

GUJARAT TECHNOLOGICAL UNIVERSITY

B. E. SEMESTER: V

Electronics Engineering/Electronics & Communication
Engineering/Electronics & Telecommunication Engineering

Subject Name: **Applied Electronics (Institute Elective-II)**

Subject Code: **151006**

Teaching Scheme				Evaluation Scheme		
Theory	Tutorial	Practical	Total	University Exam (Theory) (E)	Mid Sem Exam (Theory) (M)	Practical (I)
4	0	2	6	70	30	50

Sr. No	Course Content
1.	Power Supplies: Introduction, Ideal voltage and current source, Dependent sources, Power supply and regulated power supply ICs (7805, 7812, 7905, 7912), Switched Mode Power Supply (SMPS).
2.	Operational Amplifiers: Ideal operational amplifier, Operational amplifier Stages, Operational amplifier parameters, Equivalent circuit of op-amp, Ideal Voltage transfer Curve, Open-Loop Op-amp configurations, Closed-Loop op-amp configurations.
3.	555 Timer Circuits: Block diagram, Use as Astable multivibrator and monostable multivibrator.
4.	Transducers: Capacitive Transducer, Inductive Transducer, Linear Variable Differential Transformer, Oscillation Transducer, Potentiometric transducer, Electrical strain gauges, Resistance thermometer, Thermistor, Thermocouple, Piezoelectric Transducer, Photoelectric transducer.
5.	Optoelectronic Devices: Photoconductive sensors, Photovoltaic sensors, Photoemissive sensors, Light emitters, Liquid Crystal Display, Optocoupler.
6.	Thyristors: PNPN diode, SCR (Silicon Controlled Rectifier), Rectifier circuits using SCR, LASCR (Light Activated SCR), TRIAC (Triode A.C. Switch), DIAC (Diode A.C. Switch), UJT (Unijunction Transistor).

7.	Measuring Instruments: Cathode Ray Oscilloscope, Digital multimeter, Measurement of R, L, C and Q, Frequency counter, Digital Storage Oscilloscope .
8.	Consumer Electronics: Washing machines (Electronic Controller, Fuzzy logic machines and automatic washing Machines), Audio systems, I-pods, RFID, Barcode Scanner and decoder, Photocopier machines.
9.	Digital Systems, Memories, Microprocessors and Microcontroller: Logic Gates, Combinational Logic Designing, Karnaugh map representation of logical functions, Some common combinational circuits, Sequential circuits, A/D and D/A converter circuits, Introduction to semiconductor memories, Introduction to microprocessors, Microcontroller: The 8051 architecture and applications such as Temperature Controller, Elevators, Electronic voting machine etc.

Suggested List of Practical:

(I) Implementation and measurement of basic electronic circuits:

a.

- i. Zener Regulator circuit
- ii. Opto-coupler (using LED and Photodiode)

b. Op-amp Circuits

- i. Inverting and Noninverting Amplifier
- ii. Summing Amplifier
- iii. Saw-tooth waveform generator

c. Thyristor Circuits

- i. SCR triggering technique
- ii. UJT as a relaxation oscillator
- iii. TRIAC firing using DIAC

d. 555 Timer Circuits

- i. Astable multivibrator
- ii. Monostable multivibrator

e. Digital Circuits

- i. Basic Gates
- ii. Half and Full Adder Circuits
- iii. Decade counter using 74XX and displaying using seven segment display.

- f. Seminar based on Microcontroller Applications in a group of 3 students is mandatory.

(II) Simulation exercises on basic electronic circuits.

Reference Books:

1. Electronic devices and circuits, S Salivahanans, N Kumar, A Vallavaraj, TMH publication.
2. Basic Electronics Devices, Circuits and its Fundamentals: Santiram KAL, PHI publication.
3. The 8051 Microcontroller & Embedded Systems using Assembly and C By K. J. Ayala, D. V. Gadre (Cengage Learning , India Edition).
4. For simulation students can use either Pspice or SEQUEL (freely downloadable circuit simulation tool) (Website to download SEQUEL: www.ee.iitb.ac.in/~sequel/).