



**Course Title: DATA COMMUNICATIONS**

**Course Code: CSIT601**

**Credit Units: 4**

**Course Objectives:**

The objective of this course is

- To give students in-depth knowledge of digital communications during transmission and its varied application in different types of transmission medium.
- Microwave electromagnetic spectrum
- Optical Fiber systems
- Mobile and Satellite Communication
- Network Flows and Traffic Flows

**Pre-requisites: NIL**

**Student Learning Outcomes:**

The student will be able to:

- Identify basic computer network technology independently.
- Illustrate reference models with layers, protocols and interfaces.
- Summarize functionalities of different Layers.
- Demonstrate Data Communications System and its components.
- Identify the different types of network devices and their functions within a network.
- Describe and Analysis of basic protocols of computer networks, and how they can be used to assist in network design and implementation.

**Course Contents/Syllabus:**

L	T	P/S	SW/FW	TOTAL CREDIT UNITS
3	1	-	-	4

	<b>Weightage (%)</b>
<b>Module I Communication Theory</b>	<b>25</b>
Introduction to Computer Communication networks; Amplitude modulation system: Band pass systems and signals, Frequency Modulation systems: Spectrum of an FM signals, Narrowband and wideband FM Pulse Modulation systems: Sampling Theorem, Generation and demodulation of PAM, PWM, PPM. Quantization of signals, quantization error, PCM, Companding and Multiplexing of PCM signals.	
<b>Module II Digital Communication System</b>	<b>25</b>
Line Code: On-Off(RZ), Polar(RZ), Bipolar(RZ), On-Off(NRZ), Polar(NRZ), and their power spectrum density(PSD), HDB Coding; Base band pulse transmission: Inter symbol interference(ISI) and its reduction techniques; Nyquist criterion for distortion less baseband binary transmission; Correlative coding. Eye pattern Digital baseband transmission: BPSK, BFSK, OPSK, OAM. MSK and M-ary, FSK transmitter and receiving systems and their probability of error; Power spectra, Different types of transmission system, Circuit switching and packet switching.	
<b>Module III Microwave, Mobile and Satellite Communication</b>	<b>20</b>
Introduction to Microwave electromagnetic spectrum: Microwave signal propagation. Applications of microwave systems, Elements of satellite communication: Satellite concepts, Orbital period and velocity; Use of transponders, Uplink and downlink frequencies, GSM mobile Communication, CDMA Communication	
<b>Module IV Optical Fiber systems</b>	<b>15</b>
Fundamentals of Optical Fiber systems: Snell's law, Attenuation characteristics of fiber, overview of SDH.	
<b>Module V Switching networks and traffic theory</b>	<b>15</b>
Different types of switches, network flow and traffic flow, Traffic classification and Management	

**Pedagogy for Course Delivery:**

The class will be taught using theory and case based method. In addition to assigning the case studies, the course instructor will demonstrate and explain about elements of communication and applications of computer networks.

**Assessment/ Examination Scheme:**

<b>Theory L/T (%)</b>	<b>Lab/Practical/Studio (%)</b>	<b>End Term Examination (%)</b>
<b>100</b>	<b>-</b>	<b>100</b>

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**Theory Assessment (L&T):**

Continuous Assessment/Internal Assessment					End Term Examination
Components (Drop down)	Mid-Term Exam	Assignment	Case Study	Attendance	
Weightage (%)	10%	5%	10%	5%	70%

**Text & References:**

*Text:*

- Behrouz Forouzan ,Data Communications and Networking; Tata McGraw-Hill; Edition 5; 2012 ISBN: 0072923547
- Andrews S. Tanenbaum, David J Wetherall; Pearson Education; Computer Networks; Edition 5, 2012, ISBN: 1292024224
- William Stallings, Data & Computer Communications, PHI, Edition 6, 2012

*References:*

- Jerry Fitzgerald and Alan Dennis, Business Data Communications & Networking, John Wiley & Sons Inc, 2010.
- **Web Reference:** Cisco.netacad.net