B.Sc., Electronics Minor

SEMESTER-IV

COURSE 3: ELECTRICAL AND ELECTRONIC INSTRUMENTATION (w.e.f 2024-25)

Theory Credits: 3 3 hrs/week

The students will learn :

a. basic concepts of indicating instruments.

b. various electronic instruments such as CRO, storage oscilloscopes, function generators, spectrum analyzer etc.,

c. transducers, sensors and display devices.

UNIT-I

DC and AC indicating Instruments: Accuracy and precision - Types of errors - PMMC galvanometer, sensitivity, Loading effect - Conversion of Galvanometer into ammeter, Voltmeter and Shunt type ohmmeter- Multimeter.

UNIT-II

DC and AC bridges: DC Wheatstone bridge - Kelvin's bridge - Balancing condition for AC bridge - Maxwell's bridge - Schering's bridge - Wein's bridge - Determination of frequency.

UNIT-III

Oscilloscopes: Block diagram of CRO - Deflection Sensitivity - Electrostatic Deflection - Electrostatic Focusing - CRT Screen - Measurement of Waveform frequency, phase difference and Time intervals - Sampling Oscilloscope - Analog and Digital Storage Oscilloscopes.

UNIT-IV

Instrumentation Amplifiers and Signal Analysers: Instrumentation amplifier - Electronic Voltmeter and Multimeter - Digital Voltmeter - Function Generator - Wave Analyser - Fundamentals of Spectrum Analyser.

UNIT-V

Transducer and Display Devices: Strain Gauge - Unbounded Strain Gauge - LVDT - Resistive transducer - Photoelectric Transducer - Pen Recorder - Seven Segment Display - LCD.

Text Books

1. Electronic Instrumentation and Measurement Techniques - *W.D.Cooper & A.D. Helfrick*, prentice
   Hall of India.
2. Electronic Instrumentation and Measurement - *Kalasi*.

Reference Books

1. A Course in Electrical and Electronic Measurement andInstrumentation - *A.K. Sawhney*, Dhanpat Rai and Sons.
2. Electronic Instrumentation and Measurements -*P.B.Zbar*, McGraw Hill International.
3. Measurement Systems Application and Design - *Ernest O.Doebelin*, 4/e, TataMcGraw Hill Publishing Co. LTD

CO-PO mapping:
(1: Low 2: Medium 3: High 4.No correlation)

	PO1	PO 2	PO 3	PO 4	PO 5
CO 5	2	2	3	2	2

B.Sc., Electronics Minor

SEMESTER-IV

COURSE 3: ELECTRICAL AND ELECTRONIC INSTRUMENTATION
(w.e.f 2024-25)

Practical Credits: 1 2 hrs/week

List of Experiments:

1. Familiarization of digital multimeter and its usage in the measurements of (i) resistance (ii) current, (iii) AC & DC voltages and for (i) continuity test (ii) diode test and (iii) transistor test
2. Measure the AC and DC voltages, frequency using a CRO and compare the valuesMeasured with other instruments like Digital multimeter.
3. Formation of Sine, Square wave signals on the CRO using Function Generator andmeasure their frequencies. Compare the measured values with actual values.
4. Display the numbers from 0 to 9 on a single Seven Segment Display module byApplying voltages.
5. Display the letters **a** to **h** on a single Seven Segment Display module by applyingvoltages.

B.Sc., Electronics Minor

SEMESTER-IV

COURSE 4: MICROPROCESSOR SYSTEMS
(w.e.f 2024-25)

Theory Credits: 3 3 hrs/week

OBJECTIVES:

- To understand basic architecture of 16 bit and 32 bit microprocessors.
- To understand interfacing of 16 bit microprocessor with memory and peripheral chips involving system design.
- To understand techniques for faster execution of instructions and improve speed of operation and performance of microprocessors
- To understand RISC based microprocessors.
- To understand concept of multi core processors.

UNIT -I: (12Hrs)

CPU ARCHITECTURE *Introduction to Microprocessor, INTEL -8085(P) Architecture, CPU, ALU unit, Register organization, Address, data and control Buses. Pin configuration of 8085. Addressing modes* 8086 Microprocessor: Architecture, Pin description. Instruction format, Instruction Execution timing, Addressing modes

UNIT -II: (12 Hrs)

8085 Instruction Set:
Data transfer Instruction, Logical Instructions, Arithmetic Instructions, Branch instructions, Machine Control instructions.

UNIT -III: (12Hrs)

Assembly Language Programming using 8085, Programmes for Addition, Subtraction, Multiplication, Division, largest and smallest number in an array. BCD to ASCII and ASCII to BCD.

UNIT -IV: (12Hrs)

Basic 8086 Configurations – Minimum mode and Maximum Mode, Interrupt Priority Management I/O Interfaces: Serial Communication interfaces, Parallel Communication, Programmable Timers, Keyboard and display, DMA controller

UNIT -V: (12Hrs)
ARM PROCESSOR: Introduction to 16/32 bit processors, Arm architecture& organization, Arm based MCUs, Programming model, Instruction set.

TEXTBOOKS:

1. Microprocessor Architecture, Programming and Applications with the 8085 Penram International Publishing, Mumbai.- Ramesh S.Gaonakar
2. Microcomputer Systems the 8086/8088 family – YU-Cheng Liu and Glenn SA Gibson
3. Microcontrollers Architecture Programming, Interfacing and System Design– Raj Kamal Chapter: 15.1, 15.2, 15.3, 15.4.1
4. 8086 and 8088 Microprocessor by Tribel and avatar singh

REFERENCES:

1. Microprocessors and Interfacing – Douglas V.Hall
2. Microprocessor and Digital Systems – Douglas V. Hall
3. Advanced Microprocessors & Microcontrollers - B.P.Singh & Renu Singh – New Age
4. The Intel Microprocessors – Architecture, Programming and Interfacing –Bary B.Brey.
5. Arm Architecture reference manual –Arm ltd.

OUTCOMES:

- The student can gain good knowledge on microprocessor and implement inpractical applications
- Design system using memory chips and peripheral chips for 16bit 8086microprocessor.
- Understand and devise techniques for faster execution of instructions,improve speed of operations and enhance performance of microprocessors.
- Understand multi core processor and its advantages

CO-PO mapping:

(1: Low 2: Medium 3: High 4.No correlation)

	PO1	**PO 2**	**PO 3**	**PO 4**	**PO 5**
CO 5	**2**	**1**	**3**	**2**	**2**

B.Sc., Electronics Minor

SEMESTER-IV

COURSE 4: MICROPROCESSOR SYSTEMS
(w.e.f 2024-25)

Practical Credits: 1 2 hrs/week

List of Experiment

Programs using Intel 8085 /8086

1. Addition and Subtraction (8 bit and 16-bit)
2. Multiplication and Divition (8-bit)
3. Largest number in an array.
4. Smallest number in an array.
5. BCD to ASCII and ASCII to BCD .
6. Program To Convert Two Bcd Numbers In To Hex
7. Program To Convert Hex Number In To Bcd Number.
8. Program To Find The Square Root Of A Given Number.
9. Interfacing Experiments Using 8086 Microprocessor (Demo):

1. Traffic Light Controller
2. Elevator,

7-Segment Display