| Course Number and Name |
|---|
| BGE006 – POWER PLANT ENGINEERING |
| Credits and Contact Hours |
| 3&45 |
| Course Coordinator's Name |
| Mr.Thirumavalavan |
| Text Books and References |
| **TEXT BOOK:**<br>1. P.K.Nag-Power plant Engineering-Tata McGraw Hill publishers, 2008<br><br>**REFERENCES:**<br>1. G.R.Nagpal- Power plant Engineering-Khanna publishers, Delhi, 1998<br>2. G.D.Rai-Non Conventional sources of Energy, 2004.<br>3.G.D.Rai-Power plant Engineering, Khanna publishers, 2000.<br>4.https://memechanical**engineering**.files.wordpress.com/.../power-plant-**eng**... |
| Course Description |
| To understand the various components, operations and applications of different types of power plants . |

| Prerequisites | Co-requisites |
|---|---|
| BASIC MECHANICAL ENGINEERING | |

| required, elective, or selected elective (as per Table 5-1) |
|---|
| Non Major Elective |

| Course Outcomes (COs) | |
|---|---|
| CO1 | Student learns the steam power plant |
| CO2 | Student learns the working of generators |
| CO3 | Student learns the working of turbines |
| CO4 | Student learns the principle of working in wind energy and wind mills |
| CO5 | Student learns the solar energy |
| CO6 | Student understands the economics of power generation |

Student Outcomes (SOs) from Criterion 3 covered by this Course

| COs/SOs | a | b | c | d | e | f | g | h | i | j | k | l |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | H | | | | | | | | | | | |
| CO2 | | | H | | L | | | | H | | L | |
| CO3 | H | | | | | M | | | | | | |
| CO4 | | | H | | L | | M | | | | | L |
| CO5 | | | | | | | | | H | | | |
| CO6 | H | | | | L | | | | | | | L |

List of Topics Covered

**UNIT I STEAM POWER PLANT** **9**

Various components ,types of firing systems-pulverized fuel, tilting and tangential systems, fluidized bed combustion system, coal handling systems-crushers, feeders, ash handling system-Dust collectors ID and FD fans-flue stack, Feed pumps, Economizers, Air preheaters, Super heaters, Reheaters, Condensers- Types.

**UNIT II STEAM GENERATORS AND POWER CYCLES** **9**

Boilers-types-Boiler efficiencies, combustion calculations, equivalent evaporation, Boiler power, cooling towers-tower characteristics. Review of Rankine cycle-reheat, regeneration with open and closed type of feed water heaters and their representation in T-S diagram

**UNIT III NUCLEAR, HYDEL AND GAS TURBINE POWER PLANTS** **9** Nuclear energy,Fission,Fusion reaction, chain reaction, parts and types, waste disposal and safety in nuclear plants,Hydel plants-classification, selection of turbines, pumped storage system, performance evaluation of turbines. Gas turbine plants-open and closed cycles-combined cycle plants and their representation in T-S diagram

**UNIT IV NON CONVENTIONAL ENERGY BASED POWER PLANTS** **9**

Wind energy, wind mills, wind forming, site selection and limitation, tidal power plants, solar energy-Various solar power energy systems, geothermal energy, Fuel cells, thermionic and thermo electric converters, magneto hydro dynamic plant.

**UNIT V ECONOMICS OF POWER GENERATION** **9**

Load duration curves, power plant economics, fixed and operating costs, Load sharing and plant selection, Economical comparison of various power plants and co-generation. Environmental consideration of various power plants-$CO_2$, $SO_2$, NOx and particulate emissions and their control