Academic Course Description

> BHARATH UNIVERSITY
> Faculty of Engineering and Technology
> Department of Electronics and Communication Engineering
> **BEC601 COMPUTER COMMUNICATION AND NETWORKS**
> **Sixth Semester, 2016-17 (Even Semester)**

Course (catalog) description

This is an introductory course on Computer Communications and Networks, focusing on fundamental concepts, principles and techniques. The course will introduce basic networking concepts, including: protocol, network architecture, reference models, layering, service, interface, multiplexing, switching and standards. An overview of digital communication from the perspective of computer networking will also be provided. Topics covered in this course include: Internet (TCP/IP) architecture and protocols, network applications, congestion/flow/error control, routing and internetworking, data link protocols, error detection and correction, channel allocation and multiple access protocols, communication media and selected topics in wireless and mobile networks. This course will also give hands-on experience in network programming using the socket API.

Compulsory/Elective course   :   Compulsory for ECE students

Credit & contact hour   :   3 & 45

Course Coordinator   :   Mr.SRINIVASAN, Asst.Professor

Instructors   :

Name of the instructor	Class handling	Office location	Office phone	Email (domain:@bharathuniv.ac.in)	Consultation
Mr.SRINIVASAN	III	SA Block		Srinivasan.etc@bharathuniv.ac.in	9.00 - 9.50 AM
MS.M.SOWMIYA MANOJ	III	SA Block			12.45 - 1.15 PM

Relationship to other courses:

Pre –requisites   : Communication Engineering-I

Assumed knowledge   :The students will have a basic computer background obtained at a high school (or equivalent) level.

Following courses   : Cryptography and Network Security

Syllabus Contents

UNIT I   DATA COMMUNICATION: 9 HOURS

ISO reference model, Open system standard, Transmission of Digital Data – Electrical Interface, MODEMS, Line Configuration,

Encoding and Decoding, Multiplexing, Error Detection and Correction (CRC).

UNIT II   DATA LINK CONTROL AND PROTOCOLS: **9 HOURS**

Flow control and error control, stop and wait, Sliding windows, Automatic Repeat (ARQ), Asynchronous Protocols, - X MODEM, Y MODEM, Synchronous protocols – Character Oriented and Bit oriented protocols (HDLC).

UNIT III   LOCAL AREA NETWORKS: **9 HOURS**

IEEE 802 standards, LLC, MAC layer protocols – CSMA/CD Ethernet, Token Bus, Token Ring, FDDI, Distributed Queue Dual Bus, Switched Multimega Bit Data Service.

UNIT IV WIDE AREA NETWORKS: **9 HOURS**

Circuit Switch packet Switch, Message Switching, X .25 Protocols, Architecture And Layers of Protocol, Frame Delay, ISDN and ATM Protocol, Internet working Device, Repeater, Bridge, Routes and Gateways, Routing Algorithms.

UNIT V   UPPER OSI LAYERS: **9 HOURS**

Session layer protocols, Presentation layer – Data Security, Encryption/Decryption, Authentication, Data Composition, Application layer protocols – MHS, File transfer, Virtual terminal, CMIP.

                                                                                            TOTAL : 45 HOURS

Text book(s) and/or required materials

   T1.Behrus A. Forouzan etal, "Data Communication and Networking", 2nd Edition, Tata McGraw-

Refrence Books:

   R1.William Stallings, "Data and Computer Communication", Fifth Edition, Prentice Hall of India,1997.

   R2.Andrew S.Tanenbaum, "Computer networks", Third Edition, prentice Hall of India, 1996.

   R3.www.studytonight.com/computer-network.

Computer usage: Nil

Professional component

General	-	0%
Basic Sciences	-	0%
Engineering sciences & Technical arts	-	0%
Professional subject	-	100%

Broad area : Computer Networks

Test Schedule

S. No.	Test	Tentative Date	Portions	Duration
1	Cycle Test-1	Feb 2nd week	Session 1 to 14	2 Periods
2	Cycle Test-2	March 2nd week	Session 15 to 28	2 Periods
3	Model Test	April 3rd week	Session 1 to 45	3 Hrs
4	University Examination	TBA	All sessions / Units	3 Hrs.

Mapping of Instructional Objectives with Program Outcome

To make the students to understand the different layers of ISO /OSImodel and TCP/IP Network IEEE standards. To understand IP addressing methods and QOS parameters. To know the functions and congestion control mechanism of TCP. To know about application layer and network security.	Correlates to program outcome		
	H	**M**	**L**
1. Explain the networks, topologies and layers of OSI model,compare with TCP/IPmodel.	a,b,j	e,f	k
2. Classify error control and flow control techniques and types of LAN technologies.		a,i	b
3. Analyze different routing algorithms and methods to improve QOS	b,g	a,c,d,j	
4. Explain the role of protocols in networking.	b,e,k	a,c,d,g,i	
5. Summarize the transport layer protocols and congestion controls methods.	i		h
6. Describe various application layer services and cryptographic techniques.	a	f	

H: high correlation, M: medium correlation, L: low correlation

Draft Lecture Schedule

Session	Topics	Problem Solving Yes/No	Text /Chapter
UNIT I DATA COMMUNICATION			
1.	ISO reference model	No	T1/Part 1 R1/Chapter 1
2.	Open system standard	No	
3.	Transmission of Digital Data	No	
4.	Electrical Interface, MODEMS	No	
5.	Line Configuration	No	
6.	Encoding and Decoding	No	
7.	Multiplexing	No	
8.	Error Detection	Yes	
9.	Error Correction (CRC)	Yes	
UNIT II DATA LINK CONTROL AND PROTOCOLS			
10.	Flow control and error control	No	T1/Part 2 R1/Chapter 3
11.	stop and wait, Sliding windows	No	
12.	Automatic Repeat (ARQ)	No	
13.	Asynchronous Protocols	No	
14.	X MODEM	No	
15.	Y MODEM	No	
16.	Synchronous protocols	No	
17.	Character Oriented protocols	No	
18.	Bit oriented protocols (HDLC)	No	
UNIT III LOCAL AREA NETWORKS			
19.	IEEE 802 standards	No	T1/Part 3 R2/Chapter 4
20.	LLC,	No	
21.	MAC layer protocols	No	
22.	CSMA/CD Ethernet	No	
23.	Token Bus	No	
24.	Token Ring	No	
25.	FDDI	No	
26.	Distributed Queue Dual Bus	No	
27.	Switched Multi mega Bit Data Service	No	
UNIT IV WIDE AREA NETWORKS			
28.	Circuit Switch packet Switch	No	
29.	Message Switching	No	
30.	X .25 Protocols	No	

31.	Architecture And Layers of Protocol	No	T1/Part 4
32.	Frame Delay	No	R2/Chapter 5
33.	ISDN and ATM Protocol	No	
34.	Internetworking Device, Repeater	No	
35.	Bridge, Routes and Gateways	No	
36.	Routing Algorithms	No	
UNIT V UPPER OSI LAYERS			
37.	Session layer protocols	No	
38.	Presentation layer	No	
39.	Data Security	No	
40.	Encryption/Decryption	No	T1/Part 5
41.	Authentication	No	R3/Chapter 1
42.	Data Composition	No	
43.	Application layer protocols	No	
44.	MHS, File transfer	No	
45.	Virtual terminal, CMIP	No	

Teaching Strategies

The teaching in this course aims at establishing a good fundamental understanding of the areas covered using:

- Formal face-to-face lectures

- Tutorials, which allow for exercises in problem solving and allow time for students to resolve problems in understanding of lecture material.

- Laboratory sessions, which support the formal lecture material and also provide the student with practical construction, measurement and debugging skills.

- Small periodic quizzes, to enable you to assess your understanding of the concepts.

Evaluation Strategies

Cycle Test – I	-	5%
Cycle Test – II	-	5%
Model Test	-	10%
Attendance	-	5%
Assignment/Seminar/online test/quiz	-	5%
Final exam	-	70%

Prepared by: Mr.V.Srinivasan Assistant professor , Department of ECE   **Dated :**

Addendum

ABET Outcomes expected of graduates of B.Tech / ECE / program by the time that they graduate*:*

a. An ability to apply knowledge of mathematics, science, and engineering

b. An ability to design and conduct experiments, as well as to analyze and interpret data

c. An ability to design a hardware and software system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability

d. An ability to function on multidisciplinary teams

e. An ability to identify, formulate, and solve engineering problems

f. An understanding of professional and ethical responsibility

g. An ability to communicate effectively

h. The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context

i. A recognition of the need for, and an ability to engage in life-long learning

j. A knowledge of contemporary issues

k. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Program Educational Objectives

PEO1: PREPARATION

Electronics Engineering graduates are provided with a strong foundation to passionately apply the fundamental principles of mathematics, science, and engineering knowledge to solve technical problems and also to combine fundamental knowledge of engineering principles with modern techniques to solve realistic, unstructured problems that arise in the field of Engineering and non-engineering efficiently and cost effectively.

PEO2: CORE COMPETENCE

Electronics engineering graduates have proficiency to enhance the skills and experience to apply their engineering knowledge, critical thinking and problem solving abilities in professional engineering practice for a wide variety of technical applications, including the design and usage of modern tools for improvement in the field of Electronics and Communication Engineering.

PEO3: PROFESSIONALISM

Electronics Engineering Graduates will be expected to pursue life-long learning by successfully participating in post graduate or any other professional program for continuous improvement which is a requisite for a successful engineer to become a leader in the work force or educational sector.

PEO4: SKILL

Electronics Engineering Graduates will become skilled in soft skills such as proficiency in many languages, technical communication, verbal, logical, analytical, comprehension, team building, interpersonal relationship, group discussion and leadership ability to become a better professional.

PEO5: ETHICS

Electronics Engineering Graduates are morally boosted to make decisions that are ethical, safe and environmentally-responsible and also to innovate continuously for societal improvement.

Course Teacher	Signature
MR.SRINIVASAN	
MS.M.SOWMIYA MANOJ	

Course Coordinator   **HOD/ECE**