

## Basic Electrical & Electronics Engineering

<b>Course Code</b>	19ES1101	<b>Year</b>	I	<b>Semester</b>	I
<b>Course Category</b>	Engineering Sciences	<b>Branch</b>	IT	<b>Course Type</b>	Theory
<b>Credits</b>	4	<b>L-T-P</b>	3-1-0	<b>Prerequisites</b>	Nil
<b>Continuous Internal Evaluation:</b>	30	<b>Semester End Evaluation:</b>	70	<b>Total Marks:</b>	100

<b>Course Outcomes</b>	
Upon successful completion of the course, the student will be able to	
<b>CO1</b>	To familiarize the basic DC and AC networks used in electrical and electronic circuits.
<b>CO2</b>	To explain the concepts of electrical machines and their characteristics.
<b>CO3</b>	To identify the importance of transformers in transmission and distribution of electric power.
<b>CO4</b>	To impart the knowledge about the characteristics, working principles and applications of semiconductor diodes, metal Oxide semiconductor field effect transistors (MOSFETs).
<b>CO5</b>	To expose basic concepts and applications of Operational Amplifier and configurations.

<b>Contribution of Course Outcomes towards achievement of Program Outcomes &amp; Strength of correlations (H:High, M: Medium, L:Low)</b>														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	H	M					L		L		M	L		
CO2	H	M				L	L		L		M	L		
CO3	H	M				L	L		L		M	L		
CO4	H	M					L		L		M	L	L	L
CO5	H	M					L		L		M	L	L	L

<b>Syllabus</b>		
<b>Unit No.</b>	<b>Contents</b>	<b>Mapped CO</b>
I	Basic laws and Theorems: Ohms law, Kirchoff's Laws, series and parallel circuits, source transformations, delta-wye conversion. Mesh analysis, nodal analysis. Linearity and superposition theorem, Thevenin's and Norton's theorem with simple examples, maximum power transfer theorem with simple examples.	CO1
II	DC Machines: Constructional features, induced EMF and torque expressions, different types of excitation, performance characteristics of different types of dc machines, Starters: 2-point, 3-point starters, losses and efficiency, efficiency by direct loading.	CO2
III	Transformers: Constructional details, EMF equation, voltage regulation, losses and efficiency, open/short- circuit tests and determination of efficiency. Three Phase Induction Motors: Construction, working principle of three phase induction motor, Torque and Torque-Slip characteristics.	CO3
IV	Semiconductor Devices: p-n Junction diode - Basic operating principle,	CO4

	current-voltage characteristics, rectifier circuits (half-wave, full-wave, rectifier with filter capacitor), Zener diode as Voltage Regulator; Metal oxide semiconductor field effect transistor (MOSFET): Operation of NMOS and PMOS FETs, MOSFET as an amplifier and switch.	
V	Operational Amplifiers: The Ideal Op Amp, The Inverting Configuration, The closed loop gain, Effect of Finite open-loop gain, The Noninverting Configuration, The closed loop gain, Characteristics of Non Inverting Configuration, Effect of finite open loop gain, the voltage follower, Difference amplifiers, A Single Op-amp difference amplifier.	CO5

<b>Learning Resources</b>	
<b>Text Books</b>	
1. D.P.Kothari, I.J.Nagrath, Basic Electrical and Electronics Engineering, 1st edition, McGraw Hill Education (India) Private Limited, 2017. 2. B.L.Theraja, Fundamentals of Electrical Engineering and Electronics, 1st edition, S.Chand Publishing, New Delhi, 2006. 3. Adel S. Sedra and Kenneth C. Smith, Microelectronic Circuits 6th edition, Oxford University Press, 2014.	
<b>Reference Books</b>	
1. S.K. Bhattacharya, Basic Electrical and Electronics Engineering, Pearson Education, 2011. 2. Dharma Raj Cheruku, B T Krishna, Electronic Devices and Circuits, 2/e, Pearson Education, 2008. 3. R.K.Rajput, Basic Electrical and Electronics Engineering, University Science Press, New Delhi, 2012.	
<b>e- Resources &amp; other digital material</b>	
<a href="http://202.53.81.118/course/view.php?id=122">http://202.53.81.118/course/view.php?id=122</a> <a href="https://nptel.ac.in/courses/108105112/">https://nptel.ac.in/courses/108105112/</a>	