Course code	Course Name	L-T-P	Credits	Year of Introduction
IT203	Data Communication	3-0-0	3	2016

Prerequisite : Nil

Course Objectives

• Build an understanding of the fundamental concepts of data transmission.

• Familiarize the student with the basics of encoding of analog and digital data

• Preparing the student for understanding advanced courses in computer networking

Syllabus

Communication model-. Time Domain and Frequency Domain concepts-- Transmission Impairments- Channel capacity- Transmission media- Synchronous and Asynchronous transmission. Sampling theorem - Encoding digital data into digital signal- Encoding analog data into digital signals-- Encoding analog data into analog signals- Multiplexing- Spread spectrum -Purpose of encoding- Construction of basic source codes:- Error Detecting and correcting codes-encoding and decoding of codes -Basic principles of switching - circuit switching, packet switching, message switching. - Basics of wireless communication

Expected Outcome

After the successful completion of the course students will be able to

• Explain Data Communications concepts and its components.

• Identify the different types of Transmission media and their functions within a network.

• Independently understand encoding, decoding , error correction and error detection in data communication

• To understand switching principles and basics of wireless communication

References
1. Stallings W., Data and Computer Communications, 8/e, Prentice Hall, 2007.

2. Forouzan B. A., Data Communications and Networking, 4/e, Tata McGraw Hill, 2007. 9

3. Tanenbaum A. S and D. Wetherall, Computer Networks, Pearson Education, 2013.

4. Schiller J., Mobile Communications, 2/e, Pearson Education, 2009.

5. Ranjan Bose ,Information Theory, Coding and Cryptography 2nd Edition:, Tata McGraw-Hill, New Delhi, 2008

6. Simon Haykin,Communication Systems: John Wiley & Sons. Pvt. Ltd.

7. Taub & Schilling, Principles of Communication Systems: Tata McGraw-Hill

8. Das, Mullick & Chatterjee, Principles of Digital Communication: Wiley Eastern Ltd.

9. Error Control Coding Fundamentals and Applications: Prentice Hall Inc.

Module	Course Plan	Hours	End-Semester Exam marks
I	Communication model Simplex, half duplex and full duplex transmission. Time Domain and Frequency Domain concepts - Analog & Digital data and signals - Transmission Impairments - Attenuation, Delay distortion, Noise - Different types of noise Channel capacity -Shannon's Theorem - Transmission media- twisted pair, Coaxial cable, optical fiber, terrestrial microwave, satellite microwave.	7	15%
II	Synchronous and Asynchronous transmission. Sampling theorem - Encoding digital data into digital signal - NRZ, Biphase, Multilevel binary - Encoding digital data into analog signals - ASK, FSK, PSK	7	15%
FIRST INTERNAL EXAM			
III	Encoding analog data into digital signals - PCM, PM, DM - Encoding analog data into analog signals - AM, FM, PM. Multiplexing - TDM, FDM, WDM & DWDM Encoding techniques, . Spread spectrum-The concept of spread spectrum – frequency hopping spread spectrum – direct sequence spread spectrum – code division multiple access	7	15%
IV	Purpose of encoding, Instantaneous codes, Construction of instantaneous codes. Construction of basic source codes. Huffman coding, Arithmetic coding, ZIP coding. Error Detecting and correcting codes. Error detection - parity check, Forward Error Correction. Block codes, Convolution codes.	7	15%
SECOND INTERNAL EXAM			
V	Cyclic codes: - Generator polynomial, Generator and Parity check matrices, Encoding of cyclic codes, Syndrome computation and error detection -CRC, VRC. Decoding of cyclic codes, BCH codes, RS codes, Burst error correction.	7	20%

VI	Hamming codes, Encoding and decoding of systematic and unsystematic codes Basic principles of switching - circuit switching, packet switching, message switching. Basics of wireless communication, Introduction to WiFi, WiMax, GSM, GPRS.	7	20%
END SEMESTER EXAM			

QUESTION PAPER PATTERN (End semester examination)

Maximum Marks :   100   Exam Duration: 3 Hrs

Part A –(Modules I and II) 2 out of 3 questions (uniformly covering the two module) are to be answered. Each question carries 15 marks and can have a maximum of 4 sub divisions

Part B – (Modules III and IV) 2 out of 3 questions (uniformly covering the two module) are to be answered. Each question carries 15 marks and can have a maximum of 4 sub divisions

Part C – (Modules V and VI) 2 out of 3 questions (uniformly covering the two module) are to be answered. Each question carries 20 marks and can have a maximum of 4 sub divisions