

Maulana Abul Kalam Azad University of Technology, West Bengal

(Formerly West Bengal University of Technology)

Syllabus for B. Tech in Electrical Engineering

(Applicable from the academic session 2018-2019)

Name of the course	POWER PLANT ENGINEERING
Course Code: PE-EE-501B	Semester: 5th
Duration: 6 months	Maximum Marks: 100
Teaching Scheme	Examination Scheme
Theory: 3 hrs./week	Mid Semester Exam: 15 Marks
Tutorial: 0hr/week	Assignment & Quiz: 10 Marks
Practical: hrs./week	Attendance: 05 Marks
Credit Points: 3	End Semester Exam: 70 Marks

Objective:

1. To understand methods of selection of power plant and its economic.
2. To understand the principle of operation different types of power plants.
3. To understand methods of site selection of different power plants.
4. To understand the cause of pollution and its remedy for power plants.
5. To understand methods of cooling of generators and transformers.
6. To solve numerical problems of load estimation, economics of power plants.

Pre-Requisite

1. Electric Circuit Theory (PC-EE-301)
2. Electromagnetic field theory (PC-EE-303)
3. Electric Machine-I (PC-EE-401)
4. Electrical and Electronics measurement (PC-EE-403)

Unit	Content	Hrs	Marks
1	<p>Introduction: Power and energy, sources of energy, review of thermodynamic cycles related to powerplants, 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.</p> <p>Power plant economics and selection: 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.</p>	08	
2	<p>Steam power plant: General layout of steam power plant, Power plant boilers including critical and supercritical 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, 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.</p>	08	
3	<p>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</p>		

	powerplant, Comparative study of diesel power plant with steampower 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	
4	Nuclear power plant: Principles of nuclear energy, Lay out 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.	10	
5	Electrical system: Generators and their cooling, transformers and their cooling.Instrumentation Purpose, classification, selection and application, recorders and their use,listing of various control rooms.Pollution due to power generation and its remedy	06	

Text books:

1. Power Plant Engineering, P.K. Nag, McGraw Hill.
2. Power Plant Engineering, F.T. Morse, Affiliated East-West Press Pvt. Ltd.
3. Power Plant Technology El-Vakil, McGraw Hill.

Reference books

1. Steam & Gas Turbines & Power Plant Engineering by R.Yadav, Central Pub.House.
2. An introduction to thermal power plant engineering and operation, P.K.Das and A.K. Das, Notion press.

Course Outcome:

After completion of this course, the learners will be able to

1. explain the principle of operational of Steam, Hydroelectric, Diesel, Gas turbine, Nuclear power and non-conventional power plant.
2. identifythe cause of pollution for power generation and its remedy.
3. suggest location to set up Steam, Hydroelectric, Diesel, Gas turbine and Nuclear power plant.
4. compare Steam, Hydroelectric, Diesel, Gas turbine, Nuclear power and non-conventional power plant.
5. suggest methods of maintenance of Steam, Gas and Hydroelectric power plants
6. solve numerical problems of load estimation and economics of power plants.

Special Remarks (if any)

The above-mentioned outcomes are not limited. Institute may redefine outcomes based their program educational objective.