	National Institute of Technology Meghalaya An Institute of National Importance	CURRICULUM

Programme	**Master of Technology in Mechanical Engineering**	Year of Regulation	**2018**
Department	**Mechanical Engineering**	Semester	**II**

Course Code	Course Name	Credit Structure				Marks Distribution			
		L	T	P	C	INT	MID	END	Total
ME 512	**Power Production Engineering**	**3**	**0**	**0**	**3**	**50**	**50**	**100**	**200**

Course Objectives	To introduce present energy scenario, source and energy storage along with the economics of power plant.	Course Outcomes	CO1	Explain the economics of power plant based on load variation and solve related problems (understanding)
	To teach the steam turbines and its performance and applications		CO2	i. Understand the basic working principle of steam power plant and methods to increase the performance of Rankine cycle. (Understanding) ii. Under the various processes and methods such as circulation, riser, downcomer, economizer, superheater, air preheater and evaporator, steam turbines, nozzles and blades (understanding) iii. Solve the problems of reheat and regenerative Rankine cycle. (Applying)
	To teach the hydroelectric turbines and its performance and applications		CO3	i. Understand the hydro turbines and its performance parameters along with the velocity triangle, cavitation, governing (understanding). ii. Solve the problems on hydro turbine (Applying).
	To teach the diesel and nuclear power plant and its performance and applications		CO4	i. Explain the functioning of diesel power plant, types, layout and various components (understanding). ii. Explain in details of combustion, turbocharging and supercharging (understanding). iii. Solve the problems on diesel power plant (Applying).
			CO5	Explain the functioning of nuclear power plant and solve related problem (Understanding/applying) along with the energy storage systems.

SYLLABUS

No.	Content	Hours	COs
I	**Power Plant Economics** Energy Scenario, Load-Duration Curves, Power Plant Location, Economics of Power Plant	**03**	**CO1**
II	**Steam Turbine Power Plants** Rankine Cycle, Boiler & Types, Drum Internals, Economizer, Super heater, Feed Water Heater, Air Preheater & Evaporator, Fluidized Bed, Boiler Control, Ash Handling & Feed Water Treatment, Steam Turbines: Impulse & Reaction Turbine, Velocity Diagram, Compounding of Steam Turbine	**12**	**CO2**
III	**Hydro Electric Power Plants** Hydrological Cycles, Hydrographs, Storage, Turbines &Other Equipment, Classification of Plants & Turbines, Cavitation, Governing, Performance	**08**	**CO3**
IV	**Diesel & Gas Turbine Power Plants** Diesel &Gas Turbine Cycles, Types, DieselPower Plants, Components, Gas Turbine Power Plants	**06**	**CO4**
V	**Nuclear Power Plants** Nuclear Fission, Fission Reactions, Alpha, Beta & Gamma Decay, Half-Life, Controlled Chain Reaction, BWR & PHWR Reactors, Concept of Fusion Reaction.	**06**	**CO5**
VI	**Energy Storage** Pumped Hydro, CAES, Flywheel, Electrochemical, Magnetic, Thermal, Chemical, Hydrogen	**03**	**CO5**
	Total Hours	**38**	

Essential Readings

13. P.K. Nag,“Power Plant Engineering”, Tata McGraw Hill.

14. R.K. Hegde, “Power Plant Engineering”, Pearson Education India.

Supplementary Readings

24. AW Culp. Principles of Energy Conversion, Tata McGraw Hill.

25. Y.A. Çengel and M.A. Boles,“Thermodynamics - An Engineering Approach”, McGraw Hill.

26. B.G.A. Skrotzki and W.A. Vopat, “Power Station Engineering and Economy”, Tata McGraw Hill.