

# GUJARAT TECHNOLOGICAL UNIVERSITY

B.E Semester: 3

## Electrical Engineering

Subject Code 130902

Subject Name ANALOG AND DIGITAL ELECTRONICS

---

Sr.No	Course content
1.	Operational Amplifier: DC amplifier, direct coupled amplifier, differential amplifier, open and closed loop gain of OPAMP, differential input impedance of OPAMP, Op amp Parameters, slew rate, offset voltage, offset balancing technique, inverting amplifier, non inverting amplifier, frequency response, frequency compensation techniques.
2.	OPAMP Applications: OPAMP as adder, subtractor, integrator, differentiator, voltage follower, constant voltage source, constant current source, differential input amplifier, log and antilog amplifier, active peak detector, half wave rectifier, full wave rectifier, comparator, window detector, zero crossing detector, Schmittz' trigger, active filters etc.
3.	Special Function ICs Multivibrators Based on 555 and OPAMP, VFC, FVC, PLL, VCO, ADC, DAC, Three terminal regulator ICs, basic block schematic - 78xx & 79xx series - Adjustable output voltage regulator LM 317, LM 340 and LM 337 series power supply ICs, their use and basic design considerations for designing regulated power supplies.
4.	Number system and codes: Binary, octal, hexadecimal and decimal Number systems and their inter conversion, BCD numbers (8421-2421), gray code, excess-3 code, cyclic code, code conversion, ASCII, EBCDIC codes. Binary addition and subtraction, signed and unsigned binary numbers, 1's and 2's complement representation.
5.	Boolean Algebra: Basic logic circuits: Logic gates (AND, OR, NOT, NAND, NOR, Ex-OR, Ex-NOR and their truth tables, ), Universal Gates, Laws of Boolean algebra, De-Morgan's theorem, Min term, Max term, POS, SOP, K-Map, Simplification by boolean theorems, don't care condition
6.	Logic Families: Introduction to digital logic family such as RTL, DTL, TTL, ECL, CMOS, IIR, HTL etc., their comparative study, Basic circuit, performance characteristics, Wired logic, open collector output etc
7.	Combinational Logic: The Half adder, the full adder, subtractor circuit. Multiplexer de-multiplexer, decoder, BCD to seven segment Decoder, encoders.
8.	Flip flop and Timing circuit : set-reset latches, D-flipflop, R-S flip-flop, J-K Flip-flop, Master slave Flip flop, edge triggered flip-flop, T flip-flop.

9.	Registers & Counters: Synchronous/Asynchronous counter operation, Up/down synchronous counter, application of counter, Serial in/Serial out shift register, Serial in/Serial out shift register, Serial in/parallel out shift register, parallel in/ parallel out shift register, parallel in/Serial out shift register, Bi-directional register.
----	---

### Reference Books:

1. Op-Amp and Linear integrated Circuit technology- Ramakant A Gayakwad, PHI Publication
2. Digital Fundamentals by Morris and Mano, PHI Publication
3. Fundamental of digital circuits by A.ANANDKUMAR, PHI Publication
4. Micro Electronics Circuits by SEDAR/SMITH. Oxford Pub
5. Operational Amplifier and Linear integrated Circuits By ROBERT F.COUGHLIN, FREDERICK F. DRISCOLL
6. Operational Amplifier and Linear integrated Circuits By K.LAL kishore. Pearsons
7. Digital Fundamentals by FLOYD & JAIN, Pearsons Pub
8. Fundamentals of Logic Design by Charles H. Roth Thomson