

**BASIC ELECTRICAL & ELECTRONICS ENGINEERING**

<b>Course Code</b>	20ES1201	<b>Year</b>	I	<b>Semester</b>	II
<b>Course Category</b>	Engineering Science	<b>Branch</b>	ME	<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

CO	Statement	Skill	BTL	Units
<b>CO1</b>	<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	Understand	L2	1,2,3,4,5
<b>CO2</b>	<b>Apply</b> the basic knowledge of mathematics, science and electrical engineering to obtain the desired parameters of Electric circuits and Machines.	Apply	L3	1,2,3
<b>CO3</b>	<b>Analyse</b> the behaviour of Electric circuits, transformers and Electrical machines.	Analyze	L3	1,2,3
<b>CO4</b>	<b>Apply</b> the basic principles of Electronics to solve Analog Circuits.	Apply	L4	4,5
<b>CO5</b>	<b>Analyse</b> the characteristics/ performance parameters of Electronic Circuits.	Analyze	L4	4,5
<b>CO6</b>	Ability to <b>investigate</b> various problems in DC circuits, Electrical Machines and Electronic Devices and Circuits and <b>submit a report</b> .	Apply	L3	1,2,3,4,5

<b>Contribution of Course Outcomes towards achievement of Program Outcomes &amp; Strength of correlations (3: High, 2: Medium, 1: Low)</b>														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
<b>CO1</b>														
<b>CO2</b>	3												1	2
<b>CO3</b>													1	2
<b>CO4</b>	3	3												1
<b>CO5</b>		3											1	1
<b>CO6</b>				3					2	2			1	2

<b>Syllabus</b>		
<b>UNIT</b>	<b>Contents</b>	<b>Mapped COs</b>
<b>I</b>	<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> ).	<b>CO1</b> <b>CO2</b> <b>CO3</b> <b>CO6</b>
<b>II</b>	<b>DC Machines:</b> Construction, working principle, Voltage Build up, EMF equation, Torque expression, types of excitation, types of dc	<b>CO1</b> <b>CO2</b>

	machines, necessity of Starter, losses and efficiency.	<b>CO3</b> <b>CO6</b>
<b>III</b>	<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.	<b>CO1</b> <b>CO2</b> <b>CO3,</b> <b>CO6</b>
<b>IV</b>	<b>Semiconductor Devices:</b> P-N Junction diode - Basic operating principle, current-voltage characteristics, half-wave rectifier, full-wave rectifier, rectifiers with filter capacitor, Zener diode as Voltage Regulator.	<b>CO1</b> <b>CO4</b> <b>CO5</b> <b>CO6</b>
<b>V</b>	<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.	<b>CO1</b> <b>CO4</b> <b>CO5</b> <b>CO6</b>

### Learning Resources

#### Text Books

1. D.P.Kothari, I.J.Nagrath, Basic Electrical and Electronics Engineering, 1<sup>st</sup> Edition, McGraw Hill Education (India) Private Limited, 2017.
2. B.L.Theraja, Fundamentals of Electrical Engineering and Electronics, 1<sup>st</sup> Edition, S.Chand Publishing, New Delhi, 2006.
3. Millman Jacob, Halkias C Christos, Electronic Devices and Circuits, 2<sup>nd</sup> Edition, Tata Mcgrawhill Publications, 2007.

#### Reference Books

1. S.K. Bhattacharya, Basic Electrical and Electronics Engineering, Pearson Education, 2011.
2. Dharma Raj Cheruku, B T Krishna, Electronic Devices and Circuits, 2<sup>nd</sup> Edition, Pearson Education, 2008.
3. R.K.Rajput, Basic Electrical and Electronics Engineering, University Science Press, New Delhi, 2012.

#### e- Resources & other digital material

1. <http://202.53.81.118/course/view.php?id=122>
2. <https://nptel.ac.in/courses/108105112/>