



## COURSE HANDBOOK

1.	Course Title	Computer Communication and Networks
2.	Course Code	CSC352
3.	Credit Hours	3(3,0)
4.	Semester	Spring 2016
5.	Resource Person	Dr. Muhammad Hasanain Chaudary & Mr. Imran Raza
6.	Supporting Team Members	
7.	Contact Hours (Theory)	3 hours per week
8.	Contact Hours (Lab)	
9.	Office Hours	Thursday 16:00 PM- 17:30 PM Friday 16:00 PM- 17:30 PM
10.	Course Introduction	
This module is the foundation stone for the rest of the Computer Science Modules. It is assumed that students entering our BS program have no prior network and communication knowledge. They are introduced to data communication and Networks structural paradigm in this module.		
11.	Learning Objectives	
The goal of this course is to introduce students to the state-of-the-art in network protocols, architectures and applications. The course introduces students to basic computer network concepts, digital and analog signals, multiplexing techniques, different modem standards, physical and logical topologies, network devices, MAC layer protocols, ATM, Frame Relay, PPP, flow and error control mechanisms, error detection and correction, network layer protocols, IP, ARP, ICMP, IPV6, ICMPV6, Subnetting, different routing protocols, multicast routing protocols, TCP, UDP, RTP, QoS, network management, network security and other advance topics		
12.	Course Contents	
Introduction to the subject and networking fundamentals (1), Layers in a general model of communication and LAN devices (1), Signals (7), Media, connection and collisions (1), LAN Standards, MAN addressing, Framing, and Media Access Control (1), Basics of Token Ring, FDDI, Ethernet and IEEE 802.3 (1), Layer 2 devices (1), Switching (1), Error detection and correction (2), Flow and error control (1), IEEE 802.11 and Bluetooth (1), Layer 2 WAN protocols Frame Relay, ATM and PPP (2), internetworking, addressing and routing (5), Process to process delivery, UDP, TCP, RTP (1), Congestion control and Quality of Service (1), Client server model, Socket interface, DNS ,SMTP, FTP (2), Network management (1), Network Security (1), Advance topics in networks (1).		
13.	Lecture Schedule	
<u>Week</u>	<u>Topic of Lecture</u>	<u>Text</u>
Week 1	Introduction & Networking Fundamentals: Physical Topologies, Logical Topologies, Networking Media, TCP/IP Model	Chapter 1 & 2 of Data communication & Networking 4th edition By: Behrouz A. Forouzan

<b>Week 2</b>	<p>Layers in a general model of Communication, The OSI Model, How the OSI model compares with the TCP/IP Model</p> <p>LAN: Basic LAN devices, the evolution of network devices, the basics of data flow through LANs, the building of LANs</p>	<p>Chapter 3 of Data communication &amp; Networking 4th edition</p> <p>By: Behrouz A. Forouzan</p>
<b>Week 3-4-5</b>	<p>Signals: Sine waves, composite signals, bandwidth, bit interval &amp; bit rate, digital signal as a composite analog signal, digital signal through a wide-bandwidth medium and band-limited medium, low-pass versus band-pass, digital and analog transmission.</p> <p>Noiseless channel: Nyquist bit rate</p> <p>Noisy Channel: Shannon capacity</p> <p>Attenuation, distortion, noise, throughput, propagation speed, propagation time, wavelength.</p> <p>Digital Transmission: line coding, block coding, pulse amplitude modulation (PAM), pulse code modulation, sampling rate, parallel transmission, serial transmission.</p>	<p>Chapter 4 of Data communication &amp; Networking 4th edition</p> <p>By: Behrouz A. Forouzan</p>
<b>Week 6-7</b>	<p>Modulation of Digital Data: aspects of digital-to-analog conversion, amplitude shift keying (ASK), frequency shift keying (FSK), phase shift keying (PSK), quadrature amplitude modulation (QAM), bit/ baud comparison</p> <p>Modem Standards, amplitude modulation (AM), Frequency modulation (FM), Phase Modulation (PM)</p> <p>Multiplexing: FDM multiplexing process, De-multiplexing process, Analog hierarchy, WDM.</p>	<p>Chapter 5 of Data communication &amp; Networking 4th edition</p> <p>By: Behrouz A. Forouzan</p>
<b>Week 8-9</b>	<p>LAN standards, Hexadecimal numbers, MAC addressing, Framing, Media Access Control (MAC)</p> <p>Layer-2 technologies: The basics of token-ring, the basics of FDDI, the details of Ethernet and IEEE 802.3.</p> <p>layer 2 devices, Effects of layer 2 devices on data flow, Wireless LANs</p>	<p>Chapter 6 of Data communication &amp; Networking 4th edition</p> <p>By: Behrouz A. Forouzan</p>
<b>Week 9-10</b>	<p>Switching: circuit switching, packet switching, message switching.</p> <p>Error detection: single-bit error, burst error, redundancy, parity check, cyclic redundancy check (CRC), Checksum.</p> <p>Error Correction: Error correction by retransmission, forward error correction, burst error correction.</p> <p>Flow and Error Control, Stop-and-wait ARQ, GO-BACK-N ARQ, Selective Repeat ARQ. High Level Data Link Control Protocol (HDLC).</p>	<p>Chapter 5 of Computer Networking</p> <p>By: James F. Kurose &amp; Keith W. Ross</p> <p>Chapter 10 of Data communication &amp; Networking 4th edition</p> <p>By: Behrouz A. Forouzan</p>
<b>Week 11</b>	<p>Wireless LANs: IEEE 802.11 architecture, physical layer, MAC Layer, addressing mechanisms. Bluetooth architecture, Bluetooth radio layer, baseband layer, L2CAP.</p> <p>Point-to-point protocol: frame format, transition states, Link Control Protocol (LCP), PAP, CHAP, Network Control Protocol (NCP)</p>	<p>Chapter 5 of Computer Networking</p> <p>By: James F. Kurose &amp; Keith W. Ross</p> <p>Chapter 14 of Data communication &amp; Networking 4th edition</p>

		By: Behrouz A. Forouzan
<b>Week 12</b>	Frame Relay and ATM (Asynchronous Transfer Mode): Frame Relay Architecture, Frame Relay Layers, ATM Architecture, Switching, ATM Layers, Congestion Control and Quality of Service	Chapter 5 & 4 of Computer Networking By: James F. Kurose & Keith W. Ross
	Layer-3 Internetworking, Addressing, Routing: internet addressing, classful addressing, Subnetting	
<b>Week 13-14</b>	Classless addressing, Dynamic Address Configuration, Network Address Translation (NAT), Routing techniques	Chapter 4 of Computer Networking By: James F. Kurose & Keith W. Ross  Chapter 20 & 21 of Data communication & Networking 4th edition By: Behrouz A. Forouzan
	Layer-3 protocols Address resolution Protocol (ARP) mapping, ARP Packet format, ARP encapsulation and operations. ICMP v4, IP v6 and ICMP v6	
	Routing: Unicast Routing Protocols: RIP, OSPF, and BGP.	
	Routing: Multicast Routing: IGMP, Multicast Trees, And MBONE. Multicast Routing Protocols: DVMRP, MOSPF, CBT, PIM	
<b>Week 15-16</b>	Layer 4- Basic Concepts: Process-to-Process delivery, User Datagram Protocol (UDP), Transmission Control Protocol (TCP), and RTP.	Chapter 2 & 3 of Computer Networking By: James F. Kurose & Keith W. Ross  Chapter 23 & 24 of Data communication & Networking 4th edition By: Behrouz A. Forouzan
	Congestion Control & Quality of Service: Data Traffic, Congestion, Congestion control, Quality of Service, Techniques to Improve QOS, Integrated Services, Differentiated Services, QOS in Switched Networks	
	The basics of the application layer, Client-Server Model, Socket Interface	
	Name Space, Domain Name Space, Distribution of DNS, DNS in Internet, DNS Resolution, DNS Messages, Electronic Mail (SMTP) & File Transfer (FTP)	
<b>15.</b>	<b>Text Books</b>	Computer Networking By: James F. Kurose & Keith w. Ross •
<b>16.</b>	<b>Recommended Books</b>	1. Data communication & Networking 4 <sup>th</sup> edition By: Behrouz A. Forouzan  2. Computer Networks (fourth edition) By: Andrew S. Tanenbaum  <b>Research papers:</b> <ul style="list-style-type: none"> <li>• P. Baran, "On Distributed Communication Networks," 1964.</li> <li>• Saltzer, J., D. Reed, and D. Clark. "End-to-end Arguments in System Design." <i>ACM Transactions on Computer Systems (TOCS)</i> 2, no. 4 (1984): 195-206.</li> </ul>

		<ul style="list-style-type: none"> <li>• Clark, D. "Design Philosophy of the DARPA Internet Protocol." <i>Proc ACM SIGCOMM</i> (August 1988): 106-114. Stanford, CA.</li> <li>• Cerf, V., and R. Kahn. "A Protocol for Packet Network Interconnection." <i>IEEE Transactions on Communications</i> COM-22 (1974): 637-648.</li> <li>• Reading: RFC 1034: Domain Name System: Concepts</li> <li>• Hinden, R. "IP Next Generation Overview." <i>Comm of the ACM</i> 39, no. 6 (June 1996): 61-71.</li> <li>• Brodnik, A., S. Carlsson, M. Degermark, and S. Pink. "Small Forwarding Tables for Fast Routing Lookups." <i>Proc ACM SIGCOMM</i> (September 1997). Cannes, France.</li> <li>• Paxson, V. "End-to-End Routing Behavior in the Internet." <i>IEEE/ACM Transactions on Networking</i> 5, no. 5 (October 1997): 601-615.</li> <li>• Jacobson, V., and M. Karels. "Congestion Avoidance and Control." <i>Proc ACM SIGCOMM</i> (August 1988). Stanford, CA.</li> <li>• Mockapetris and Dunlap, "Development of the Domain Name System"</li> <li>• Jacobson: "Congestion Avoidance and Control" :</li> <li>• Chiu/Jain: "Analysis of Increase/Decrease Algorithms for Congestion Avoidance."</li> <li>• Bansal/Balakrishnan: "Binomial Congestion Control Algorithms":</li> <li>• Reading: Mogul etal: "Fragmentation Considered Harmful" Hinden, R. "IP Next Generation Overview." <i>Comm of the ACM</i> 39, no. 6 (June 1996): 61-71.</li> </ul>
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17.	Detail of Teaching and Assessment		
The learning hours for this module are made up of the teaching contact hours as well as the students' private study hours. Further details and timings will be notified later.			
Type		Details:	
Teaching Contact Hours		2 Lectures/week (1.5 hours each)	
Instructors Office Hours		2 hours/week	
Students' Private Study hours		4 hours/week	
Details and timings for the assessment of this module are as follows:			
Theory Part:			
Exam (Weightage)		Duration	Type
Sessional-I Exam (10%)		1 hour	Subjective
Sessional-II Exam (15%)		1.5 hour	Subjective
Final Exam (50%)		3 hours	Subjective
Quiz (6 per semester) (15%)		20 min each	Subjective
Assignments (10%)		4 per semester	Take home type
The minimum pass marks for this course shall be 50%. Students obtaining less than 50% marks in this course (Theory or Practical) shall be deemed to have failed. The correspondence between letter grades, credit points, and percentage marks at COMSATS Lancaster - DDP shall be as follows:			
Grades	Letter Grade	Credit Points	Percentage Marks
A	( Excellent)	4.0	90and above
A-		3.7	85-89
B+		3.3	80-84
B	(Good)	3.0	75-79
B-		2.7	70-74
C+		2.3	65-69
C	(Average)	2.0	60-64
C-		1.7	55-59
D	(Minimum passing)	1.3	50-54
F	(Failing)	0.0	Less than 50
18.	Format of Assignment		
Assignments are usually submitted electronically in a specific format, which will be announced later.			
19.	Plagiarism		
Plagiarism is the failure to credit the writings or ideas of another person that you have used in your own work. In such cases you are, deliberately or inadvertently, attempting to pass their work off as your own. Plagiarism is a <b>serious offence</b> , and can carry severe consequences, from failure of this module to deregistration from the course. You may also commit plagiarism by failing to reference your own work that you have already used in a previously, or by failing to credit the input of other students on group projects.			
It is your responsibility to ensure that you understand plagiarism and how to avoid it. The following recommendations can help you in avoiding plagiarism.			

- Be sure to record your sources when taking notes, and to cite these if you use ideas or, especially, quotations from the original source. Be particularly careful if you are cutting and pasting information between two documents, and ensure that references are not lost in the process.
- Be sensible in referencing ideas – commonly held views that are generally accepted do not always require acknowledgment to particular sources. However, it is best to be safe to avoid plagiarism.
- Be particularly careful with quotations and paraphrasing.
- Be aware that technology is now available at CIIT and elsewhere that can automatically detect plagiarism.
- Ensure that all works used are referenced appropriately in the text of your work and fully credited in your bibliography.
- If in doubt, ask for further guidance from your Course Organizer.

The material that you submit for assessment, whether in an answer script in a written examination or as assessed coursework, must be your own unaided work. Cheating in written examinations and plagiarism in assessed coursework are **examination offences**.

**Plagiarism in assessed coursework** - this is the use or presentation of the work of another person, including another student, as your own work (or as part of your own work) without acknowledging the source. Plagiarism therefore includes submitting the work of someone else as your own, and extensive copying from someone else's work in your own paper or report.

Brief quotations from the published or unpublished work of other persons may be used, but must always be clearly indicated by being placed inside quotation marks, with the source indicated in some way, and the work listed in the bibliography at the end of your own piece of work.

It can also be plagiarism to summarize another person's ideas or judgments without reference to the source.

**Copying material from web pages without acknowledgement is plagiarism.**

**Copying programs (for example from the Internet) without explanation of where they are from or how much you have modified the programs is also plagiarism.**

**Copying from another student (with or without their consent) is plagiarism and both parties will be subject to investigation and possible penalty.**

**Do not copy and do not allow others to copy from you.**

When you are taking notes for a paper or piece of coursework, it is important to include all the sources you have used, and to indicate any quotations so that you can make the necessary references when you come to write the report/assignment/essay etc. "Unconscious plagiarism", including an un-attributed quotation because you did not identify quotations in your notes, is as much an examination offence as deliberate plagiarism, and will be dealt with in the same way as any other examination offence.

**'Turnitin' Academic Plagiarism Detection Service**

All final project reports are checked for plagiarism using the plagiarism detection service 'Turnitin'. Reports are checked against the web and other digital archives to determine how much of it is copied from other sources. Clearly it is ok if some of the text comes from other sources (providing the source is referenced) but the majority of the text should be your own and you will be heavily penalized and potentially subject of a plagiarism investigation if not. Please note that other coursework may be run through the 'turnitin' system at the module organizer's discretion.

**The Google test**

To ensure against plagiarism, all assessed coursework is subject to the "Google Test", which works as follows.

Sentences and phrases from your work are typed into Google, which quickly finds material that has been copied from any web page. Any work containing material found on a Web page will be deemed to have failed the Google Test, unless it has been properly referenced and quoted.

We strongly recommend that you apply the Google Test to your own work before you submit it, to make sure that you have not "accidentally" included words from any web pages. If you find any sections copied from web pages in your work, you should make sure that you remove the offending sections before you submit or make sure that they are properly referenced.

<b>20.</b>	<b>Attendance Policy</b>
Every student must attend 80% of the lectures/seminars delivered in this course and 80% of the prescribed practical/laboratory sessions. 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.	
<b>21.</b>	<b>Conduct</b>
<p>CIIT has high expectations of student behaviour. It is expected that students will help to maintain a pleasant atmosphere suitable for serious study throughout their programme of study. Any behaviour that prevents other students from studying will result in disciplinary action by the University. Persistent offenders will be referred to concerned committee for further disciplinary action and possible deregistration.</p> <p>Two issues requiring particular attention are <b>noise disruption and mobile phones</b>. Students should not distract others by talking during taught classes (lectures, labs, tutorials, exercises classes, etc.). Students using the labs should be aware of others around them, and should keep any discussion to a reasonable level.</p> <p><b>Mobile phones should always be switched off</b> during taught classes, in the Library, and in any tests or examinations. Any student whose mobile phone rings during a taught class or in the Library may be asked to leave. Any student whose mobile phone rings during a test or examination will be referred to concerned committee for disciplinary action. This may lead to a mark of zero being awarded for that particular assessment, and more serious penalties for a subsequent offence.</p>	
<b>22.</b>	<b>Procedures for CSC352 Module</b>
<p><b>a) Coursework/Assignment Submissions:</b></p> <p>Coursework is usually submitted electronically. When the work is required to be submitted in this way, you have until midnight on the advertised submission date to submit the work. Please note, you must submit the work electronically in the specified file format. When group coursework is to be submitted electronically, a representative of each group (the group leader) should be chosen for submission. If there is any doubt, please contact the Course Organizer <b>BEFORE</b> the submission date.</p> <p>Every piece of <b>written coursework</b> must have a correctly completed front cover sheet which you must sign in order to declare that it is your own work. Please contact course organizer for the template of front cover sheet. Paper submissions must be made in person to the specified person during office contact hours. Do not give coursework to any other member of staff as we will not accept responsibility for anything that is not submitted properly. Especially, do not push work under offices doors as it is quite likely to be picked up and disposed of by the cleaning staff. Students, who miss the coursework deadline because of extenuating circumstances, can still submit their work (subject to the approval of course organizer). In this case the submission will be logged as "Late Submission" and will automatically be penalized.</p> <p><b>b) Examinations:</b></p> <p>For the explanations, students will be assessed according to clear understanding of concepts and correct usage of technical information in their responses. For essays and assignments, the relevance of information and the coherence of the details would be assessed along with importance and credits for proper examples. For practical assignments, students will be rewarded according to the proper usage of features and tools regarding that assignment, extra credit will be given to students who show more technical learning.</p> <p><b>c) Penalties for Late Submission of Coursework</b></p> <p>If you fail to submit coursework on time you will be penalized on the following scale:  10% per day will be lost from your overall mark. (For purposes of calculating penalty – each period of up to 24 hours after the initial submission is counted as 1 day). However, this will be capped at 30% (3 days) maximum penalty. Normally you will not be allowed to submit after the cut-off date. Saturdays and Sundays count as periods late when calculating the penalty.</p> <p><b>d) Request for Extensions to Coursework Submission Dates</b></p> <p>If you have any extenuating circumstances that will result in your coursework being late or you having to miss a scheduled lab session, you must report them to the admin office within 10 days of the coursework deadline.</p>	

**e) Extenuating Circumstances**

Extenuating circumstances normally mean circumstances beyond your control (e.g. illness, death of a close relative etc). Losing memory sticks, computer problems or theft of laptops will not count since you should always have backup copies elsewhere; printer problems will also not count as you should allow enough time to get the printing done even if there are problems.

Any such claim **MUST** be supported by documentary evidence e.g. an original medical certificate covering the date(s) in question, accompanied by an extenuating circumstances formal statement by the student. Any claim will not be considered, under any circumstances, without supporting documents.

Such an authorized absence will allow you to have an experiment rescheduled or coursework submission date shifted by an appropriate amount. However, if the new submission date is likely to exceed the published coursework cut-off date then you may be asked to do a different piece of work to the other students on that course. Also, overall end-of-semester deadlines for marks cannot be exceeded. Each case will be looked at on its individual merits.

Please note that it is your own responsibility to submit claims for extenuating circumstances and students with extenuating circumstances cannot be given extra marks. Marks will only be given for the work actually produced, not what might have been done if extenuating circumstances had not arisen.

**f) Private Study**

In addition to the timetabled classes and labs etc., students should plan to spend at least 4 hours per week on private study for this module. A variety of sources of material may be recommended: lecture slides and/or notes (for information tailored towards the individual module concerned), text-books (for basic, factual information), journals (for in-depth exploration of recent research trends), and conference proceedings (for cutting-edge research in progress). Some of this scientific material may be authored by the module teaching staff.