**17EE1102-BASICS OF ELECTRICAL ENGINEERING**

**(Civil Engineering)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Course Category** | Engineering Science | **Credits** | 3 |
| **Course Type** | Theory | **Lecture - Tutorial-Practical** | 3 - 0-0 |
| **Prerequisite** | 1. Differentiations, integration and complex calculations. 2. Basics of Electricity | **Sessional Evaluation** | 40 |
| **Semester End Exam Evaluation** | 60 |
| **Total Marks** | 100 |

|  |  |  |
| --- | --- | --- |
| **Course Objectives** | 1. The basic concepts of magnetic circuits, AC and DC circuits. 2. The working principle, construction, applications of AC machines. 3. The fundamentals of wiring, earthing, switch gear and safety measures. | |
| **Course Outcomes** | CO1 | Realize the fundamental concepts of DC circuits. |
| CO2 | Understand the fundamental concepts of AC circuits. |
| CO3 | Understand the operation of transformers. |
| CO4 | Understand the operations of AC machines. |
| CO5 | Realize the concepts of electrical safety and wiring system. |
| CO6 | Comprehend the fundamentals of power system. |
| **Course Content** | **UNIT-I**  **FUNDAMENTALS OF DC CIRCUITS:** Introduction to DC circuits – Active and passive elements – Ohm’s law – Voltage – Current relations for resistor – Inductor – Capacitor– Kirchhoff’s laws– Mesh analysis – Nodal analysis and star-delta transformation.  **UNIT-II**  **FUNDAMENTALS OF AC CIRCUITS:** Generation of AC– Average and RMS values – Form and peak factors for sinusoidal – Concept of phasor representation – j-operator– Analysis of R, L, C, R-L, R-C and R-L-C circuits– Introduction to three phase systems – Types of connections – Relationship between line and phase values.  **UNIT-III**  **SINGLE PHASE TRANSFORMERS:** Principle and operation of a transformer – Construction– EMF equation– Principle of operation of auto transformer.  **UNIT-IV**  **AC MOTORS:** Classification of electrical machines – Working principle – Construction and applications of alternators and AC machines (single phase induction motors: split phase, capacitor start and capacitor start & run motors).  **UNIT-V**  **ELECTRICAL SAFETY, WIRING SYSTEM:** Safety measures in electrical system – Types of wiring – Wiring accessories – Staircase, fluorescent lamps – Basic principles of earthing– Types of earthing– Types of conductors and cables.  **UNIT-VI**  **INTRODUCTION TO POWER SYSTEM:** Simple layout of generation, transmission & distributions – Working principle, application of fuses (Rewirable fuse, HRC) – Relays, circuit breakers. – Types of towers. | |
| **Textbooks**  **&**  **Reference Books** | **TEXTBOOKS:**   1. “Basic Electrical Engineering” by Dash.S.S, Subramani.C and Vijaya kumar.KFirst edition, Vijay Nicole Imprints Pvt.Ltd, 2013. 2. “Basic Electrical Engineering” by M.S.Naidu and S. Kamakshaiah, First Edition 2001Tata McGraw Hill. 3. “Basic Electrical Engineering” by Metha.V.K, RohitMetha, Fifth edition, Chand. S & Co, 2016.   **REFERENCE BOOKS:**   1. “Basic Electrical Engineering” by Kothari .D.P and Nagrath.I.J, Second edition, Tata McGraw - Hill, 2009. 2. “Basic Electrical and Electronics Engineering” by Bhattacharya.S.K, First Edition, Pearson Education, Reprint 2015. 3. “A Text book on Power System Engineering” by A. Chakrabarti, M.L. Soni,P.V.Gupta, U.S. Bhatnagar and Dr. A Chakrabarti, DhanpathRai& Company Pvt Ltd, 2009. | |
| **E-Resources** | 1. http://nptel.ac.in/courses. 2. http://iete-elan.ac.in. 3. <http://freevideolectures.com/university/iitm>. | |