



A T M E

College of Engineering



Department of Electrical and Electronics Engineering

COURSE MODULES OF THE COURSE TAUGHT FOR THE EVEN SESSION FEB-MAY

2024-25

Course Syllabi with CO's

Faculty Name: Ms. Swapna H				Academic Year: 2024-25			
Department: Electronics and Electronics Engineering							
Course Code	Course Title	Course Type	Prerequisite	Contact Hours			Total Hrs/ Sessions
				L	T	P	
BEE405A	Electrical Power Generation & Economics	ESC	Nil	3	-	-	40
Objectives	<ol style="list-style-type: none"> To understand the basics of hydroelectric power plant, merits and demerits of hydroelectric power plants, site selection, arrangement and elements of hydroelectric plant. To understand the working, site selection and arrangement of Steam, Diesel, and Gas Power Plants. To understand the working, site selection and arrangement of Nuclear Power Plants. To understand importance of different equipments in substation, Interconnection of power stations and different types of grounding. To understand the economics of power generation 						
Topics Covered as per Syllabus							
Module - 1							
Hydroelectric Power Plants: Hydrology, run off and stream flow, hydrograph, flow duration curve, Mass curve, reservoir capacity, dam storage. Hydrological cycle, merits and demerits of hydroelectric power plants, Selection of site. General arrangement of hydel plant, elements of the plant, Classification of the plants based on water flow regulation, water head and type of load the plant has to supply. Water turbines – Pelton wheel, Francis, Kaplan and propeller turbines. Characteristic of water turbines Governing of turbines, selection of water turbines. Underground, small hydro and pumped storage plants. Choice of size and number of units, plant layout and auxiliaries. (8 Hours)							
BTL		L1 – Remembering, L2 – Understanding,					
Module – 2							
Steam Power Plants: Introduction, Efficiency of steam plants, Merits and demerits of plants, selection of site. Working of steam plant, Power plant equipment and layout, Steam turbines, Fuels and fuel handling, Fuel combustion and combustion equipment, Coal burners, Fluidized bed combustion, Combustion control, Ash handling, Dust collection, Draught systems, Feed water, Steam power plant controls, plant auxiliaries.							
Diesel Power Plant: Introduction, Merits and demerits, selection of site, elements of diesel power plant, applications.							
Gas Turbine Power Plant: Introduction Merits and demerits, selection of site, Fuels for gas turbines, Elements of simple gas turbine power plant, Methods of improving thermal efficiency of a simple gas power plant, Closed cycle gas turbine power plants. Comparison of gas power plant with steam and diesel power plants.							
BTL		L1 – Remembering, L2 – Understanding,					
Module – 3							
Nuclear Power Plants: Introduction, Economics of nuclear plants, Merits and demerits, selection of site, Nuclear reaction, Nuclear fission process, Nuclear chain reaction, Nuclear energy, Nuclear fuels, Nuclear plant and layout, Nuclear reactor and its control, Classification of reactors, power reactors in use, Effects of nuclear plants, Disposal of nuclear waste and effluent, shielding.							



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Module – 4	
<p>Substations: Introduction to Substation equipment; Transformers, High Voltage Fuses, High Voltage Circuit Breakers and Protective Relaying, High Voltage Disconnect Switches, Lightning Arresters, High Voltage Insulators and Conductors, Voltage Regulators, Storage Batteries, Reactors, Capacitors, Measuring Instruments, and power line carrier communication equipment. Classification of substations – indoor and outdoor, Selection of site for substation, Bus-bar arrangement schemes and single line diagrams of substations. Interconnection of power stations. Introduction to gas insulated substation, Advantages and economics of Gas insulated substation.</p> <p>Grounding: Introduction, Difference between grounded and ungrounded system. System grounding – ungrounded, solid grounding, resistance grounding, reactance grounding, resonant grounding. Earthing transformer. Neutral grounding and neutral grounding transformer.</p>	
BTL	L1 – Remembering, L2 – Understanding,
Module – 5	
<p>Economics: Introduction, Effect of variable load on power system, classification of costs, Cost analysis. Interest and Depreciation, Methods of determination of depreciation, Economics of Power generation, different terms considered for power plants and their significance, load sharing. Choice of size and number of generating plants. Tariffs, objective, factors affecting the tariff, types. Types of consumers and their tariff. Power factor, disadvantages, causes, methods of improving power factor, Advantages of improved power factor, economics of power factor improvement and comparison of methods of improving the power factor. Choice of equipment.</p>	
BTL	L1 – Remembering, L2 – Understanding,
List of Text Books	
<ol style="list-style-type: none"> 1. Power Plant Engineering, P.K. Nag, Mc Graw Hill, 4th Edition, 2014 2. Generation of Electrical Energy, B.R.Gupta, S. Chand, 2015 3. Electrical power Generation, Transmission and Distribution, S.N. Singh, PHI, 2nd Edition, 2009 	
List of Reference Books	
<ol style="list-style-type: none"> 1. A Course in Power Systems, J.B. Gupta, Katson, 2008 2. Electrical Power Distribution Systems, V. Kamaraju, McGrawHill, 1st Edition, 2009 3. A Text Book on Power System Engineering, A. Chakrabarti, et al, Dhanpath Rai, 2nd Edition, 2010 4. Electrical Distribution Engineering, Anthony J. Pansini, CRC Press, 3rd Edition, 2006 5. Electrical Distribution Systems, Dale R PatrickEt al, CRC Press, 2nd Edition, 2009 	
List of URLs, Text Books, Notes, Multimedia Content, etc	
<ol style="list-style-type: none"> 1. http://electrical-engineering-portal.com 2. http://nptel.iitm.ac.in/courses.php 	
Course Outcomes	<p>At the end of the course the student will be able to:</p> <p>CO1: Explain the basics of hydro electric power plant, merits and demerits of hydroelectric power plants, site selection, arrangement and elements of hydroelectric plant.</p> <p>CO2: Explain the working, site selection and arrangement of Steam, Diesel and Gas Power Plants.</p> <p>CO3: Explain the working, site selection and arrangement of Nuclear Power Plants.</p> <p>CO4: Explain the importance of different equipments in substation, Interconnection of power stations and different types of grounding.</p> <p>CO5: Explain the economics of power generation.</p>
Internal Assessment Marks: 50 Marks	



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ISO 9001:2015

Department of EEE
Emitting Elite Energy

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The Correlation of Course Outcomes (CO's) and PO's and PSOs

Course Code:	BEE405A	Course Title: Power Generation and Economics												
List of Course Outcomes	Program Outcomes												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO-1	2	-	-	-	-	-	2	-	-	-	-	-	3	-
CO-2	2	-	-	-	-	2	2	-	-	-	-	-	3	-
CO-3	2	-	-	-	-	2	2	-	-	-	-	-	3	-
CO-4	2	2	-	-	-	2	2	-	-	-	-	2	3	-
CO-5	2	2	-	-	-	-	2	-	-	-	-	2	3	-

Note: 3 = Strong Contribution 2 = Average Contribution 1 = Weak Contribution '-' = No Contribution