

Course: BTech

Semester: 1

Prerequisite: Knowledge of Physics and Mathematics up to 12th science level. |

Rationale: The course provides introductory treatment of the field of Electrical Engineering to the students of various branches of engineering

Teaching and Examination Scheme

Teaching Scheme					Examination Scheme					Total
Lecture Hrs/Week	Tutorial Hrs/Week	Lab Hrs/Week	Hrs/Week	Credit	Internal Marks			External Marks		
					T	CE	P	T	P	
3	0	2	0	4.00	20	20	20	60	30	150

SEE - Semester End Examination, **CIA** - Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations/MCQ Tests, etc.)

Course Content

W - Weightage (%) , **T** - Teaching hours

Sr.	Topics	W	T
1	DC Circuits Electrical circuit elements (R, L and C), voltage and current sources, Kirchhoff current and voltage laws, Simplifications of networks using series and parallel combinations and star-delta conversions. Superposition, Thevenin's and Norton Theorems.	10	5
2	AC Circuits Sinusoidal voltages and currents, their mathematical and graphical representation, Concept of instantaneous, peak (maximum), average and R.M.S. values, frequency, cycle, period, peak factor and form factor, phase difference, lagging, leading and in phase quantities and phasor representation. Rectangular and polar representation of phasors, examples based on theory. Study of A.C. circuits consisting of pure resistance, pure inductance, pure capacitance and voltage-current-voltage-current phasor diagrams and waveforms. The Development of concept of reactance, study of series R-L, R-C, R-L-C circuit and resonance, study of parallel R-L, R-C and R-LC circuit, concept of impedance, admittance, conductance and susceptance in case of the above combinations and relevant voltage-current phasor diagrams, concept of active, reactive and apparent power and power factor, examples based on the three-phase of three phase supply and phase sequence. Voltages, currents and power relations in three-phase balanced star-delta-connected delta-connected loads along with phasor diagrams,	30	15
3	Diode and Transistors Introduction to Ideal Diode, Effect of temperature Ideal diodes, unbiased diode and Forward and reverse bias of Diode. PIV, surge current, Diode as Uncontrolled switch. Rectifiers: Half wave, Full wave, and bridge wave. Ripple factor, PIV rating. Choke and Capacitor input filter rectifiers, Clipper and Clamper circuits, Voltage multiplier: Construction and working of BJT, Characteristics & specifications of BJT (PNP & NPN transistors), Biased and unbiased BJT, Configuration of the transistor, the concept of gain & BW, Operation of BJT in the cut-off, saturation & active regions (DC analysis), BJT as a switch, Transistor as an amplifier, Voltage divider bias and analysis, VDB load line and Q point.	30	15
4	Voltage Regulator- Basic series and shunt regulator, Types of voltage regulator IC: Fixed and adjustable positive and negative linear voltage regulator, IC linear fixed voltage regulator (78XX, 79XX, LM340 Series), Linear Adjustable Regulator (IC LM317, LM337, and IC 723 IC regulator), DC Regulated Power supply, Switched-mode power supply (SMPS).	15	5
5	Sensors and Transducers Introduction to sensors and Transducers, Comparison between sensors and Transducers, Applications of Sensors and Transducers, Types of Electronic sensors, Types of Transducers.	15	5

Reference Books

1.	A text book of Electrical technology Vol2 (TextBook) By B.L.Theraja S. Chand Publication
2.	Electrical Engineering Fundamentals By V. D. Toro Prentice Hall India 2, Pub. Year 1989
3.	Electrical and Electronics Technology By E. Hughes Pearson 10, Pub. Year 2010
4.	Basic Electrical Engineering By D. P. Kothari and I. J. Nagrath, Tata McGraw Hill 3, Pub. Year 2010
5.	Basic Electrical Engineering By D. C. Kulshreshtha McGraw Hill 1, Pub. Year 2009
6.	Fundamentals of Electrical Engineering By Leonard S. Bobrow Oxford University Press 2, Pub. Year 1996

Course Outcome

After Learning the Course the students shall be able to:

- 1)To acquire knowledge regarding the various laws and principles associated with A.C. and D.C. electrical circuits.
- 2)To acquire knowledge regarding various type of semiconductor devices.
- 3)To acquire knowledge regarding voltage regulator, sensors and transducer.

List of Practical

1.	To Study about Various Electrical and Electronics Symbols and demonstrate various measuring instruments used in Basic electrical Engineering laboratory. To Study about Various Electrical and Electronics Symbols and demonstrate various measuring instruments used in Basic electrical Engineering laboratory.
2.	To Perform and Solve Electrical Networks with Series and Parallel Combinations of Resistors Using Kirchhoff 's Laws. To Perform and Solve Electrical Networks with Series and Parallel Combinations of Resistors Using Kirchhoff 's Laws.
3.	To Obtain Inductance, Power and Power Factor of the Series RL Circuit With AC Supply Using Phasor Diagram. To Obtain Inductance, Power and Power Factor of the Series RL Circuit With AC Supply Using Phasor Diagram.
4.	To Obtain Capacitance, Power and Power Factor of the Series RC Circuit With AC Supply Using Phasor Diagram. To Obtain Capacitance, Power and Power Factor of the Series RC Circuit With AC Supply Using Phasor Diagram.
5.	To Obtain Inductance, Capacitance, Power and Power Factor of the Series R-L-C Circuit With AC Supply Using Phasor Diagram. To Obtain Inductance, Capacitance, Power and Power Factor of the Series R-L-C Circuit With AC Supply Using Phasor Diagram.
6.	Verification of superposition theorem with dc source. Verification of superposition theorem with dc source.
7.	Verification of Thevenin's theorem with dc source.. Verification of Thevenin's theorem with dc source..
8.	Verification of Norton's theorems in dc circuits. Verification of Norton's theorems in dc circuits.
9.	Verification of Current and Voltage Relations in Three Phase Balanced Star and Delta Connected Loads. Verification of Current and Voltage Relations in Three Phase Balanced Star and Delta Connected Loads.
10.	To study the cut-section of a dc machine, single phase induction machine and three phase induction machine.

	To study the cut-section of a dc machine, single phase induction machine and three phase induction machine.
11.	Find out the Efficiency and Voltage Regulation of Single Phase Transformer by Direct Load Test. Find out the Efficiency and Voltage Regulation of Single Phase Transformer by Direct Load Test.
12.	To Plot V-I characteristics Diodes. (a) PN junction diode Characteristics, (b) Zener Diode characteristics. To Plot V-I characteristics Diodes. (a) PN junction diode Characteristics, (b) Zener Diode characteristics.
13.	To Observe Rectifier Circuit (a) Half wave Rectifier without filter, (b) Full wave rectifier without filter, (c) Half wave To Observe Rectifier Circuit (a) Half wave Rectifier without filter, (b) Full wave rectifier without filter, (c) Half wave
14.	To Observe Response of Clipping and Clamping circuits using diodes (a) Diode Positive Clipper without and with Biased clipper, (b) Diode Negative Clipper without and with Biased clipper, (c) Biased Positive Negative Clipper (Combinational Clipper), and (d) Positive Clamper, and Negative Clamper. To Observe Response of Clipping and Clamping circuits using diodes (a) Diode Positive Clipper without and with Biased clipper, (b) Diode Negative Clipper without and with Biased clipper, (c) Biased Positive Negative Clipper (Combinational Clipper), and (d) Positive Clamper, and Negative Clamper.
15.	Designing of power supply using IC regulator circuit. (a) Designing of +5 Volt DC Power Supply using 7805, (b) Designing of -5 Volt DC Power Supply using 7905, (c) Designing of +12 Volt DC Power Supply using 7812, and (d) Designing of -12 Volt DC Power Supply using 7912. Designing of power supply using IC regulator circuit. (a) Designing of +5 Volt DC Power Supply using 7805, (b) Designing of -5 Volt DC Power Supply using 7905, (c) Designing of +12 Volt DC Power Supply using 7812, and (d) Designing of -12 Volt DC Power Supply using 7912.
16.	(a)To Plot and Study input-output characteristics of Common Base (B) configuration of the Transistor and (b) To Plot and Study input-output characteristics of common Emitter (CE) configuration of Transistor. (a)To Plot and Study input-output characteristics of Common Base (B) configuration of the Transistor and (b) To Plot and Study input-output characteristics of common Emitter (CE) configuration of Transistor.
17.	To study the Voltage divider bias circuit: (a) To observe the effect of change in base current on the Q-operating point, and (b) To set Q point for operation of a transistor amplifier in the linear region. To study the Voltage divider bias circuit: (a) To observe the effect of change in base current on the Q-operating point, and (b) To set Q point for operation of a transistor amplifier in the linear region.
18.	To plot characteristics of Schottky and Varactor diode. To plot characteristics of Schottky and Varactor diode.
19.	Designing of Linear Adjustable Regulator using IC LM317. Designing of Linear Adjustable Regulator using IC LM317.
20.	Introduction to Sensors and Transducers. Introduction to Sensors and Transducers.