Course Type	Title of the Course	Credits	Course Structure	Pre-Requisite
FCEC003	ELECTRONICS AND ELECTRICAL ENGINEERING	4	3-0-2	None

Course Outcomes:

1. To understand the basics of AC and DC circuits, transformers along with DC generator and motor
2. To analyze series-parallel RLC circuits and
3. To implement basic circuits using diodes, BJTs and op-amps as circuit elements
4. To get familiarized with OP-AMP and its applications
5. To develop circuits using basic electrical and electronic components

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12
CO 1	3	2	2	2	2	-	-	-	-	-	-	-
CO 2	3	2	2	2	2	-	-	-	-	-	-	-
CO 3	3	2	2	2	2	-	-	-	-	-	-	-
CO 4	3	2	2	2	2	-	-	-	-	-	-	-
CO 5	3	2	2	2	2	-	-	-	-	-	-	-

COURSE CONTENT

Unit-I

Electric Circuits: Basic Circuit Elements, Nodal and Loop Analysis,

Superposition, Thevenin's Theorem & Norton's Theorem and Maximum Power Transfer Theorem;

Unit-II

Steady-state analysis of AC circuits: Sinusoidal and phasor representation of Voltage and current, single phase AC circuit, behavior of R, L and C

Combination of R, L and C in series and parallel, Resonance; Introduction to three-phase circuits, Star-Delta Transformation

Unit-III

Transformers: Principle of operation and construction of single-phase transformer, Introduction to DC Motor.

Electronics Devices and Circuits: Junction Diode, Applications: rectifiers, clipping and clamping circuits, LEDs;

Unit-IV

Bipolar-junction Transistor: Physical operation, operating point, load-line, Self-bias circuit, single-stage CE amplifier configuration

Ideal op-amp, inverting, non-inverting and unity gain amplifiers, integrator, differentiator, summer/subtractor.

Unit-V

Digital circuits- Boolean Algebra, logic gates, K-Maps upto 4-variables, Combinational circuits: Adders and subtractors.

Flip-Flops: SR, JK, D, T and their characteristic tables. Introduction to Sensors, Introduction to Embedded Computers.

List of experiments for Electrical and Electronics Engineering

1. Verification of Maximum Power Transfer theorem
2. Verification of Thevenin's and Norton's theorems
3. Study of resonance in series RLC and parallel RLC circuits
4. Analysis of step-up and step-down transformer
5. Implement of series RC circuit as differentiator and integrator. Also perform their analysis as low pass and high pass filters
6. Implementation of clipping and clamping circuits
7. Implementation of half-wave and full wave rectifier circuits
8. Application of LEDs in electronic circuits
9. Implementation of CE amplifying configuration. Plot gain vs frequency graph
10. Implementation of Adders and subtractors.
11. Implementation of JK and Toggle flip-flops. Subsequently implement 3-bit asynchronous up-counter.
12. Measurement of power in single phase circuits using three voltmeter and three ammeter method.
13. Experiments with common sensors
14. Experiment with embedded computers

Suggested Reading:

1. M.E. Van Valkenburg, "Network Analysis" Pearson publishers, 3rd Edition
2. Boylestad and Nashelsky, "Electronic Devices and Circuit Theory" Pearson publishers, 10th Edition
3. Edward Hughes, "Electrical and Electronic technology", Pearson publishers, 10th Edition
4. Malvino and Leach, " Digital Principles and Applications", TMH publishers, 8th Edition