

NOTICE

Modified syllabus of DCT (6th Semester - B.Tech)
(Course Code: **PCEC 4305** for **ETC/ E&CE/ CSE/ IT** Branch)

As per the recommendation of Board of Studies, the following modified syllabus on the subject "Digital Communication Technique (course code – PCEC 4305)" of 6th semester B.Tech (ETC/ E&CE/ CSE/ IT Branch), is introduced from this academic session (2012-13). The colleges offering the above mentioned course are instructed to follow the syllabus from the current 6th semester B.Tech till further revision of the course.

PCEC 4305 DIGITAL COMMUNICATION TECHNIQUE (3-0-0)

Module - I (12 hours)

Sampling Theorem, Signal Reconstruction from uniform samples, Practical issues in signal sampling and reconstruction, Maximum Information Rate, Non-ideal practical sampling analysis, Some applications of sampling theorem (**Ref Text Book 2: Chapter 6.1**)

Digital Representation of Analog Signal - Quantization of Signals, Quantization error, PCM, Electrical representation of binary digits, PCM System, Companding, Certain issues in Digital transmission: Line coding, scrambling, T1 Digital System, Multiplexing T1 lines – The T2, T3 and T4 lines. Differential PCM: Linear predicted design, Delta Modulation, Adaptive Delta Modulation (**Ref Text Book 1: Chapter 5.4, 5.5 and 5.6**)

Module - II (14 hours)

Digital Modulation Technique:

Generation, Transmission, Reception, Spectrum and Geometrical Representation in the Signal Space of BPSK, DPSK, QPSK, QASK, M-ary PSK, BFSK, M-ary FSK, and Minimum Shifting Keying (MSK). (**Ref Text Book 1: Chapter 6**)

Noise in PCM and DM:

Calculation of Quantization Noise, Output Signal Power, and the Thermal Noise. Output SNR in PCM, Quantization noise in Delta Modulation, output signal power, output SNR, Comparison with PCM and DM (**Ref Text Book 1: Chapter 12.1 -12.3**)

Module - III (16 hours)

Principle of Digital Data Transmission:

Digital Communication Systems – Source, Line coder, Multiplexer, Regenerative repeater; Line Coding: PSD of various line codes, polar signaling, constructing a DC Null in PSD by pulse shaping, On Off signaling, Bipolar signaling; Pulse shaping – ISI and effect, Nyquist first criterion for zero ISI; Scrambling, Digital receiver and regenerative repeaters; Equalizers, Timing extraction, Detection error, Eye Diagram

(**Ref Text Book 2: Chapter 7.1, 7.2, 7.3.1, 7.3.2, 7.4, 7.5, 7.6**)

A base band signal Receiver, Peak signal to RMS noise output voltage ratio, probability of error, optimum threshold, optimum receiver for both base band and pass band: calculation of optimum filter transfer function, optimum filter realization using Matched filter, Probability error of the matched filter, optimum filter realization using correlator.

(**Ref Text Book 1: Chapter 11.1 – 11.3**)

Discrete Messages and information content:

The Concept of amount of Information, Average Information, Entropy; Information rate, source coding to increase average information per bit; Shannon-Fano coding, Shannon's Theorem- Channel Capacity, Capacity of Gaussian channel, Bandwidth – S/N Trade off. Use of Orthogonal Signals to attain Shannon's limit. Matched Filter Reception, calculation of error probability, Efficiency of orthogonal Signal transmission.

(**Ref Text Book 1: Chapter 13.1 – 13.4**)

Text Books:

1. Taub's Principles of Communication Systems by H Taub, D L Schilling and G Saha, 3rd Edition 2008, TMH Education Pvt Ltd, New Delhi.
2. Modern Digital and Analogue Communication Systems by B.P. Lathi and Z Ding, 4th Edition 2010, Oxford University Press, New Delhi.

Additional Readings:

1. Principles of Communication Systems by Taub & Schilling, 2nd Edition. Tata McGraw Hill.
2. Digital Communication by Amitabha Bhattacharya, TMH Publishing Company Ltd, 2006.
3. Communication Systems by Siman Haykin, 4th Edition, John Wiley & Sons, Inc.
4. Digital and Analogue Communication System, Leon W. Couch-II, 6th Edition, Pearson.