

Course Code	Course Title	L	T	P	C	QP
	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING	3	0	1	3	

Pre-requisites: Students should have good understanding of Mathematics and Physics.

Course Educational Objectives:

CEO 1:	Impart a basic knowledge of electrical quantities such as current, voltage, power, energy and frequency to understand the impact of technology in a global and societal context.
CEO 2:	To provide comprehensive idea about AC and DC circuit analysis, working principles and applications of basic machines in electrical engineering.
CEO 3:	To expose the students in the field of analog and digital electronics engineering and to acquire the fundamental knowledge in the field.

SYLLABUS

UNIT: 1

(10 Hours)

DC Circuits & Network Theorems: Introduction to electrical terminology, Ohm's Law, Equivalent Resistance, Star-delta transformation, Source conversion, Ideal and practical sources; Kirchhoff's Law, Mesh and Nodal Analysis; Thevenin's theorem, Norton's Theorem and Maximum Power Transfer Theorem excited by independent sources.

UNIT: 2

(8 Hours)

Single Phase AC Circuits: AC Fundamentals: RMS & Average values for sinusoidal and non-sinusoidal AC, Complex algebra, AC through pure R, L, C, series RL, RC and RLC circuits. Resonance in series RLC circuit, Quality factor.

UNIT: 3

(10 Hours)

Semiconductor Diodes: Introduction; Ideal Diode; Semiconductor Materials; Energy Levels; Extrinsic Materials- n - and p -Type; Semiconductor Diode; Resistance Levels; Diode Equivalent Circuits; Zener Diode.

Diode Applications: Half-Wave Rectification; Full-Wave Rectification, Clipper, Clamper.

UNIT: 4

(8 Hours)

Digital Electronics Fundamentals: Binary, Octal, Hexadecimal and Decimal Number System and their Conversion; Complements and its operation; Logic gates; Universal Gates.

Electronic Instrumentation: Introduction; Basic Principle; Digital Oscilloscope; Block Diagram of Cathode Ray Oscilloscope, function generator.

UNIT: 5

(8 Hours)

Elementary concept of DC & AC machines:

Construction and working of DC Generator and motor, EMF equation, Types of DC machines, Applications, Single phase two winding transformers: Construction, principle of working, EMF equation.

Introduction to Sensors: -Temperature sensors, Displacement sensors, Piezoelectric Sensors.

Textbooks:														
1. E. Hughes, "Electrical and Electronics Technology", Pearson, 2012.														
2. B.L. Thereja, A.K. Thereja, 'Electrical Technology'Volume-I, S. Chand.														
3. B.L. Thereja, A.K. Thereja, 'Electrical Technology'Volume-II, S. Chand.														
4. Electronic Devices and Circuit Theory by Robert L Boylestad and Louis Nashelsky, 11 th Edition, Prentice Hall.														
5. Kothari DP and I.J Nagrath, "Basic Electrical and Electronics Engineering", Second Edition, McGraw Hill Education, 2020.														
Reference Books:														
1. S.K.Bhattacharya "Basic Electrical and Electronics Engineering", Pearson Education, Second Edition, 2017.														
2. Digital Design by M. Morris Mano, 5 th Edition, Pearson Education.														
3. S. Parker Smith: "Problems in Electrical Engineering" Asia Publications														
4. Schaum's Outline of Basic Electrical Engineering.														
5. Handbook of Modern Sensors: Physics, Designs, and Applications Paperback – 19 September 2014 by Jacob Fraden (Springer).														
Course Outcomes: Upon successful completion of this course, students should be able to:														
CO1	Analyze the circuits excited by DC sources through different network theorems.													
CO2	Illustrate the single-phase AC circuits along with the concept of impedance parameters and power.													
CO3	Understand the working principle and applications of DC & AC machines.													
CO4	To acquire the knowledge about the characteristics and working principles of semiconductor diodes.													
CO5	Explain the basic principles of CRO, function generator, number system and Boolean algebra.													
CO6	Understand the basic concept of sensors used in day to day life.													
CO-PO & PSO mapping:														
COs	PROGRAMME OUTCOMES												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	3	2	2	-	-	-	-	-	-	-	-	-	-	
CO2	3	2	2	-	-	-	-	-	-	-	-	-	-	
CO3	2	1	1	-	-	-	-	-	-	-	-	-	-	
CO4	2	1	1	-	-	-	-	-	-	-	-	-	-	
CO5	2	1	1	-	-	-	-	-	-	-	-	-	-	
CO6	1	1		-	-	-	-	-	-	-	-	-	-	
Avg.	2.1 6	1.3 3	1.1 6	-	-	-	-	-	-	-	-	-	-	

Level – Higher (3), Medium (2), Low (1)