

2009-2010  
SSP-S327

**ANDHRA UNIVERSITY**  
**DEPARTMENT OF PHYSICS**  
(Common for M.Sc.Space Physics and M.Sc.Physics)  
**III Semester(w.e.f 2009-10 batch)**  
**P303, SP303: Digital Electronics & Microprocessors**

**UNIT - I**

**Digital Circuits** (i) **Number Systems and Codes:** Binary, Octal, Hexadecimal number systems, Gray code, BCD code, ASCII code. (ii) **Logic Gates and Boolean Algebra:** OR, AND, NOT, NOR, NAND gates, Boolean theorems, DeMorgan laws.

**II) Combinational Logic Circuits:** (i) Simplification of Boolean Expressions: Algebraic method, Karnaugh Map method, EX-OR, EX-NOR gates, ENCODER, DECODER, Multiplexer, Demultiplexers.

(ii) **Digital Arithmetic Operations and Circuits:** Binary addition, Design of Adders and Subtractors, Parallel binary adder, IC parallel adder. (iii) **Applications of Boolean Algebra:** Magnitude Comparator, Parity generator, Checker, Code converter, Seven-segment decoder/ Driver display.

**UNIT - II**

**Sequential Logic Circuits:** (i) **Flip-Flops and Related Devices:** NAND latch, NOR latch, Clocked flip-flops, Clocked S-C flip-flop, J-K flip-flop, D flip-flop, D latch, Asynchronous inputs, Timing problem in flip-flops. (ii) **Counters:** Asynchronous counters (Ripple), Counters with MOD number  $< 2^n$ , Asynchronous down counter, Synchronous counters, Up-down counter, Presettable counter.

(iii) **Registers:** Shift Register, Integrated Circuit registers, Parallel In Parallel Out (PIPO), SISO, SIPO, PISO

(iv) **Applications of Counters:** Frequency Counter and Digital clock.

**A/D and D/A Converter Circuits:** D/A Converter, Linear weighted and ladder type, An integrated circuit DAC;

Analog-to-Digital Conversion, Digital Ramp ADC, Successive Approximation Method, Sample and Hold Circuit, Digital Voltmeter.

**UNIT - III**

**Intel 8085 Microprocessor:**

Architecture, Functional diagram, Pin description, Timing Diagram of Read Cycle, Timing diagram of write Cycle.

**Programming the 8085 Microprocessor:**

(i) **Addressing Methods, Instruction set, Assembly language programming.**

(ii) **Examples of Assembly Language Programming:** Simple Arithmetic - Addition/Subtraction of two 8-bit/16-bit numbers, Addition of two decimal numbers, Masking of digits, word disassembly.

(iii) **Programming using Loops:** Sum of series of 8-bit numbers, Largest element in the array, Multiple byte addition, Delay sub-routine.

**UNIT - IV**

**Data Transfer Technique:**

Serial transfer, Parallel transfer, Synchronous, Asynchronous, DMA transfer, Interrupt driven Data transfer.

**8085 Interfacing:**

I/O Interfacing: Programmable Peripheral Interfacing, 8255, Programmable Peripheral Interval Timer 8253, Programmable Communication Interface 8251, DAC 0800 and ADC 0800 interfacing.

**TEXT & REFERENCE BOOKS:**

1. "Digital Systems - Principles and applications" - Ronald.J.Tocci,
2. "Fundamentals of Microprocessors & Microcomputers" - B. RAM.
3. "Introduction to Microprocessors for Engineers and Scientists" - P.K.Ghosh and P.R.Sridhar
4. "Microprocessor Architecture, Programming and Applications with the 8085 /8080A" - Ramesh. S. Gaonkar.