

## Department of Freshman Engineering

## Basic Electrical &amp; Electronics Engineering

<b>Course Code</b>	20ES1101	<b>Year</b>	I	<b>Semester</b>	I
<b>Course Category</b>	Engineering Science	<b>Branch</b>	IT	<b>Course Type</b>	Theory
<b>Credits</b>	3	<b>L-T-P</b>	3-0-0	<b>Prerequisites</b>	Nil
<b>Continuous Internal Evaluation</b>	30	<b>Semester End Evaluation</b>	70	<b>Total Marks</b>	100

**Course Outcomes**

Upon successful completion of the course, the student will be able to

CO1	<b>Understand</b> the basic concepts of DC circuits, Electrical Machines, Concepts of Electronic Devices and Circuits and realize the Applications of Electrical & Electronics in Interdisciplinary Engineering Domains (L2)
CO2	<b>Apply</b> the basic knowledge of mathematics, science and electrical engineering to obtain the desired parameters of Electric circuits and Machines. (L3)
CO3	<b>Analyse</b> the behaviour of Electric circuits, transformers and Electrical machines. (L4)
CO4	<b>Apply</b> the basic principles of Electronics to solve Analog Circuits. (L3)
CO5	<b>Analyse</b> the characteristics/ performance parameters of Electronic Circuits. (L4)
CO6	Ability to <b>investigate</b> various problems in DC circuits, Electrical Machines and Electronic Devices and Circuits and <b>submit a report</b> .

**Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:High, 2: Medium, 1:Low)**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1														
CO2	3													
CO3		3												
CO4	3												1	
CO5		3											1	
CO6				3					2	2				

**Syllabus**

Unit No.	Syllabus	Mapped CO's
1	<b>Basic laws and Theorems-DC Circuits:</b> Ohms law, Kirchhoff's Laws, series and parallel resistive circuits, source transformations, delta-wye conversion. Mesh analysis, nodal analysis. Superposition theorem, Thevenin's theorem, Norton's theorem and maximum power transfer theorem with simple examples ( <b>independent sources only</b> ).	CO1,CO2, CO3,CO6
2	<b>DC Machines:</b> Construction, working principle, Voltage Build up, EMF equation, Torque expression, types of excitation, types of dc machines, necessity of Starter, losses and efficiency.	CO1,CO2, CO3,CO6
3	<b>Transformers:</b> Construction, working principle, EMF equation, open and short-circuit tests, voltage regulation definition, losses and efficiency. <b>Three Phase Induction Motors:</b> Construction, working principle of three phase induction motor.	CO1,CO2, CO3,CO6
4	<b>Semiconductor Devices:</b> P-N Junction diode - Basic operating principle, current-	CO1,CO4,

## Department of Freshman Engineering

	voltage characteristics, half-waverectifier, full-waverectifier,rectifiers with filter capacitor, Zener diode as Voltage Regulator.	CO5,CO6
5	<b>Operational Amplifiers:</b> The Ideal Op Amp, The Inverting Configuration-The closed loop gain, Effect of Finite open-loop gain, The Non-inverting Configuration - The closed loop gain, Characteristics of Non Inverting Configuration, Effect of finite open loop gain, The voltage follower.	CO1,CO4, CO5,CO6
<b>Learning Resources</b>		
<b>Text Books</b>		
<ol style="list-style-type: none"> <li>1. D.P.Kothari, I.J.Nagrath, Basic Electrical and Electronics Engineering, 1<sup>st</sup> Edition, McGraw Hill Education (India) Private Limited, 2017.</li> <li>2. B.L.Theraja, Fundamentals of Electrical Engineering and Electronics, 1<sup>st</sup> Edition, S.Chand Publishing, New Delhi, 2006.</li> <li>3. Millman Jacob, Halkias C Christos, Electronic Devices and Circuits, 2<sup>nd</sup> Edition, Tata Mcgrawhill Publications, 2007.</li> </ol>		
<b>Reference Books</b>		
<ol style="list-style-type: none"> <li>1. S.K. Bhattacharya, Basic Electrical and Electronics Engineering, Pearson Education, 2011.</li> <li>2. Dharma Raj Cheruku, B T Krishna, Electronic Devices and Circuits, 2<sup>nd</sup> Edition, Pearson Education, 2008.</li> <li>3. R.K.Rajput, Basic Electrical and Electronics Engineering, University Science Press, New Delhi, 2012.</li> </ol>		
<b>e- Resources &amp; other digital material</b>		
<ol style="list-style-type: none"> <li>1. <a href="http://202.53.81.118/course/view.php?id=122">http://202.53.81.118/course/view.php?id=122</a></li> <li>2. <a href="https://nptel.ac.in/courses/108105112/">https://nptel.ac.in/courses/108105112/</a></li> </ol>		