GUJARAT TECHNOLOGICAL UNIVERSITY
B. E. SEMESTER: V
MECHANICAL ENGINEERING

Subject Name: **Power Plant Engineering**
Subject Code: **151904**

Teaching Scheme				Evaluation Scheme		
Theory	**Tutorial**	**Practical**	**Total**	**University Exam (Theory) (E)**	**Mid Sem Exam (Theory) (M)**	**Practical (I)**
3	0	0	3	70	30	50

Sr. No.	Course content
1.	**Thermal Power Plant:** General layout of modern thermal power plant, Site selection, Presents status of power generation in India.
2.	**High Pressure Boilers & Accessories:** Unique features and advantages of high pressure boilers, LaMont, Benson, Loeffler, Schmidt-Hartmann, Velox, supercritical, Supercharged and fluidized bed combustion boiler. Different types of super-heaters, Re-heaters, economizers, Air pre-heaters, Methods of superheat control, Corrosion in boilers and its prevention.
3.	**Coal & Ash Handling Systems:** Coal handling storage of coal, Burning systems, Types of stokers their working, Pulverized fuel handling systems, Unit and central systems, Pulverized mills- ball mill, Bowl mill, Ball &race mill, Impact or hammer mill, Pulverized coal burners, Oil burners. Necessity of ash disposal, Mechanical, Hydraulic, pneumatic and steam jet ash handling system, Dust collection and its disposal, Mechanical dust collector, Electrostatic precipitator.
4.	**Draught System:** Natural draught- estimation of height of chimney, Maximum discharge, Condition, Forced, Induced and balanced draught, Power requirement by fans.
5.	**Condensers and Cooling Towers:** Types of condensers, sources of air in condenser, Effects of air leakage, Methods of obtaining maximum vacuum in condenser, Dalton's law of partial pressure, vacuum & condenser efficiency, Mass of cooling water required, Air pump-Edward air pump. Necessity of cooling ponds and cooling towers, Condenser water cooling systems, Types of cooling towers, cooling ponds.
6.	**Feed Water Treatment:** Necessity of feed water treatment, Different impurities found in feed water, Effect of impurities, pH & its role in corrosion and scale formation, Internal & external water treatment systems- hot lime soda process, Zeolite ion exchange process, Demineralization plants, Reverse osmosis process, Sea water treatment using reverse osmosis, De-aeration.

7.	**Diesel Power Plant:** Essential components of diesel power plant, Different systems like fuel supply system, Engine cooling system, Engine lubrication system, Exhaust system, Engine starting and stopping system.
8.	**Nuclear Power Plant :** Nuclear fusion and fission, Chain reaction, Nuclear fuels, Components of nuclear reactor, Classification of reactors, Pressurized water reactor, Boiling water reactor, Gas cooled reactor, CANDU reactor, Fast breeder reactor, Nuclear waste and its disposal, Nuclear power plants in India.
9.	**Pollution and its Control:** Air pollution by thermal power plants and its control, Effect of different pollutants on human health, Water pollution by thermal power plants and its control, Acid rains.
10.	**Economics of Power Generation:** Load curves, Load duration curves, Connected load, Maximum load, Peak load, base load and peak load power plants, Load factor, Plant capacity factor, Plant use factor, Demand factor, Diversity factor, Cost of power plant, Performance and operating characteristics of power plant, Tariff for electric energy.

Term Work:

The term work shall be based on the topics mentioned above.

Practical / Oral:

The candidate shall be examined on the basis of term-work.

Reference Books:

1. Power Plant Engineering, Arora & Domkundwar, Dhanpat Rai & Co. Delhi.
2. Power Plant Engineering, R.K. Rajput, Laxmi Publication, Delhi
3. Power Plant Engineering, A.K. Raja, New Age International, Delhi
4. Power Plant Engineering, Dr. P.C. Sharma, S.K. Kataria & Sons, Delhi
5. Power Plant Engineering, P.K. Nag, Tata McGrahill Co., Delhi
6. Power Plant Engineering, Nagpal, Khanna Publishers, Delhi.
7. Power Plant Engineering, C. Elanchazhian, I.K. International, Delhi