**D-1**

**Maharashtra State Board of Technical Education, Mumbai**

**TEACHING PLAN (TP)**

|  |  |  |
| --- | --- | --- |
|  | **Academic Year: 2019-20120** | |
|  |  | **Date:** |
| **Institute Name: Late Annasaheb Polytechnic Nashik** | | **Institute Code:1479** |
| **Program Name & Code:** Electrical Engineering (EE) | | **Course (Subject) Code:** 22327(EPG) |
| **Course Name:***Electrical Power Generation* | | **Scheme:**‘I’ |
| **Class:** SYEE | **Semester:** IIIrd | **Name of Faculty:** Prof.Dhanwate D.S. |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Chapter** |  |  |  |  |  | **Teaching** |  |  | | |
| **No.** | **CO** | **UO** | **Title/Details** | **Plan** | **Actual** | **Remarks** |  | | |
| **(Allocated** |  | **Method/** |  | | |
|  |  |  |  |  | **media** |  |  | | |
| **hours)** |  |  |  |  |  |  |  | | |
|  |  |  |  |  |  |  |  | | |
|  |  |  |  |  |  |  |  |  | | |
|  |  |  | **THERMAL POWER PLANTS :** |  |  |  |  |  | | |
|  | **Unit -I** | | **COAL, GAS/ DIESEL AND** |  |  |  |  | |  |
|  |  |  | **NUCLEAR BASED** |  |  |  |  |  | | |
|  | A | 1a | 1.1 Layout and working of a |  |  |  |  |  | | |
|  |  |  | typical thermal power plant |  |  |  |  |  | | |
|  |  |  | with steam turbines and |  |  |  |  |  | | |
|  |  |  | electric generators. |  |  |  |  |  | | |
|  |  |  | 1.2 Properties of |  |  |  |  |  | | |
|  | A | 1b | conventional fuels used in |  |  |  |  |  | | |
|  |  |  | the energy conservation |  |  |  |  |  | | |
|  |  |  | equipment used in thermal |  |  |  |  |  | | |
|  |  |  | power plants: Coal, Gas / |  |  |  |  |  | | |
|  | A | 1c | Diesel, Nuclear fuels-fusion |  |  |  |  |  | | |
|  |  |  | and fission action |  |  | Chalk Board, |  |  | | |
|  |  |  |  |  |  |  |  | | |
|  |  |  | 1.3 Safe practices and |  |  | PPT, |  |  | | |
|  |  |  |  | Notes, |  |  | | |
|  | A | 1d | working of various thermal |  |  |  |  | | |
|  |  |  |  |  |  | | |
| 01 |  |  | power plants : Coal based, |  |  |  |  |  | | |
|  | gas-based, diesel based, |  |  |  |  |  | | |
| (20) |  |  |  | Ref.book |  |  | | |
|  |  | nuclear based. |  |  |  |  | | |
|  |  |  |  |  | (Electrical |  |  | | |
|  |  |  |  |  |  |  |  | | |
|  |  |  | 1.4 Functions of the |  |  | Tech.Vol-I) |  |  | | |
|  |  |  |  |  |  |  | | |
|  | A | 1e | following types of thermal |  |  |  |  |  | | |
|  |  |  | power plants and their major |  |  |  |  |  | | |
|  |  |  | auxiliaries: |  |  |  |  |  | | |
|  |  |  | a. Coal fired boilers : fire |  |  |  |  |  | | |
|  |  |  | tube and water tube |  |  |  |  |  | | |
|  |  |  | b. Gas / Diesel based |  |  |  |  |  | | |
|  |  |  | combustion engines |  |  |  |  |  | | |
|  |  |  | c. Types of nuclear reactors |  |  |  |  |  | | |
|  |  |  | : Disposal of nuclear waste |  |  |  |  |  | | |
|  | A | 1f | and nuclear shielding. |  |  |  |  |  | | |
|  |  |  |  |  |  |  |  |  | | |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | A |  | | 1.5 Thermal power plants in |  |  |  |  |  |
|  |  |  | | Maharashtra |  |  |  |  |  |
|  |  |  | |  |  |  |  |  |  |
|  | **Unit -II** | | | **LARGE AND MICRO-HYDRO** |  |  |  |  |  |
|  | **POWER PLANTS** |  |  |  |  |  |
|  |  |  | |  |  |  |  |  |
|  | B | 2a | | 2.1 Energy conservation process of |  |  |  |  |  |
|  |  |  | | hydro power plant. |  |  |  |  |  |
|  |  |  | | 2.2 Classification of hydro power |  |  | Chalk Board, |  |  |
|  |  |  | | plant : High, medium and low head. |  |  | PPT+Videos, |  |  |
|  |  |  | | 2.3 Construction and working of |  |  | Notes |  |  |
|  |  |  | |  |  |  |  |
|  | B | 2b | | hydro turbines used in different |  |  |  |  |  |
|  |  |  | | types of hydro power plant: |  |  |  |  |  |
|  |  |  | | a. High head – Pelton turbines |  |  |  |  |  |
|  |  |  | | b. Medium head – Francis turbines |  |  | Ref.book |  |  |
|  |  |  | | c. Low head – Kaplan turbine. |  |  | (Basic |  |  |
| 02 |  |  | |  |  |  | Electrical |  |  |
| B | 2c | | 2.4 Safe practices for hydro power |  |  | Engineering |  |  |
| (10) |  |  |  |
|  |  | | plants. |  |  | ) |  |  |
|  |  |  | |  |  |  |  |
|  | B | 2d | | 2.5 Different types of micro- hydro |  |  |  |  |  |
|  |  |  | | turbines for different heads : |  |  |  |  |  |
|  |  |  | | Francis and Kaplan turbines. |  |  |  |  |  |
|  |  |  | | 2.6 Locations of these different |  |  |  |  |  |
|  |  |  | | types of large and mocro-hydro |  |  |  |  |  |
|  | B | 2e | | power plants in Maharashtra. |  |  |  |  |  |
|  |  |  | | 2.7 Potential location of mocro- |  |  |  |  |  |
|  |  |  | | hydro power plants in Maharashtra. |  |  |  |  |  |
|  | **Unit-III** | | | **SOLAR AND BIOMASS BASED** |  |  |  |  |  |
|  | **POWER PLANTS** |  |  |  |  |  |
|  |  |  | |  |  |  |  |  |
|  | C | 3a | | 3.1 Solar Map of India : Global |  |  |  |  |
|  |  |  | | solar power radiation. |  |  | Chalk Board, |  |
|  |  |  | |  |  |  |  |
|  | C | 3b | | 3.2 Solar Power Technology |  |  | PPT+Videos |  |
|  |  |  | | a. Concentrated Solar Power (CSP) |  |  |  |  |
|  |  |  | | plants, construction and working of |  |  |  |  |
|  |  |  | | : Power Tower, Parabolic Trough, |  |  |  |  |
|  |  |  | | Parabolic Dish, Fresnel Reflectors. |  |  | Ref.book |  |
|  |  |  | | b. Solar Photovoltaic (PV) Power |  |  | (Basic |  |
|  |  |  | | plant : layout, construction, |  |  | Electrical |  |
|  |  |  | | working. |  |  | Engineering |  |
| 03 | C |  | |  |  |  | ) |  |
| (12) | 3c | | 3.3 Biomass-based Power Plants |  |  |  |  |
|  |  |  |  |
|  |  |  | | a. Layout of a Bio-chemical based ( |  |  |  |  |
|  |  |  | | e.g. biogas ) power plant: |  |  |  |  |
|  |  |  | | b. Layout of a Thermo-chemical |  |  |  |  |
|  | C | 3d | | based (e.g. Municipal waste ) power |  |  |  |  |
|  |  |  | | plant. |  |  |  |  |
|  |  |  | | c. Layout of a Agro-chemical based |  |  |  |  |
|  | C |  | |  |  |  |  |  |
|  |  | 3e | | (e.g. bio-diesel) power plant |  |  |  |  |
|  |  |  | |  |  |  |  |  |
|  | C | 3.4 Features of the solid, liquid and |  |  |  |  |
|  |  |  | |  |  |  |
|  |  |  | | gas biomasses as fuel for biomass |  |  |  |  |
|  |  |  | | power plant |  |  |  |  |
|  | **Unit-IV** | | | **WIND POWER PLANTS** |  |  |  |  |
|  |  |  | |  |  |  |  |
|  |  |  | |  |  |  |  |  |
|  | D | 4a | | 4.1 Wind Map of India : Wind power |  |  |  |  |
|  |  |  | | density in watts per square meter. |  |  |  |  |
|  | D | 4b | | 4.2 Layout of Horizontal axis large |  |  |  |  |
|  |  |  | | wind power plant: |  |  |  |  |
|  |  |  | | a. Geared wind power plant. |  |  |  |  |
|  |  |  | | b. Direct drive wind power plant. |  |  |  |  |
|  | D | 4c | | 4.3 Salient features of electric |  |  |  |  |
|  |  | generators used in large wind power |  |  |  |
|  |  |  | |  |  | Chalk Board, |  |
|  |  |  | | plants: |  |  |
|  |  |  | |  |  | PPT+Videos |  |
|  |  |  | | a. Constant Speed Electric |  |  |
|  |  |  | |  |  |  |  |
|  |  |  | | Generators : Squirrel Cage Induction |  |  |  |
|  |  |  | |  |  |  |  |
|  |  |  | | Generators ( SCIG),Wound Rotor |  |  | Ref.book |  |
|  |  |  | | Induction Generator (WRIG) |  |  |  |
|  |  |  | |  |  | (Electrical |  |
| 04 |  |  | | b. Variable Speed Electric |  |  |  |
|  |  | |  |  | Tech.Vol-II) |  |
|  | | Generators: |  |  |  |
| (12) |  | |  |  |  |
|  |  | | Doubly-Fed Induction Generator |  |  |  |  |
|  |  |  | |  |  |  |  |
|  |  |  | | (DFIN), Wound Rotor Synchronous |  |  |  |  |
|  | D | 4d | | Generator (WRSG), Permanent |  |  |  |  |
|  |  | Magnet Synchronous Generator |  |  |  |  |
|  |  |  | |  |  |  |  |
|  |  |  | | (PMSG). |  |  |  |  |
|  |  |  | | 4.4 Construction layout of different |  |  |  |  |
|  |  |  | | types of horizontal and vertical axis |  |  |  |
|  |  | 4e | |  |  |  |  |
|  |  | small wind turbines. |  |  |  |
|  |  |  | |  |  |  |  |
|  | D |  | | 4.5 Working of different types of |  |  |  |  |
|  |  |  | | horizontal and vertical axis small |  |  |  |
|  |  |  | |  |  |  |  |
|  |  |  | | wind turbines : direct-drive and geared; permanent magnet generator and induction generators. |  |  |  |
|  |  |  | |  |  |  |  |
|  |  |  | |  |  |  |  |  |
|  |  | |  | 4.6 Location and installation of small |  |  |  |  |  |
|  |  | |  | wind turbines. |  |  |  |  |  |
|  |  | |  |  |  |  |  |  |  |
|  |  | |  |  |  |  |  |  |  |
|  |  | |  |  |  |  |  |  |  |
|  |  | |  | **ECONOMICS OF POWER** |  |  |  |  |  |
|  | **Unit-V** | | | **GENERATION AND** |  |  |  |  |  |
|  |  | |  | **INTERCONNECTED POWER** |  |  |  |  |  |
|  |  | |  | **SYSTEM.** |  |  |  |  |  |
|  | E | |  | 5.1Related terms : Connected load , |  |  |  |  |  |
|  |  | |  | firm power, cold reserve, hot reserve, |  |  | Chalk Board, |  |  |
|  | E | | 5a | spinning reserve. Base load and peak load plants ; Load curve, load duration curve , integrated duration curve. |  |  | PPT+Videos |  |  |
|  |  | |  |  |  |  |  |  |  |
|  |  | |  |  |  |  |  |  |
|  |  | |  |  |  |  |  |  |
|  |  | |  | 5.2 Cost of generation : Average |  |  |  |  |  |
|  |  | |  |  |  |  |  |
|  | E | | 5b | demand, maximum demand, |  |  |  |  |  |
|  |  | | demand factor, plant capacity |  |  |  |  |  |
|  |  | |  |  |  |  |  |
|  |  | |  | factor, plant use factor, diversity |  |  |  |  |  |
| 05 |  | |  | factor, load factor and plant load |  |  | Ref.book |  |  |
|  | |  | factor. |  |  | (Electrical |  |  |
| (10) |  |  |  |  |  |
|  | |  |  |  |  | Tech.Vol-II) |  |  |
|  |  | |  | 5.3 Choices of size and number of |  |  |  |  |
|  |  | | 5c |  |  |  |  |
|  | E | | generator units, combined operation |  |  |  |  |  |
|  |  | |  |  |  |  |  |  |
|  |  | |  | of power station. |  |  |  |  |  |
|  |  | |  | 5.4 Causes and impact and reasons |  |  |  |  |  |
|  | E | | 5d | of Grid system fault : State grid, |  |  |  |  |  |
|  |  | | National grid, Brownout and |  |  |  |  |  |
|  |  | |  |  |  |  |  |
|  |  | |  | Blackout; Sample blackouts at |  |  |  |  |  |
|  |  | |  | National and International level. |  |  |  |  |  |
|  |  | |  |  |  |  |  |  |  |

**Signature of the Faculty**

**(Prof. D.S. Dhanwate)**

**Signature of the H.O.D**

**(Prof. S.M.Sonje)**

|  |
| --- |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |