

Gautam Buddha University; Greater Noida

School of Engineering (Mechanical Engineering)

| Degree | Course Name | Course Code | Marks:100 |
|------------------------------|-------------------------------------|-------------|----------------------|
| M. Tech. in Thermal Engg. | Thermal and Nuclear Power Plants | MET 517 | SM+MT+ET 25+25+50 |
| Semester | Credits | L-T-P | Exam. |
| I | 3 | 3-0-0 | 3 Hours |

Unit - I

Introduction: Sources of energy; Types of power plants; Direct energy conversion system; Energy sources in india; Recent developments in power generation; Combustion of coal; Volumetric analysis; Gravimetric analysis; Flue gas analysis.

(06 Hours)

Unit - II

Steam Power Plants: General layout of steam power plant; Modern coal-fired steam power plants; Power plant cycles; Fuel handling; Combustion equipment; Ash handling; Dust collectors; Steam generators- types; Accessories; Feed water heaters; Performance of boilers; Water treatment; Cooling towers; Steam turbines; Compounding of turbines; Steam condensers; Jet & surface condensers; Supercritical and ultra-supercritical power plants.

(10 Hours)

Unit - III

Gas Turbine Power Plant: Cogeneration; Combined cycle power plants; Analysis; Waste-heat recovery; IGCC power plants; Fluidized bed combustion – Advantages & disadvantages; Multi-generation.

(07 Hours)

Unit - IV

Nuclear Power Plants: Recapitulation of relevant topics of nuclear physics; Nuclear reactors; Classification: Types of reactors; Site selection. Methods of fuel enrichment: Uranium and thorium.

(07 Hours)

Unit - V

Nuclear Power Plants Safety: By-products of nuclear power generation; Economics of nuclear power plants; Nuclear power plants in India; Future of nuclear power; Nuclear waste disposal. **(07 Hours)**

Unit - VI

Power Plant Instrumentation: Classification; Pressure measuring instruments; Temperature measurement and Flow measurement. Analysis of combustion gases; Pollution: Types; Methods to Control. **(08 Hours)**

Recommended Books:

1. Power Plant Engineering; Black & Veatch; Springer; 1st Edition; 1996.
2. Nuclear Engineering Handbook; K. D. Kok; CRC Press; 1st Ed.; 2009.
3. Power Plant Engineering; A.K. Raja; A.P. Srivastava; M Dwivedi; New Age Publishers; 1st Ed.; 2006.
4. Power Plant Technology; M. M. El Wakil; Tata McGraw Hill; New Delhi; 1st Edition; 1984.
5. Nuclear Power Plant Engineering; J. H. Rust; Haralson Publishing Company; 1st Ed.; 1979.