

UNDERGRADUATE PROGRAMME IN ELECTRONICS

EL-6

Digital System Design

Total Periods: 48

Unit-1

(P -14)

Number System and Codes: Decimal, Binary, Hexadecimal, Octal, BCD, conversion of one code to another, Complements (one's and two's), Signed and Unsigned numbers, Addition, Subtraction, Multiplication. Gray and Hamming Codes.

Logic Gates and Boolean algebra: Truth Tables, OR, AND, NOT, XOR, XNOR, Universal (NOR and NAND) Gates, Boolean Theorems, DeMorgan's Theorems, Principle of duality.

Digital Logic families: Fan-in, Fan out, Noise Margin, Power Dissipation, Figure of merit, Speed power product, Current and Voltage parameters. TTL, MOS and CMOS families.

Unit-2

(P -12)

Combinational Logic Analysis and Design: Standard representation of logic functions (SO P and POS), Karnaugh map minimization. Encoder and Decoder. Multiplexers and Demultiplexers, Implementing logic functions with multiplexer, half Adder, full Adder and subtractor. 4-bit parallel adder.

Unit-3

(P -14)

Sequential logic design: Latch, Flip flop (FF), S-R FF, J-K FF, T and D type FFs, Clocked FFs, Registers, Counters (ripple, synchronous and asynchronous, ring and modulo-N), State Table, State Diagrams.

Unit-4

(P -08)

Programmable Logic Devices: Introduction to Programmable circuits, Programmable Logic Arrays (PLA), Programmable Array Logic (PAL)

Memories: General Memory Operation, ROM, RAM (Static and Dynamic), PROM, EPROM, EEPROM, EAPROM

Essential Text:

Unit 1:

Chapter 1,2,7,10.

M. Morris Mano, Michael D. Ciletti, Digital Design, Pearson Education Asia,(Fourth Edition)

Unit 2:

Chapter 3,4.

M. Morris Mano, Michael D. Ciletti, Digital Design, Pearson Education Asia,(Fourth Edition)

Unit 3:

Chapter 5,6.

M. Morris Mano, Michael D. Ciletti, Digital Design, Pearson Education Asia,(Fourth Edition)

Unit 4:

Chapter 7.

M. Morris Mano, Michael D. Ciletti, Digital Design, Pearson Education Asia,(Fourth Edition)

Suggested books:

1. Thomas L. Floyd, Digital Fundamentals, Pearson Education Asia (1994)
2. W. H. Gothmann, Digital Electronics: An Introduction To Theory And Practice, Prentice Hall of India(2000)
3. R. L. Tokheim, Digital Principles, Schaum's Outline Series, Tata McGraw- Hill (1994)

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EL-6 Practical –Digital System Design

To implement the following in hardware and simulate the same using software.

1. To verify and design AND, OR, NOT and XOR gates using NAND gates.
2. To convert a Boolean expression into logic gate circuit and assemble it using logic gate IC,s.
3. Design a Half and Full Adder.
4. Design a Half and Full Subtractor.
5. Design a seven segment display driver.
6. Design a 4 X 1 Multiplexer using gates.
7. To build a Flip- Flop Circuits using elementary gates.(RS, Clocked RS, D-type).
8. Design a counter using D/T/JK Flip-Flop.
9. Design a shift register and study Serial and Parallel shifting of data.