PPH3025: DIGITAL ELECTRONICS AND MICROPROCESSORS

L	T	P	Cr
3	1	3	5.0

Course Objectives: To provide theoretical knowledge and develop practical skill in digital systems, logic systems and Microprocessor. electronic systems and microprocessor

Digital Systems: Standard gate assemblies. Binary Address, Parallel and Serial operations, Half Adder, Full Adder, J-K Flip-flop, Shift Register, Up and Down Counters, Synchronous and Asynchronous counters, Bipolar and MOS digital systems and their comparison, Decoder, Multiplexer, Encoder, Read Only Memory, Random Access Memory, Applications of ROM and RAM, Digital Display, Seven segment display, Sequence generator. Memory Storage cell (both Bipolar and MOS RAM), Read, Write and Address operations (both Bipolar and MOS RAM), Digital to Analog Converters, Weighted resistor and 2R Ladder type, Analog to digital Converters.

Microprocessors: An Introduction to Microprocessor, Microcomputers and assembly language. Bus interfacing, Bus organized computers, SAP-1, SAP-2 and SAP-3, Machine language, ASCII code. 8085 Microprocessor architecture, Microprocessor initiated operations. Internal data operations, 8085 registers, Externally initiated operations, Memory mapping and memory classification. Simple microcomputer system, Microprocessor communication and bus timings.8085 machine cycles. Memory interfacing with 8085.Interfacing I/O devices, Introduction to 8085 assembly language programming. 8085 instructions. General purpose programmable Peripheral devices. Microprocessor Applications, Recent trends in Microprocessor Technology. Introduction to 8086 microprocessors and 8051 microcontroller.

Laboratory Assignments:

1. To construct logic gates AND, NOT, EX-NOR and EX-OR using NANAD gates and verify their truth tables.
2. To design and construct multiplexer and demultiplexer and verify their truth tables.
3. To study the fundamentals of basic memory units and to become familiar with various types of flip-flops and verifying the Truth tables of Flip- Flops.
4. To study BCD to binary decoder and encoder
5. To study binary to seven segment decoder.
6. To design various flip-flops (R-S, D-, T-, J-K, J_K master slave) using gates and verify their truth tables.
7. To design and construct Half/Full adder and subtractor circuits.
8. To study the working of a 4-bit comparator and adder/subtractor chips.
9. To construct and study various ripple counters using J-K flip-flops.
10. To construct and study various synchronous counters using J-K flip-flops.

11. To construct and study various registers using J-K flip-flops.
12. To study 4-bit and 8-bit DAC for various V_{ref}.
13. To study and understand the working of the given 4-bit ADC.
14. To perform various mathematical, logical and jump operations for 8 bit numbers using 8085 microprocessor
15. To perform various mathematical, logical operations and jump operations for 16 bit numbers using 8085 microprocessor
16. To write a program to arrange an array of data in ascending/descending order using 8085 microprocessor

Course Learning Outcomes (CLO):

Students will have understanding of:

1. logic circuits, digital systems and microprocessor and their peripheral devices.
2. operating and designing digital systems.
3. how to solve problems in design and/ or implementation of digital

Recommended Books:

1. *Tocci R. J., Digital Systems-Principles and Applications, Prentice Hall of India, (2002).*
2. *Gaonkar R. S., Microprocessor Architecture, Programming and Applications, Prentice-Hall (2000).*
3. *Malvino A.P. and Brown A., Digital Computer Electronics, Prentice-Hall, (1999).*
4. *Mathur A.P., Introduction to Microprocessors, McGraw-Hill Publishing Co., (1980).*