

Specialization Group I (Digital Electronics and Solid State devices)

Course 13: Digital Electronics and Communication System

Course code: MSCPH-521

Credit: 3

BLOCK 1 Digital Electronics

Unit –1: Number systems; Binary number system, binary to decimal conversion, decimal to binary conversion, octal number, hexadecimal number, Excess- 3 code, The Gray code, Arithmetic Circuit, binary addition and subtraction, Arithmetic logic unit.

Unit –2: Logic families; logic gates; Boolean algebra, Pairs, Quads and Octets, don't care condition, Magnitude comparator, De Morgan's laws, simplifying Boolean expressions, SOP, POS, K map,

Unit –3: Flip-flops; RS flip-flops, D flip-flops, JK flip-flops, master slave flip-flops, flip flop timing, multiplexers, de-multiplexers encoders and decoders.

Unit –4: Registers and Counters: Types of registers, Serial IN – Serial out, Serial IN –Parallel Out, Universal Shift Register, Asynchronous counters, synchronous counters, A digital clock

Unit –5: Analog to digital (A / D) and digital to Analog (D / A) conversion: Analog to digital (A / D) and digital to Analog (D / A) conversion, resistor network, Binary ladder, D/A Accuracy and Resolution, Continuous A/D Conversion, A/D Techniques.

BLOCK – 2 Wave propagation and communication

Unit 6: Modulation AM and FM (Transmission and reception): Modulation, AM generation, Power consideration, Balanced modulator, SSB transmission, AM detection, AGC, Radio receiver characteristics, Signal to noise ratio, FM analysis, Noise considerations, Generation, Direct method and reactance tube method, FM transmitter, AFC, FM Propagation, Phase discriminator.

Unit- 7: Antenna: Antenna and TV Antenna, HF antenna, Yagi antenna, loop antenna, Satellite communication, parabolic reflector, dish antenna, Fundamentals of image transmission, vestigial transmission, TV camera tubes, image orthicon, vidicon, TV transmitter, TV receiver and picture tubes

Unit- 8: Satellite Communication: Orbits, Station keeping; Satellite attitude; Path loss calculation; Link calculation; Multiple access techniques; Transponders; Effects of nonlinearity of transponders.

Reference Books:

1. Millman and Halkias, *Integrated Electronics*, McGraw-Hill, New Delhi.
2. R.A. Gaikwad, *Op-Amps and integrated circuits*.
3. Choudhary and Jain, *Linear Integrated Circuits*.
4. Taub and Schilling, *Digital Integrated Electronics*, McGraw-Hill, New Delhi.
5. Kennedy, *Electronic Communication Systems*
6. Donald Leach, Albert Malvino, *Digital Electronics*