan with submission due date.

S. No.	Artifact	Due Date	Remarks
1	Assignment 1	1st week Oct	Tentative
2	Sessional 1	2nd week of October	Tentative
3	Assignment 2	2nd week of November	Tentative
4	Assignment 3	2nd week of November	Tentative
5	Sessional 2	Last week of November	Tentative
6	Assignment 4	2nd week of December	Tentative
7	Terminal Examination	1st week of january	Tentative

The course teacher may add quizzes, project or more assignment as he/she may deemed fit

XII. Policy & Procedures

- **Attendance Policy:** Every student must attend 80% of the lectures delivered in this course and 80% of the practical/laboratory work prescribed for the respective courses. The students falling short of required percentage of attendance of lectures/seminars/practical/laboratory work, etc., shall not be allowed to appear in the terminal examination of this course and shall be treated as having failed this course.

- **Grading Policy:** The minimum pass marks for each course shall be 50%. Students obtaining less than 50% marks in any course shall be deemed to have failed in that course. The correspondence between letter grades, credit points, and percentage marks at CIIT shall be as follows:

Grade	A	A-	B+	B	B-	C+	C	C-	D	F
Marks	90 - 100	85 - 89	80 - 84	75 - 79	70 - 74	65 - 69	60 - 64	55 - 59	50 - 54	<50
Cr. Point	4.0	3.7	3.3	3.0	2.7	2.3	2.0	1.7	1.3	0.0

- **Missing Exam:** No makeup exam will be given for final exam under any circumstance. When a student misses Sessional 1 or Sessional 2 for a legitimate reason (such as medical emergencies), his grade for this exam will be determined based on the Department policy. Further, the student must provide an official excuse within one week of the missed exam.

- **Academic Integrity:** All CIIT policies regarding ethics apply to this course. The students are advised to discuss their grievances/problems with their counsellors or course instructor in a respectful manner.

- **Plagiarism Policy:** Plagiarism, copying and other anti-intellectual behavior are prohibited by the university regulations. Violators may have to face serious consequences.