

GUJARAT TECHNOLOGICAL UNIVERSITY
DIPLOMA IN ELECTRICAL ENGINEERING
SEMESTER: V

Subject Name: **Digital Electronics and Digital Instruments**

Sr. No.	Course Content
1.	Number System and Codes: 1.1 Types of number system. 1.2 Conversion of number system from one to another. 1.3 Basic mathematical operations. 1.4 Binary addition, subtraction, multiplication and division.
2.	Switching Systems and Codes: 2.1 Diode and transistor as a switch. 2.2 Diode as a clipper circuit with input and output waveforms.
3.	Boolean Algebra: 3.1 Positive logic and negative logic. 3.2 Laws and theorems of Boolean algebra. 3.3 Demorgan's 1st and 2nd theorems. 3.4 Commutative law, associate law and distributive law.
4.	Logic Gates: 4.1 Logic families and circuits. 4.2 RTL, DTL, TTL, ECL logic. 4.3 MOS, PMOS, NMOS, CMOS logic circuits. 4.4 Different types of logic gates, symbol and truth table. 4.5 Combinational logic. 4.6 Arithmetic circuit.
5.	Flip-Flop and Counters: 5.1 Flip-flop circuits R-S, T, D, J-K and master slave J-K. 5.2 Shift register. 5.3 Asynchronous and synchronous counter using 7493 and 7490. 5.4 Up-down counter. 5.5 Encoder and decoder. 5.6 Semiconductor memory ROM, PROM, E-PROM.
6.	Digital Display Devices: 6.1 Digital LED display devices. 6.2 Alpha numerical display devices 14 segment and dot matrix. 6.3 Digital LCD display. 6.4 BCD to seven segment decoder.
7.	A to D and D to A Converters: 7.1 Digital to analog conversion. 7.2 Analog to digital conversion.

8.	Digital Instruments: 8.1 Comparison of digital instrument with analog instrument. 8.2 Digital volt-meter. 8.3 RAMP type integrating, and stair case type. 8.4 Successive approximation type DVM. 8.5 Phase meter. 8.6 Functional block diagram of Digital frequency meter. 8.7 Digital multi meter with Functional block diagram. 8.8 Digital energy meter with Functional block diagram. 8.9 Digital watt meter with Functional block diagram.
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Laboratory Experiences:

1. Study of R.C. differentiating circuit.
2. Study of R.C. integrating circuit.
3. Testing the given combinational logic and preparing truth table.
4. Half addition and full addition.
5. Half subtraction and full subtraction.
6. Verify the Demorgan's theorem.
7. Verify NAND and NOR as universal gates.
8. Building and testing R-S and D flip-flops.
9. Building and testing J-K master and slave flip-flops.
10. Operation of shift register.
11. 4 bit binary asynchronous counting.
12. 4 bit Up/Down counting.
13. Study of decoder and encoder circuit truth table.
14. BCD to seven segment display.
15. A/D conversion.
16. D/A conversion.
17. Study of clipping circuit.
18. Study of clamping circuit.
19. Study of seven segment LED display.
20. Study of seven segment LCD display.
21. Study of alphanumeric display.
22. Study of digital instrument.

Note: Minimum 10 experiments should be performed.

Reference Books:

1. Digital principles & applications A. P. Malvino (TMH).
2. Pulse digital & switching wave forms Millman & Taub (MH).
3. Electronic devices & circuits Allen Mottershed.
4. Principles of digital electronics Malvino & Leach (TMH).
5. Digital circuits & systems Douglass V. Hall (MH).
6. Modern digital electronics R. K. Jain.
7. CD' – Digital electronics (Maxwell).