Gautam Buddha University, Greater Noida

School of Engineering (Mechanical Engineering)

Degree	Course Name	Course Code	Marks:100
Integrated B. Tech. + M. Tech. / M.B.A.	Power Plant Engineering	ME 401	SM+MT+ET 25+25+50
Semester	**Credits**	**L-T-P**	**Exam.**
VII	4	3-1-0	3 Hours

Unit - I

Introduction: Power and energy; Sources of energy; Review of thermodynamic cycles related to power plants; Fuels and combustion calculations; Load estimation; Load curves; Various terms and factors involved in power plant calculations; Effect of variable load on power plant operation; Selection of power plant units; Effect of plant type on costs; Rates; Fixed elements; Energy elements; Customer elements and investor's profit; Depreciation and replacement; Theory of rates; Economics of plant selection; Other considerations in plant selection. **(08 Hours)**

Unit - II

Steam Power Plant: General layout of steam power plant; Power plant boilers including critical and super critical boilers; Fluidized bed boilers; Boilers mountings and accessories; Different systems such as coal handling system; Pulverizers and coal burners; Combustion system; Draft; ash handling system; Dust collection system. **(07 Hours)**

Unit - III

Power Plant Auxiliary Systems: Feed water treatment and condenser and cooling towers and cooling ponds; Turbine auxiliary systems such as governing; Feed heating; Reheating ; Flange heating and gland leakage; Operation and maintenance of steam power plant; Heat balance and efficiency; Site selection of a steam power plant.

Electrical System: Generators and generator cooling; Transformers and their cooling; Bus bar; etc. **(07 Hours)**

Unit - IV

Diesel Power Plant: General layout; Components of diesel power plant; Performance of diesel power plant; Fuel system; Lubrication system; Air intake and admission system; Supercharging system; Exhaust system; Diesel plant operation and efficiency; Heat balance; Site selection of diesel power plant; Comparative study of diesel power plant with steam power plant.

Gas Turbine Power Plant: Layout of gas turbine power plant; Elements of gas turbine power plants; Gas turbine fuels; Cogeneration; auxiliary systems such as fuel; Controls and lubrication; Operation and maintenance; Combined cycle power plants; Site selection of gas turbine power plant. **(08 Hours)**

Unit - V

Nuclear Power Plant: Principles of nuclear energy; Layout of nuclear power plant; Basic components of nuclear reactions; Nuclear power station; Nuclear waste disposal; Site selection of nuclear power plants.

Hydro Electric Station: Hydrology; Principles of working; Applications; Site selection; Classification and arrangements; Hydro-electric plants; Run off size of plant and choice of units; Operation and maintenance; Hydro systems; Interconnected systems.

Non Conventional Power Plants: Introduction to non-conventional power plants (Solar; wind; geothermal; tidal) etc. **(08 Hours)**

Unit - VI

Instrumentation: Purpose; Classification; Selection and application; Recorders and their use; Listing of various control rooms.

Pollution: Pollution due to power generation. **(07 Hours)**

Recommended Books:

1. Power Plant Engineering; P.K. Nag; Tata McGraw Hill.
2. Power Plant Engineering; Mahesh Verma; Metropolitan Book Company Pvt. Ltd. New Delhi.
3. Steam & Gas Turbines & Power Plant Engineering; R. Yadav; Central Pub. House.