| **National Institute of Technology Meghalaya**An Institute of National Importance | **CURRICULUM** |
| --- | --- |
| Programme  | **Bachelor of Technology in Mechanical Engineering** | Year of Regulation  |  **2018** |
| Department  |  **Mechanical Engineering** | Semester | **V** |
| Course Code | Course Name | Credit Structure | Marks Distribution |
| L | T | P | C | INT | MID | END | Total |
| **ME 371** | **Power Plant Engineering and Energy Audit** | **2** | **0** | **0** | **2** | **50** | **50** | **100** | **200** |
| Course Objectives | To introduce present energy scenario, source and energy storage along with the economics of power plant. | Course Outcomes | CO1 | Students will be able to explain and classify working principles of different plant components of steam turbine power plant. |
| CO2 | Students will be able to understand basic working principles and classify diesel and gas turbine plants. Compare with steam turbine power plant. |
| To explain the working principles, plant layout, plant components of different power plants like steam turbine, diesel, gas turbine, nuclear, hydro-electric, solar thermal, windturbine and fuel cell plants. | CO3 | Students will be able to explain functioning of nuclear power plant and plant components. Recognize safety measures and disposal of nuclear waste. |
| To explain the environment pollution during power generation and its control measures. | CO4 | Students will be able to explain working principles of power plants using renewable energy resources. |
| CO5 | Students will be able to demonstrate underlying pollution and its effect during power generation in power plants.Illustrate its control rules and measures. |
| No. | COs | Mapping with Program Outcomes (POs) | Mapping with PSOs |
| PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| 1 | CO1  | **3** | **0** | **0** | **0** | **0** | **2** | **2** | **2** | **0** | **0** | **0** | **0** | **2** | **2** | **0** |
| 2 | CO2  | **3** | **0** | **0** | **0** | **0** | **2** | **2** | **2** | **0** | **0** | **0** | **0** | **2** | **2** | **0** |
| 3 | CO3  | **3** | **0** | **0** | **0** | **0** | **2** | **3** | **3** | **0** | **0** | **0** | **0** | **2** | **2** | **0** |
| 4 | CO4  | **3** | **0** | **0** | **0** | **0** | **2** | **3** | **2** | **0** | **0** | **0** | **1** | **2** | **2** | **0** |
| 5 | CO5  | **0** | **0** | **0** | **0** | **0** | **3** | **3** | **2** | **0** | **0** | **0** | **0** | **2** | **2** | **0** |
| SYLLABUS |
| No. | Content | Hours | COs |
| I | **Introduction**Energy scenario, sources of energy, energy storage, pollution and its control. | **02** | **All COs** |
| II | **Steam Turbine Power Plants**Layout, site selection, major plant components: steam turbines, condensers, cooling tower, boilers, coal handling systems, feed water treatment. Operation and maintenance of steam power plant, safety measures. | **05** | **CO1** |
| III | **Diesel and Gas Turbine Plant**Layout, applications, types, plant components, gas turbine fuels, lubrication systems, operation and maintenance, comparison with steam turbine power plant, safety measures. | **05** | **CO2** |
| IV | **Nuclear Power Plants**Plant layout, applications, components of nuclear power plant, types of reactors, safety, disposal of nuclear waste, nuclear power plants in India and world. | **04** | **CO3** |
| V | **Other Power Plants**Plant layout, site selection, principles of working and plant components of- hydro-electric, solar thermal & wind turbine power plant and fuel cell power systems. | **04** | **CO4** |
| VI | **Pollution and its Control**Air and water pollution by power plants and its control, radioactive contamination, central and state pollution control rules and data, effects of pollutants on human health, acid rain | **04** | **CO5** |
| Total Hours | **24** |  |
| **Essential Readings** |
| 1. P.K. Nag, “Power Plant Engineering”, 4th ed., 2017, McGraw Hill Education. |
| 2. R.K. Hegde, “Power Plant Engineering”, 1sted., 2015, Pearson Education India. |
| 3. S. Domkundwar, S. C. Arora, A. V. Domkundwar, “Power Plant Engineering”, 8thed., 2016, Dhanpat Rai and Co. (P) Limited. |
| **Supplementary Readings** |
| 1. M. M. El Wakil, "Power plant technology", 1st ed. 2010, McGraw Hill Education. |



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