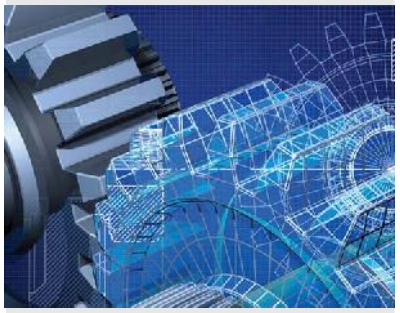
16EE101 BASICS OF ENGINEERING PRODUCTS



Hours Per Week :

L	T	P	C
3	-	2	4

Course Description and Objectives:

This course enables the students to understand the basics of civil, mechanical, electrical and electronics systems and components used in day-to-day life. It deals with construction materials, power generation principles and working of a few commonly used household appliances. Besides, the student will be able to identify/appreciate various concepts, service and maintainance of engineering products.

Course Outcomes:

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

CO1: Describe the working principle of Refrigeration and Air conditioning systems.

CO2: Gain awareness on choosing appropriate construction materials.

CO3: Operate and maintenance of basic electrical engineering appliances.

CO4: Analyze the different lighting sources and its features.

SKILLS:

- ✓ *Identify UPS requirements for a given load.*
- ✓ *Provide a lighting scheme for specific working environment.*
- ✓ *Design a composition of hHeating element for a particular application.*
- ✓ *Troubleshoot issues relating to immersion heater and induction heater.*
- ✓ *Provide an earthing for domestic outlet.*
- ✓ *Select, configure and maintain a few engineering appliances such as TV, radio, telephone, mobile phone, wifi router, micro oven, PA system, etc.*

ACTIVITIES:

- *Trouble shooting of immersion heater and induction heaters.*
- *Disassemble and Assemble of Domestic Appliances such as Mixer Grinder, Fan etc.,*
- *Provide Earthing for Domestic Outlet.*
- *Design Electric Wiring system for a prototype house.*
- *Design UPS for a defined load.*
- *Practice assembly of a FM radio.*
- *Configure a Wifi Router for required number of users.*

UNIT - 1 L-9

WORKING PRINCIPLE OF AC, REFRIGERATOR, PUMPS, IC ENGINES AND SCREW JACK: Working principle of air-conditioner and refrigerator- components, assembly and disassembly, working principle of centrifugal and reciprocating pumps; Types, parts and applications, working principle of screw jack and its components; Working principle of IC engines- 2 stroke and 4 stroke.

UNIT - 2 L-10

BRICKS : General, qualities and classification of bricks; Tests for bricks; Size and weight of bricks; Timber- definition, qualities of good timber, decay of timber and advantages of timber in construction.

CEMENTS : Types and composition of cement, setting of cement, tests for physical properties of cement, and different grades of cement.

AGGREGATES : Classification of aggregates, source, size and shape of aggregates; Tests for aggregates.

STEEL: Types of steel, physical properties and mechanical properties of steel. Simple layout design, paints, tiles, fittings, ventilation, furniture and green house aspects.

UNIT - 3 L-8

ELECTRIC ENERGY SYSTEMS : Overview of power system structure; Conventional and non conventional generations - types of turbines, generators, substations, towers, earthing procedure, protection schemes, single phase and three phase systems.

Methods of electrical wiring systems - wiring procedure and calculations; Wiring methods.

Uninterruptible power supply (UPS)- components in UPS, its functionality and calculation of ratings for UPS components to a specific load.

UNIT - 4 L-10

LIGHT : Light energy, evolution of light sources, working of incandescent, fluorescent, MV, SV and LED lamps, comparison and applications.

HEAT : Heat energy, modes of heat transfer, resistance and induction heating, comparison and applications.

MOTOR : Electric motors, classification, construction and working principles of motors used in domestic applications, mixer grinder, ceiling and exhaust fan, hair dryer, washing machine, water pump, air coolers, vacuum cleaner, computer cooling motor and electric bike.

UNIT - 5 L-8

HOUSE HOLD ELECTRONIC APPLIANCES: Working principles of television, radio, remote control, telephone, microwave oven, cell phone, PA system, induction stove, wifi router and DTH.

LABORATORY EXPERIMENTS

LIST OF EXPERIMENTS Total hours: 30

Demonstration of Modelling / functioning / disassembly / assembly / fault rectification / understanding of the following.

1. Air-conditioners and Refrigerators
2. 2 Stroke and 4 Stroke Engines
3. Reciprocating Pumps
4. Power Screw Jack
5. Size and Water absorption capacity of Bricks
6. Initial and final setting time of Cement
7. Toughness value of coarse aggregates
8. Bulking of Sand
9. Earthing Schemes
10. Electric Wiring
11. UPS system
12. Immersion Heater, Induction Heater and Iron Box.
13. Ceiling Fan and Mixer.
14. Television
15 Radio
16. Remote Control
17. Telephone
18. Fax Machine
19. Mobile Phone
20. PA System

TEXT BOOKS:

1. M.S.Shetty, “Concrete Technology”, 1st edition, S.Chand and Co, 2005.
2. S. C. Rangwala, “Engineering Materials”, 36th edition., Charotar Publishing House, Anad, 2009.
3. Govindasamy, A. Ramesh et al, “Electrical engineering - Electrical machines and Appliances Theory, 1 st edition, Tamilnadu Textbook Corporation, 2010.
4. Janakaraj, A Sumathi et al, “Electrical engineering - Electrical machines and Appliances Theory”, 1 st edition, Tamilnadu Textbook Corporation, 2011.
5. M. Brain, “How Stuff Works”, 1 st edition, John Wiley and Sons, 2001.
6. P. Kumar, “Basic Mechanical Engineering”, 1 st edition, Pearson Publishers, 2013.