**19EC3103-DIGITAL COMMUNICATION**

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| **Course Category:** | | Program Core | | **Credits:** | 3 |
| **Course Type:** | | Theory | | **Lecture-Tutorial-Practical:** | 2-1-0 |
| **Prerequisite:** | | Random Signals and Stochastic Processes- Analog Communication | | **Sessional Evaluation:**  **External Evaluation:**  **Total Marks:** | 40  60  100 |
| **Course**  **Objectives** | Students undergoing this course are expected tounderstand: | | | | |
| 1. The basic components of digital communication system. 2. The pulse code modulation schemes for various applications. 3. The Inter-Symbol Interference (ISI) and Nyquist criterion for distortion less baseband binary transmission 4. The transmission and detection of digital passband modulation schemes. 5. The mathematical background for different communication receivers. 6. The architecture, interfaces, channels and applications of GSM. | | | | |
| **Course Outcomes** | After completing the course the student will be able to | | | | |
| CO1 | | Illustrate thedigital transmission with the help of block diagram. | | |
| CO2 | | Describe each block in PCM with help of digital communication system. | | |
| CO3 | | Analyze the need for Nyquist criterion for no-ISI transmission. | | |
| CO4 | | Discuss the generation and detection of ASK and FSK, BPSK and QPSK schemes. | | |
| CO5 | | Derive expressions for error probabilities of ASK and FSK, BPSK and QPSK. | | |
| CO6 | | Demonstrate the architecture of GSM system. | | |
| **Course**  **Content**  **Course**  **Content** | **UNIT – I**  **ELEMENTS OF DIGITAL COMMUNICATION SYSTEMS**: Block diagram of Digital Communication System, Merits and Demerits of Digital Transmission, Line Coding.  **MULTIPLEXING TECHNIQUES:**FDM, TDM, CDM, Comparison of FDM, TDM and CDM, Digital Multiplexers.  **UNIT – II**  **PULSE CODE MODULATIONS:** Introduction to PCM, Transmitter and Receiver, Uniform Quantization, Non-uniform Quantization, Companding, DPCM Transmitter and Receiver, Delta Modulation Transmitter and Receiver, Adaptive Delta Modulation Transmitter and Receiver, Noise in PCM and DM systems. Comparison of Pulse Code Modulation Schemes.  **UNIT – III**  **BASEBAND TRANSMISSION:** Introduction, Inter-Symbol Interference (ISI), Nyquist Criterion for Distortion Less Baseband Binary Transmission, Ideal Nyquist Channel, Raised Cosine Filter & its Spectrum, Correlative Coding – Duo Binary & Modified Duo Binary Signaling Schemes, Baseband M-array PAM Transmission, Equalization Schemes, Eye Patterns.  **UNIT – IV**  **PASSBAND DATA TRANSMISSION:** Introduction, Passband Transmission Model, Generation and Detection of Coherent Amplitude Shift Keying, Frequency Shift Keying, Binary Phase Shift Keying and Quadrature Phase Shift keying, Generation and Detection of non-coherent FSK and DPSK, Generation and Detection of QAM, Comparison of ASK, FSK, BPSK, DPSK and QPSK Schemes.  **UNIT – V**  **Matched Filter:** Integrator and dump filter, Optimum filter, Matched filter, Properties of Matched filter, Matched filter for rectangular pulse, Bit Error Rate due to Noise.  **Error probabilities-** ASK, FSK, BPSK and QPSK.  **UNIT – VI**  **Introduction to Mobile Communication**: Evolution of Mobile Communications,  **Global System for Mobile (GSM):** Architecture, Interfaces, Channels and Applications. | | | | |
| **Text Books and Reference Books** | **TEXT BOOKS:**   1. Communication Systems - Simon Haykin - Wiley India Edition, 4th Edition, 2011. 2. Digital and Analog Communicator Systems - Sam Shanmugam- John Wiley- 2005. 3. Lee. W. C. Y – “Mobile Cellular Telecommunication – Analog and Digital Systems”, Mc Graw Hill, 2015.   **REFERENCE BOOKS:**   1. Principles of communication systems - Herbert Taub. Donald L Schiling- Goutam Sana- 3rd Edition-McGraw-Hill- 2008. 2. Communication Systems- Analog& Digital –R. P. Singh & S.D. Sapre- T.M.H. Publications. 2nd Edition, 2008. 3. Digital Communications - John G. Proakis. Masoudsalehi – 5th Edition-   McGraw-Hill- 2008. | | | | |

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| **Contribution of Course Outcomes towards achievement of Program Outcomes** | | | | | | | | | | | | | | |
|  | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| CO1 | 3 | 3 | 2 | 2 | 1 | - | - | - | - | - | - | 2 | 3 | 3 |
| CO2 | 3 | 3 | 2 | 2 | 1 | - | - | - | - | - | - | 2 | 3 | 2 |
| CO3 | 3 | 3 | 3 | 2 | 1 | 1 | - | - | 1 | - | - | 2 | 2 | 3 |
| CO4 | 3 | 3 | 2 | 2 | 1 | 1 | - | - | - | - | - | 2 | 2 | 3 |
| CO5 | 3 | 3 | 2 | 2 | 1 | 1 | - | - | 1 | - | - | 2 | 3 | 2 |
| CO6 | 3 | 3 | 2 | 2 | 1 | - | - | - | - | - | - | 2 | 3 | 2 |