| **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, wind  turbine 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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