UE19EC254: Digital Communication (4-0-0-4-4)

Course Description:
This course provides a comprehensive treatment of the physical layer aspects of practical communication systems. It covers topics from analog communication that are prerequisites for digital communication. It also covers sampling, quantization, pulse shaping and modulation techniques.

Course Objectives:
- Understand the principles of amplitude and angle modulation
- Learn the different sampling techniques
- Understand the performance of different waveform coding techniques
- Understand the idea of signal space
- Learn the different digital modulation techniques

Course Outcomes:
Students completing the course should be able to
- Analyze the different analog modulation techniques
- Analyze the different sampling techniques
- Design quantization and pulse shaping systems
- Develop detection rules for the given transmission scheme
- Analyze the different coherent and non-coherent digital modulation techniques

Pre - Requisite: NIL

Course Content:
Unit 1: Amplitude and Angle Modulation
12 Hours

Unit 2: Sampling
Sampling Theorem, Quadrature Sampling of Band Pass Signals, Practical aspects of sampling and signal recovery. Sample and Hold circuit for signal recovery, Time Division Multiplexing.
10 Hours
Unit 3: Quantization and Pulse Shaping

12 Hours

Unit 4: Intersymbol Interference and Signal Space Representation

11 Hours

Unit 5: Digital Modulation Techniques

11 Hours

Text Book:

Reference Book:
UE19EC257: Digital Communication Laboratory (0-0-2-1-1)

Course Objectives:
- Impart understanding of working principles and applications of communication systems
- Introduce basic applications of modulation
- Provide basic understanding of sampling.

Course Outcomes:

Students completing the course should be able to
- Analyze and appreciate the working of communication circuits involving various modulation methods.
- Design simple circuits using QPSK, DPSK etc.
- Understand various techniques used in FSK, PSK, TDM
- Develop simple projects based on various digital modulation
- Understanding of modems, mixers, up/down converters

Pre - Requisite: Nil

Course Content:
1. Pulse Amplitude Modulation
2. DSBSC and SSB Generation
3. Amplitude Modulation and Demodulation
4. Transistor Mixer Up/Down Conversion
5. Frequency Modulation
6. Flat Top Sampling
7. Amplitude shift Keying
8. Phase Shift Keying
9. Frequency Shift Keying
10. Time Division Multiplexing
11. Open ended experiments: QPSK, DPSK, 16-QAM

Reference Books:
1. Laboratory manual prepared by Department of Electronics and Communication Engineering, PES University.