

PG DEPARTMENT OF COMPUTER SCIENCE				CLASS: <i>IM.Sc. Computer Science</i>				
Sem	Course Type	Course Code	Course Title	Credits	Contact Hours/week	CIA	Ext	Total
II	Major Core - 5	21P2DMC5	Advanced Computer Networks	4	5	25	75	100

Nature of Course			
Knowledge and skill	✓		Employability oriented
Skill oriented			Entrepreneurship oriented

Course Objectives

1. To understand the general principles of data communication.
2. To familiarize the transmission media, flow control and error detection and correction.
3. To acquire the knowledge of the basic protocols involved in wired and wireless communication process.
4. To gain core knowledge of network layer routing protocols and IP addressing.
5. To motivate the need for network security practices in organizational units.

Unit	Content	Hrs	K-Level	CLO
I	Introduction: Data Communication -Networks - Network Types - Internet History - Standards and Administration. Network Models: Protocol Layering - TCP/IP Protocol Suite - The OSI Model. Physical Layer: Data Signals - Periodic Analog Signals - Digital Signals - Transmission Impairment - Data Rate Limits – Performance.	15	Up to K2	1
II	Multiplexing - Spread Spectrum. Switching: Introduction - Circuit - Switched Networks - Packet Switching - Structure of a Switch. Data - Link Layer: Introduction - Link Layer Addressing. Error Detection & Correction: Introduction - Block Coding - Cyclic Codes - CheckSum - Forward Error Correction.	15	Up to K3	2
III	Wired LANs: Ethernet: Ethernet Protocol - Standard Ethernet Wireless LANs: Introduction - IEEE 80.11 Projects - Bluetooth Other Wireless Networks: WiMAX - Cellular Telephony - Satellite Networks. Connecting Devices. Network Layer: Introduction to Network Layer: Network - Layer Services - Packet Switching - Network - Layer Performance - IPV4 Addresses - Forwarding of IP Packets.	15	Up to K4	3

IV	Network - Layer Protocol: Internet Protocol (IP) - ICMPv4 - Mobile IP. Next Generation IP: IPv6 Addressing - The IPv6 Protocol - The ICMPv6 Protocol - Transition from IPv4 to Ipv6. Transport Layer: Introduction - Transport - Layer Protocols. Transport - Layer Protocols: Introduction - User Datagram Protocol - Transmission Control Protocol.	15	Up to K3	4
V	Cryptography and Network Security: Introduction – Confidentiality – Other Aspects of Security. Internet Security: Network Layer Security – Transport Layer Security – Application Layer Security - Firewalls	15	Up to K4	5

Book for Study

Data Communications and Networking by Behrouz A.Forouzan, 5th edition, Tata McGraw Hill Education (India) Private Limited.

Chapters

UNIT – I 1: 1.1- 1.5., 2: 2.1- 2.3., 3: 3.1- 3.6.
 UNIT – II 6: 6.1, 6.2 , 8: 8.1- 8.4., 9: 9.1, 9.2., 10: 10.1- 10.5.
 UNIT – III 13: 13.1, 13.2., 15: 15.1, 15.2., 16: 16.1- 16.3, 17: 17.1, 18: 18.1- 18.5.
 UNIT – IV 19: 19.1- 19.3., 22: 22.1- 22.4., 24: 24.1- 24.3
 UNIT – V 31: 31.1- 31.3. 32: 32.1- 33.4.

Books for Reference

1. Computer Networks by A.S.Tanenbaum, Fifth Edition, Pearson Education. Inc, 2011.
2. Introduction to Data Communication in Networking by B.Frouzan, Tata McGraw Hill Education (India) Private Limit
3. Computer Networks – A Systems Approach by Larry L. Peterson and Bruce S. Davie, 4th Edition, Publisher: Elsevier Science, 2007.

Web Resources

1. <http://www.geeksforgeeks.org>
2. <http://www.en.m.wikipedia.org>
3. <http://www.tutorialspoint.com>

Rationale for Nature of the course

- To allow multiple processes to send and receive the data over the network without interfering with other processes.

Activities on Knowledge and Skill

- Creating Models
- Quiz
- Seminar

Pedagogy

Chalk and talk Materials, PPT, Assignment, Seminar, Group discussion, Interaction and Projectors.

Course Designer(s) Name

1. Mr. N. RadhaKrishnan
2. Ms. S. Saranya

Lesson Plan

UNITS	Topics to be covered	Hours	Mode
I	Introduction to Networks,	3	Lecture
	Network Models,	5	Lecture, GD
	Physical Layer	7	Lecture
II	Switching.	7	Lecture
	Data - Link Layer, Error Detection & Correction.	8	Lecture
III	Wired LANs: Ethernet.	5	Lecture
	Other Wireless Networks.	5	Lecture
	Network Layer.	5	Lecture, PPT
IV	Network - Layer Protocol.	5	Lecture
	Transport Layer: Transport - Layer Protocols.	10	Lecture
V	Cryptography and Network Security.	7	Lecture, Assignment
	Internet Security.	8	Lecture, PPT

Course Learning Outcomes

On the successful completion of the course, students will be able to

CLOs	COURSE LEARNING OUTCOMES	K - Levels
CLO 1	Describe the functions of each layer in OSI and TCP/IP model.	Up to K2
CLO 2	Differentiate various Switching techniques and Apply the concept of different Error Detection and Correction methods.	Up to K3
CLO 3	Discuss the design principles of wired and wireless communication media.	Up to K4
CLO 4	Understand the various Transport layer protocols and also differentiate IPV4 and IPV6 Protocols.	Up to K3
CLO 5	Discuss and Explain current network authentication applications, network security and their vulnerabilities that are exploited by intentional and unintentional attacks.	Up to K4

Mapping of CLOs with POs

CLOs / POs	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	2	2	2	1	1	-
CLO2	2	2	2	1	2	-
CLO3	2	2	2	2	2	1
CLO4	2	2	1	2	2	1
CLO5	2	2	1	2	3	3

(3 –Advanced Application, 2 – Intermediate Level, 1- Basic Level)

Continuous Internal Assessment (CIA): 25 Marks

Components	Marks	K Level
Test (Average of two tests) (Conducted for 40 marks and converted into 10 marks)	10	(Refer Next Table)
Assignment	5	K4
Seminar	5	K4
Quiz	5	K4
Total	25	

Learning Outcome Based Education & Assessment (LOBE)

Formative - Blue Print – Model for Advanced Computer Networks Articulation Mapping – K Levels with Courses Learning Outcomes (CLOs)

Internal	CLOs	K- Level	Section A		Section B (Either/or Choice)	Section C (Open Choice)
			Short Answers			
			No. of Questions	K- Level		
CIA I	CLO 1	Up to K2	2	K1	2(K1&K1)	2(K2)
	CLO 2	Up to K3	3	K1	2(K2&K2)	1(K3)
CIA II	CLO 3	Up to K4	2	K2	2(K4&K4)	2(K4)
	CLO 4	Up to K3	3	K2	2(K3&K3)	1(K3)
Question Pattern (CIA I & II)	No. of Questions to be asked		5		4	3
	No. of Questions to be answered		5		2	2
	Marks for each question		2		5	10
	Total Marks for each section		10		10	20

- CLO5 will be allotted for individual Assignment which carries five marks as part of CIA component.

Distribution of Section-wise Marks with K Levels *

K Levels	Section A (No Choice)	Section B (Either/or)	Section C (Open Choice)	Total Marks	% of Marks without choice	Consolidated %
K1	10	10	-	20	33.33	83
K2	-	10	20	30	50	
K3	-	-	10	10	16.67	17
K4	-	-	-	-	-	-
Total Marks	10	20	30	60	100	100

K Levels	Section A (No Choice)	Section B (Either/or)	Section C (Open Choice)	Total Marks	% of Marks without choice	Consolidated
K1	-	-	-	-	-	17
K2	10	-	-	10	16.67	
K3	-	10	10	20	33.33	33
K4	-	10	20	30	50	50
Total Marks	10	20	30	60	100	100

**Learning Outcome Based Education & Assessment (LOBE)
Summative - Blue Print – Model for Advanced Computer Networks
Articulation Mapping – K Levels with Courses Learning Outcomes (CLOs)**

UNITS	CLOs	K- Level	Section A		Section B		Section C (Either/or Choice)	Section D (Open Choice)
			MCQs		Short Answers			
			No of Questions	K - Level	No of Questions	K – Level		
1	CLO1	Up to K2	2	K1 & K1	1	K1	2(K1&K1)	1(K2)
2	CLO2	Up to K3	2	K2 & K3	1	K1	2(K2&K2)	1(K3)
3	CLO3	Up to K4	2	K2 & K4	1	K2	2(K4&K4)	1(K4)
4	CLO4	Up to K3	2	K3 & K3	1	K2	2(K3&K3)	1(K3)
5	CLO5	Up to K4	2	K3 & K4	1	K3	2(K4&K4)	1(K4)
No. of Questions to be asked			10		5		10	5
No. of Questions to be answered			10		5		5	3
Marks for each question			1		2		5	10
Total Marks for each section			10		10		25	30

- K1 – Remembering and recalling facts with specific answers
- K2 – Basic understanding of facts and stating main ideas with general answers
- K3 – Application oriented – Solving Problems
- K4 – Examining, analyzing, presentation and make inferences with evidences

Distribution of Section – wise Marks with K Levels

K Levels	Section A (No Choice)	Section B (No choice)	Section C (Either/or)	Section D (Open choice)	Total Marks	% of Marks without choice	Consolidated
K1	2	4	10	-	16	13.33	13%
K2	2	4	10	10	26	21.67	22%
K3	4	2	10	20	36	30.00	30%
K4	2	-	20	20	42	35	35%
Total Marks	10	10	50	50	120	100	100%