GUJARAT TECHNOLOGICAL UNIVERSITY
B. E. SEMESTER: V
Electrical & Electronics Engineering/Electronics Engg./Electronics & Communication Engg./Electronics & Telecommunication

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)**	**Internal Assessment (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.

References 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/).