TELECOMMUNICATION SWITCHING THEORY AND APPLICATIONS

V Semester: ECE

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
AEC523	**ELECTIVE**	3	-	-	3	30	70	100
Contact Classes: 45	**Tutorial Classes: Nil**	**Practical Classes: Nil**				**Total Classes: 45**		

OBJECTIVES:
The course should enable the students to:

I. Learn to consider tele-traffic demands, quality of service, scalability, performance and cost into Consideration to develop requirements and architectures.
II. Underlying technologies and applications including wireless communications, including mobility, optical communications, wavelength routing, packet networks and the Internet.
III. Coordinated with CS 440, computer networks, where communications protocols and the TCP/IP Protocols suite is addressed.

COURSE OUTCOMES (COs):

I. Review, analyse, interpret and explain the main concepts of telecommunication network.
II. Evaluate, compare, classify and explain the operation of fundamental telecommunication switching network configurations models
III. Discuss, classify and determine the significance of basic modern signalling system.
IV. Analyse, interpret and discuss the concepts of OSI/ISO and explain its role in design of telephone network.
V. Analyse, interpret and discuss the concepts Integrated Services Digital Networks, types of networks, charging procedures and routing mechanisms.

COURSE LEARNING OUTCOMES (CLOs):

1. Understand basic and some advanced concepts and techniques of telecommunications networks.
2. Discuss the simple telephone communication.
3. Ability to analyse the characteristics of the telephone systems.
4. Ability to analyse the processes used in telecommunication.
5. Ability to make use of the parameters in designing telephone switches
6. Discuss the basic settings in the operation of telecommunications systems and devices
7. Determine the traffic engineering and traffic load parameters.
8. Understand the, grade of service and blocking probability.
9. Implement the performance of a digital telephone switch.
10. Evaluate the Time Division Multiplexing services.
11. Explain network and transport layer functions and describe Internet routing algorithms and TCP/IP.
12. Understand the concept of ISO/OSI models.
13. Acquire the purpose of layering and describe the current layered architecture for the Internet
14. Analyse the LAN and metropolitan network.

15. Apply the fiber optics into data networks.
16. Design network synchronization and network management
17. Understand the cellular communication networks.
18. Develop problem solving approaches as applied in telecommunications networking areas.
19. Analyse performance of basic communication networks using both analytical and simulation techniques
20. Apply the telecommunication network design techniques and practical implementation issues.
21. Understand the network and protocol architecture
22. Determine the voice data integration.

Unit-I	INTRODUCTION	Classes: 10

Introduction: Evolution of telecommunications, simple telephone communication, manual switching system, major telecommunication networks, strowger switching system, crossbar switching; Electronic Space Division Switching: Stored program control, centralized SPC, distributed SPC, enhanced services, two stage networks, three stage network n-stage networks.

UNIT-II	TIME DIVISION SWITCHING	Classes: 09

Time Division Switching: Time multiplexed space switching, time multiplexed time switching, combination Switching, three stage combination switching, n-stage combination switching; Traffic Engineering: Network traffic load and parameters, grade of servicVe and blocking probability, modeling switching systems, incoming traffic and service time characterization, blocking models and loss

Estimates, delay systems.

UNIT-III	DATA NETWORKS	Classes: 08

Data networks: Block diagram, features, working of EPABX systems, and data transmission in PSTNs, data rates in PSTNs, modems, switching techniques for data transmission, circuit switching, store and forward switching data communication architecture.

ISO-OSI reference model, link to link layers, physical layer, data link layer, network layer, end to end layers, transport layer, session layer, presentation layer, Satellite based data networks, LAN, metropolitan area network, fiber optic networks, and data network standards.

UNIT-IV	TELEPHONE NETWORKS	Classes: 08

Telephone Networks: Subscriber loop systems, switching hierarchy and routing, transmission plan, transmission systems, numbering plan, charging plan, signaling techniques, in channel signaling, common channel signaling, and cellular mobile telephony.

UNIT-V	INTEGRATED SERVICES DIGITAL NETWORKS	Classes: 10

Integrated Services Digital Networks: Motivation for ISDN, new services, network and protocolNArchitecture, transmission channels, user network interface, signaling, numbering and addressing, service characterization, interworking, ISDN standards, broadband ISDN, voice data Integration.

Text Books:

1. Thiagarajan Vishwanathan, "Telecommunication Switching Systems and Networks"; PHI Publications, 1992.

2. J. E. Flood, "Telecommunications Switching, Traffic and Networks", Pearson Education, 2nd Edition, 2007.

3. John C. Bellamy, "Digital Telephony", Wiley Publications, 3rd Edition, 2000.

Reference Books:

1. Wayne Tomasi, "Electronic Communications Systems", Pearson Education, 5th Edition, 2009.
2. William C.Y.Lec, "Mobile Cellular Telecommunication, Analog and Digital Systems", McGraw-Hill Inc, 2nd Edition, 1995.
3. Kaveh Pahlavan, Allen H. Levesque" Wireless Information Networks", Wiley Series, John Wiley and Sons Inc, 1st Edition, 2005.

Web References:

1. http://www.ie.itcr.ac.cr/
2. http://www.neduet.edu.pk/
3. http://www.researchgate.net
4. http://www.mitpress.mit.edu

E-Text Books:

1. http://www.e-booksdirectory.com/listing.php?category=292
2. link.springer.com/book/10.1007%2F978-1-4899-2215
3. www.ie.itcr.ac.cr/acotoc/Maestria_en_Computacion/Sistemas_de
4. https://www.crcpress.com/...Communications-Theoretical...Applications