**20EE1203-ELEMENTS OF ELECTRICAL AND ELECTRONICS ENGINEERING**

(Civil Engineering)

|  |  |  |  |
| --- | --- | --- | --- |
| **Course Category:** | Engineering Science | **Credits:** | 3 |
| **Course Type:** | Theory | **Lecture - Tutorial-Practical:** | 3-0-0 |
| **Pre-requisite:** | 1. Basics of Mathematics 2. Basics of Electricity | **Sessional Evaluation:** | 40 |
| **External Exam Evaluation:** | 60 |
| **Total Marks:** | 100 |

|  |  |  |
| --- | --- | --- |
| **Course Objectives** | 1. The basic concepts of DC circuits. 2. The basic concepts of AC circuits 3. The operations of AC Generator and Induction motor. 4. The construction and working principle of the transformers. 5. The fundamentals of electrical safety and wiring. 6. The transducers and electric welding. | |
| **Course Outcomes** | CO1 | Comprehend the fundamental concepts of DC circuits. |
| CO2 | Understand the fundamental concepts of AC circuits. |
| CO3 | Know the operations of AC Generator and Induction motor. |
| CO4 | Acquire the knowledge about the transformers. |
| CO5 | Understand the fundamentals of electrical safety and wiring system. |
| CO6 | Understand about different transducers and methods of welding. |
| **Course Content** | **UNIT-I**  **Fundamentals of DC Circuits:** Introduction to DC circuits, Active and passive elements, Voltage - Current relations for resistor, Inductor and Capacitor, Kirchhoff’s laws-simple problems.  **UNIT-II**  **Fundamentals of AC Circuits:** Generation of sinusoidal voltage, Average and RMS values, Form Factor and peak factors for sinusoidal waveforms, Analysis of R, L, C circuits with sinusoidal source, j notation, Concept of Impedance, introduction to three phase system and comparison between three phase and single phase system.  **UNIT-III**  **AC Generator:** Working principle, Construction and applications of alternators **Induction motor:** Classification of Induction motors, Working principle, Construction and applications of capacitor start and capacitor start & run motors (descriptive only)  **UNIT-IV**  **Single Phase Transformers:** Principle and operation of a transformer, Construction, EMF equation, Losses and efficiency of transformer, Three phase transformer connections (descriptive only).  **UNIT-V**  **Electrical Safety and Wiring:** Importance of electrical safety, Introduction to Personal protective equipment (PPE), Types of wiring, Wiring accessories, Staircase and fluorescent lamp connections, Earthing, Pipe and plate earthing, Types of conductors used in wiring.  **UNIT-VI**  **Transducers:** Resistance temperature detector (RTD), Thermocouple, Strain gauge, Piezo electric transducer.  **Electric welding:** Introduction, resistance welding and arc welding techniques. | |
| **Textbooks**  **&**  **Reference Books** | **TEXT BOOKS:**   1. Dash .S.S, Subramani. C and Vijayakumar.K, *“Basic Electrical Engineering”*, 1st edition, Vijay Nicole Imprints Pvt.Ltd, 2013. 2. R. Muthusubramanian and S. Salivahanan, *“Basic Electrical and Electronics Engineering”* 1st edition, Tata McGraw Hill publications, 2009. 3. Metha.V.K, Rohit Metha, *“Basic Electrical Engineering”*, 5th edition, Chand. S & Co, 2016.   **REFERENCE BOOKS:**   1. Kothari .D.P and Nagrath.I.J, *“Basic Electrical Engineering”,* 2nd edition, Tata McGraw - Hill, 2009. 2. Bhattacharya. S.K, *“Basic Electrical and Electronics Engineering”,* , Pearson Education, 1st edition Reprint, 2015. 3. A. Chakrabarti, M.L. Soni, P.V.Gupta, U.S. Bhatnagar and Dr. A Chakrabarti, *“A Text book on Power System Engineering”*, Dhanpath Rai & Company Pvt. Ltd, 2009. | |
| **E-Resources** | 1. http://nptel.ac.in/courses. 2. http://iete-elan.ac.in. 3. <http://freevideolectures.com/university/iitm>. | |