

B.Sc. (Electronics) - III Year
Semester – V
Paper – V: (A) Digital Electronics & Microprocessor
(DSE-1: Compulsory)

Total: 56 Hrs
(4 Hrs / week)

UNIT-I (12 Hrs)

Number system and Logic gates: Conversion of binary, octal, decimal & hexadecimal number systems, Binary addition and subtraction (1's and 2's complement methods).

Logic gates- OR, AND, NOT, XOR, NAND, NOR gates and their truth tables, Design of basic gates using the universal gates: NAND and NOR gates, half adder, full adder and parallel adder logic circuits. Logic families and their characteristics: TTL, CMOS and ECL logic circuits.

UNIT-II (12 Hrs)

Boolean algebra and Combinational logic circuits: Boolean algebra - Laws and identities, De Morgan's Theorems, Simplification of Boolean expressions using Boolean identities, Reduction of Boolean expressions using Karnaugh Maps, Sum of Products (SOP) representation (up to four variables), Multiplexer, De-Multiplexer, Decoder (3 to 8) and Encoder (8 to 3).

UNIT-III (16 Hrs)

Sequential logic circuits: Flip-flops: SR, D, JK, T, JK and JK Master-Slave, **Registers:** Shift registers, SISO, SIPO, PISO and PIPO registers, Universal shift register (IC 7496) Shift register **counters-** Ring counter, Johnson Counter-bit Asynchronous (Ripple) counter, Modulo-N counter, Synchronous counter, Up/Down Counters - ripple counter IC 7493 - Decade counter IC 7490 - working, Truth-table and timing diagrams.

Semiconductor memories: Organization and working of ROM, types of ROM's - PROM, EPROM, EEPROM, FLASH, RAM- static and dynamic **Semiconductor memories ::** Organization and working of ROM, types of ROM's - PROM, EPROM, EEPROM, FLASH, RAM- static and dynamic

UNIT-IV (16 Hrs)

Introduction to 8085 Microprocessor & its architecture:: Introduction to Microcomputer, Intel 8085 Microprocessor – Architecture of 8085 microprocessor – CPU – Timing & Control Unit – Instruction cycle, Fetch Cycle, Execute cycle (Timing diagram), Machine cycle and clock states. Interrupts – Hardware and Software, Address space partitioning – Memory mapped I/O & I/O mapped I/O.

Instruction set of 8085 microprocessor: Classification - Data transfer operations, Arithmetic operations, logical operations, Branch control operations and stack, I/O and Machine control operations. Stack and Subroutines, Addressing modes

Programming of 8085 microprocessor: Assembly language programming, addition (8 and 16 bit), 8 bit - subtraction, multiplication and division. Finding the largest and smallest number in data array

Suggested Books:

1. Digital Principles and Applications – Malvino & Leach - TMH.
2. Digital Principles and Applications - Ronald J.Tocci – Pearson Education.
3. Text book of Electronics BSc III year (Vol.III) - Telugu Akademi
5. Fundamentals of Digital Circuits – Anand Kumar – PHI
6. Digital Electronics Principles and Integrated circuits – Maini – Wiley India.
7. Digital Electronics – Gothman
8. Microprocessor Architecture and Programming – Ramesh S.Goanker – Penram.
9. Fundamentals of Microprocessors and Micro controllers – B.Ram, - Dhanpat rai & sons.
10. Introduction to Microprocessor – Aditya P.Mathur – TMH.

B.Sc. (Electronics) - III Year
Semester – V
Paper – V: (A) Digital Electronics & Microprocessor Practical's
(DSE-1: Compulsory)

1. Verification of truth tables of AND, OR, NOT, NAND, NOR, XOR Gates using IC 74XX series.
2. Construction of basic gates using NAND and NOR gates.
3. Construction of Half Adder using gates. Verification of truth table.
4. Construction of Full Adder using gates and verification of truth table.
5. Verification of truth tables of flip flops: RS, D, and JK using IC's.
6. Binary addition (8 bit and 16 bit) and subtraction (8 bit).
7. Decimal Addition (DAA).
8. Multiplication and Division (8 bit).
9. Picking of largest/Smallest number from the given data.
10. Arranging the given data in ascending/descending order.
11. Time Delay generation.

Simulation experiments:

1. 4 bit parallel adder using Full adders.
2. Decade counter using JK flip flops.
3. Up/Down counters using JK flip flops.
4. Multiplexer/De-Multiplexer.
5. Encoder.

Note: Student has to perform minimum of eight experiments

1. Lab manual for Electronic Devices and Circuits – David A Bell, 4th Edition – PHI
2. Basic Electronics – A Text Lab Manual – Zbar, Malvino, Miller.

B.Sc. (Electronics) - III Year
Semester – V
Paper – V: (B) Electronic Instrumentation
(DSE-1: Compulsory)

Total: 56 Hrs
(4 Hrs / week)

UNIT-I (14 Hrs)

Characteristics of an Instrument: Fundamental Elements of a measurement system- Static characteristics- Accuracy, precession, bias. Linearity, threshold, resolution, hysteresis, dead space, scale readability, span, static stiffness, input impedance, repeatability and reproductability- Errors and calculation of errors in overall system- dynamic characteristics-Zero, First and second order instrument- Responses for step, impulse, ramp and sinusoidal inputs, Classification of standards, IEEE standards of ISO9001, Quality of Management standards.

UNIT-II (16 Hrs)

Transducers and Sensors: Transducers, Factors for selection of Transducers, Definition of Transducer and sensor- Classification of transducers- Pressure (strain gauge, piezoelectric transducer), Displacement (potentiometric, LVDT) Ultrasonic Transducers (Ultrasonic Sensor).

Microphones: Microphones and their types, Temperature measurement, resistance wire thermometers, semiconductor thermo meters, and thermo couples, temperature (thermistor) and photosensitive (Vaccume and gas filled tubes, photocvonductivecells, photovoltaic cells, photoemmissive) Transducers. Flow transducers-flow meter, force transducer-Dynamometer, Acceleration Transducer-accelerometer, Applications of transducers.

UNIT-III (12 Hrs)

Bridge Measurements: Introduction- Wheatstone bridge, Kelvin Bridge, Guarded Wheatstone bridge, AC bridges and their applications: Maxwell bridge, Haybridge, Schering bridge, Wien bridge.

UNIT-IV (14 Hrs)

Testing and Measuring Instruments: Oscilloscope, Block diagram, CRT circuits, Vertical and Horizontal Deflection Systems, Delay line, multiple trace, Probe, Special Oscilloscopes.

Measuring Instruments: DC Voltmeters, DC Current meters, AC Voltmeters and AC current meters, Ohmmeters, Multimeters, Meter protection, Extension of range, True RMS Responding Voltmeters, specifications of Instruments.

Suggested Books:

1. Instrumentation Devices and systems, CS Rangan., GR sharma and VSV mani, 1999 TataMcgrawh Hill, New Delhi.
2. Modern Electronics Instrumentation and Measurement techniques, A.D. Helfrick and W.D.Cooper, 1992 PHI New Delhi
3. A Course in Electrical and Electronic Measurement anmd Instrumentation, A.K. Sawhney, Dhanpat Ray and sons.
4. Measurement System applications and Design, E.O. Doebelin, 1983 International Edition, 3rd Edition McGraHills NY
5. Transducers and Instrumentation, DVS Murthy,1995 PHI New Delhi
6. Instrumentation for measurements, JW Dalley, WF Riley and KG McConnel,1993 Wiley NY
7. Instrumentation Measurements and Analysis, BC Nakre and KK Chaudhary, TMC NewDelhi
8. Principles of Instrumental Analysis, DA Skoog, 3rd Ed, Saunders College Publishing.

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(DSE-1: Compulsory)

1. Temperature transducer (Thermocouple/ Thermistor)
2. Pressure Transducer- Strain gauge
3. Displacement Transducer- LVDT (Linear Variable Differential Transformer)
4. Ultrasonic Transducer - Ultrasonic Sensor
5. Flow Transducer- Flow meter
6. Force Transducer- Dynamometer
7. Acceleration Transducer- Accelerometer
8. Photovoltaic cell (Solar cell)
9. Passive Transducers- Photocells (LDR)
10. CRO Characteristics
11. DC Voltmeter/ DC Current Meter
12. AC Voltmeter /AC current Meter
13. Multimeter