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| Subject Code | Name of the Subject | L | T | P | C |
| **20EE1T01** | **BASIC ELECTRICAL & ELECTRONICS ENGINEERING**  **(Common to MECH , CIVIL & ROBOTICS)** | 3 | 0 | 0 | 3 |
| Pre-requisite | Physics’ – Electricity & Magnetism | | | | |
| Subject Category | Engineering science course | | | | |
| Semester | I | | | | |

**COURSE OUTCOMES: *After successful completion of this course, students should be able to:***

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| --- | --- | --- | --- |
| CO1 | : | Analyze different electrical networks using KVL, KCL and Theorems. |  |
| CO2 | : | Understand the basic concepts of single-phase system for simple AC circuit. |  |
| CO3 | : | Demonstrate the construction, working and operating characteristics of AC & DC machines. |  |
| CO4 | : | Study the construction details, operation and characteristics of various semiconductor devices, digital and logic operations. |  |

**SYLLABUS**

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| --- | --- | --- |
| **UNIT-I** | **:** | **ELECTRICAL CIRCUITS** |
| Basic definitions – types of network elements Electrical Circuit Elements (R, L and C), Voltage and Current Sources, Ohms Laws, Kirchoff’s Laws and Star/Delta Conversion, Series-Parallel- Series and Parallel (Only Resistor), Superposition, Thevenin’s and Norton’s Theorems, Problems in Simple Circuits with DC Excitation. | | |
| **UNIT-II** | **:** | **AC FUNDAMENTALS** |
| Representation of Sinusoidal Waveforms, Peak and RMS Values. Real Power, Reactive Power, Apparent Power, Power Factor. Concept of phase angle and phase difference Single phase Circuits - Voltage and Current Relations in Star/Delta Connections-Simple Problems. | | |
| **UNIT-III** | **:** | **ELECTRICAL MACHINES** |
| Electrical Machines: DC Machines: Classification of DC Machines-DC Generator and Motor Construction-Principle of operation –EMF Equation-Performance Characteristics-Simple problems AC Machines: Classification of AC Machines-Transformers-Synchronous Machines, Induction motor Performance Characteristics-Starting Methods-Simple problems. | | |
| **UNIT- IV** | **:** | **Semi -Conductor Devices and Its Characteristics** |
| Characteristics of PN Junction Diode –– Zener Diode- Intrinsic and Extrinsic Semiconductors – Semiconductor Diodes– Bipolar Junction Transistors-CB, CE, CC Configurations and Characteristics – FET – MOSFET – Silicon-controlled Rectifier – DIAC – TRIAC-Half waveand Full wave Rectifiers- Voltage Regulation. | | |
| **UNIT-V** | **:** | **INTRODUCTION TO DIGITAL ELECTRONICS** |
| Binary Number System – Logic Gates – Boolean Algebra -De Morgan’s Theorem-Simplification of Boolean Expressions using De Morgan’s Theorem – Half and Full Adders – A/D and D/A Conversion. | | |

**TEXT BOOKS:**

1. Basic Electrical Engineering, D.P. Kothari and I.J. Nagrath, 3rd edition 2010, Tata McGraw Hill.
2. Basic Electrical Engineering, P. V. Prasad, S. Sivanagaraju, K. R. Varmah, and Chikku Abraham, Cengage, 2019.
3. Basic Electrical & Electronics Engineering – J. B. Gupta, S. K. Kataria & Sons Publications, 2019 edition.

**REFERENCE BOOKS:**

1. Basic Electrical Engineering - D.C. Kulshreshtha, 2009, Tata McGraw Hill.
2. Fundamentals of Electrical Engineering, L.S. Bobrow, Oxford University Press, 2011
3. Electrical and Electronics Technology, E. Hughes, 10th Edition, Pearson, 2010.
4. Electrical Engineering Fundamentals, Vincent Deltoro, Second Edition, Prentice Hall India, 1989.
5. Principles of Electrical Engineering and Electronics”, [V K Mehta](https://www.schandpublishing.com/author-details/-v-k-mehta/196) & [Rohit Mehta](https://www.schandpublishing.com/author-details/-rohit-mehta/160),S Chand Publishers,2019 edition.