AE-415: Power Plant Engineering										
L	**T**	**P**	Credit	Area		**CWS**	**PRS**	**MTE**	**ETE**	**PRE**
3	0/1	2/0	4	DEC		15/25	25/-	20/25	40/50	-

Objectives: To familiarize the students with types of power plants, steam generators, combined cycle power plants, other power plants, control of power plants and environmental impact of power plants

AE-415: Power Plant Engineering		Contact Hours
Unit-1	Classification of power plants: base load and Peak load power stations, co-generated power plant, captive power plant, and their fields of application & selection criteria, Indian energy scenario, Indian coals: formation, properties, analysis, benefication and heating value calculation of coals; cocking and non-cocking coals, fuel handling systems; coal gasification	**8**
Unit-2	Steam Generators: High pressure utility boiler, natural and forced circulation, fuel handling, coking and non-coking coal, coal benefication, coal pulverization, pulverized fuel firing system, combustion process, need of excess air, cyclone furnace, fluidized bed boiler, placement of evaporator, economizers, super heaters, re-heaters, air pre-heater in the boiler, de-aeration, boiler blow- down, ash collection by bag house, gravity separation, electrostatic precipitators and wet scrubbers, boiler efficiency calculations, water treatment: external and internal treatment	**6**
Unit-3	Combined Cycle Power Plants: Binary vapour cycles, coupled cycles, gas turbine- steam turbine power plant, gas pipe line control, MHD- Steam power plant, thermionic steam power plant, integrated coal combined cycle (IGCC) power plant	**6**
Unit-4	Other power plants : Nuclear power plants - working and types of nuclear reactors, boiling water reactor, pressurized water reactor, fast breeder reactor, controls in nuclear power plants, hydro power plant -classification and working of hydroelectric power plants, diesel and tidal power plants	**8**
Unit-5	Instrumentation and Controls in power plants: Important instruments used for temperature, flow, pressure, water/ steam conductivity measurement; flue gas analysis, drum level control, combustion control, super heater and re-heater temperature control, furnace safeguard and supervisory system (FSSS), auto turbine run-up system(ATRS), interlocks and protection of boiler turbines	**8**
Unit-6	Environment Pollution and Energy conservation: Economics of power generation: load duration curves, power plant economics, pollution from power plants, disposal/ management of nuclear power plant waste. concept of energy conservation and energy auditing	**6**
	Total	**42**

Reference Books:

1	M.M. El Wakil, “Power Plant Engineering”, Publisher-Tata McGraw Hill (ISBN 13: 9780072871029)
2	P.K Nag , “Power Plant Engineering”, Publisher-Tata McGraw Hill(ISBN-13: 9789339204044)
3	by J Wiesman and R Eckart, “Modern Power Plant Engineering”, Publisher-Prentice hall India Ltd (ISBN 9780135972526)
4	T.D Eastop and Mc Conkey”, Applied Thermodynamics”, Longman Scientific and Technical Publisher-Pearson (ISBN 8177582380)

Course Outcomes

CO1	To understand basics of power plant their types and Indian energy scenario, Indian coals.
CO2	To understand Steam Generators, boiler efficiency calculations and water treatment
CO3	To discuss Combined Cycle Power Plants
CO4	To explain Instrumentation and Controls in power plants
CO5	To explain nuclear power plants, hydro power plant and diesel and tidal power plants.
CO6	To apply environment pollution and Energy conservation

CO-PO/PSOMatrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	2	2	0	0	0	0	0	0	2	2	1	1
CO2	3	3	2	3	1	0	0	0	0	0	0	1	2	1	1
CO3	3	3	3	3	1	0	0	0	0	0	0	2	3	3	2
CO4	3	3	3	3	1	0	0	0	0	0	0	1	3	3	2
CO5	2	2	2	2	2	0	0	0	0	0	0	1	2	2	2