***BT3 – Electronics Subject: Digital Telecommunication (II)***

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| **Digital Telecommunication II**  **2hrs/week** |

**Content:**

**Chapter 1:Digital transmission. (12h)**

1.1. Introduction.

1.2. Advantages and disadvantages of PCM digital transmission.

1.3. Block diagrams of the modulator and demodulator of PCM and role of each element.

1.4. Sampling theory and the types of sampling

1.4.1. Ideal sampling.

1.4.2. Natural sampling.

1.4.3. Flat-top sampling.

1.5.Sample and hold.

1.6. Analog to digital conversion: circuit diagram and principle of its operation

1.7. Transmission channel.

1.8. Digital to analog conversion: circuit diagram and principle of its operation

1.9. Low pass filter.

1.10. Delta modulation:

1.10.1- Definition, block diagram, role, principle, analysis, generation and demodulation.

1.10.2-Advantages and disadvantages of delta modulation.

**Chapter 2:Digital modulation methods**. **(10h)**

2.1. Amplitude shift keying ASK modulation:

2.1.1. Definition, block diagram, role, principle, waveforms, generation, demodulation and applications.

2.1.2. Mathematical expression of ASK signal (without analysis).

2.1.3. Utilizations.

3.2 Frequency shift keying FSK modulation:

3.2.1. Definition, block diagram, role, principle, waveforms, generation, demodulation and applications.

3.2.2. Mathematical expression of FSK signal (without analysis).

3.2.3. Utilizations.

3.3. Phase shift keying PSK modulation:

3.3.1. Definition, block diagram, role, principle, waveforms, generation and demodulation.

3.3.2. Mathematical expression of PSK signal (without analysis).

3.3.3. Coherent and noncoherent demodulation.

3.3.4. Utilizations.

3.4. Quadrature phase shift keying QPSK:

3.4.1. Definition, block diagram, role, principle, waveforms, generation and demodulation.

3.4.2. Utilizations.

3.5. Differential phase shift keying DPSK:

3.5.1. Definition, block diagram, role, principle, waveforms, generation and demodulation.

3.5.2. Utilizations.

3.6. Advantages and disadvantages of each above modulation.

**Chapter 3: Frequency division multiplexing. (1 h)**

3.1. Introduction.

3.2. Hierarchy of FDM system.

3.3. Bloc diagram and principle of operation.

**Chapter 4: Time division multiplexing. (1h)**

4.1. TDM (Time Division Multiplexing).

4-2. Bloc diagram.

4.3. Principle of operation.

4.4. Utilization.

4.5. Frame and synchronization.