

**MYMENSINGH POLYTECHNIC INSTITUTE**  
**POWER TECHNOLOGY**

5<sup>th</sup> Semester,

SEMESTER PLAN- 2024, Class Start : 14-01-2024

T P C

**Subject: POWER PLANT ENGINEERING (27152) 2 3 3**

Week No.	Theory		Practical		
	Content (Specific Objective)	Activity		Content(Practical Job no)	Remarks
		Class Test	Learning Materials		
1	<b>SOURCES OF ENERGY AND POWER PLANT</b> 1.1 List various sources of energy. 1.2 Define renewable energy. 1.3 Describe the various sources of Renewable Energy. 1.4 Compare between conventional and non-conventional energy. 1.5 Define power plant with classification. 1.6 Describe the basic operation of a power plant. 1.7 State the significance of power plant. 1.8 List the authorities of power supply in Bangladesh. 1.9 Explain grid system. 1.10 List the various types of power plant in Bangladesh with capacity.		Ref. books, white board ,marker, flow chart,OHP , Practical ground.	Job no:-02  Observe boiler 1.1 Identify different type of boiler. 1.2 Identify the boiler accessories and mounting. 1.3 Identify the pressure gauge, type of condenser. 1.4 Identify the fuel firing system of Boiler.	
2	<b>BOILER</b> 2.1 Define Boiler. 2.2 Describe the different types of boiler based on tube content and operating pressure. 2.3 Compare between water tube and fire tube boiler. 2.4 Explain boiler Blow-down, boiler capacity, boiler efficiency and boiler scaling. 2.5 Illustrate the working principle of various boiler mountings and boiler accessories. 2.6 List the various specification parameters of a Boiler. 2.7 Discuss the feed water treatment process. 2.8 List maintenance equipment's of boiler. 2.9 List the visual inspection equipment. 2.10 Describe the startup and shut down procedure of boiler.			Job no:-02  <b>Observe water turbine</b> 2.1 Identify the components of water turbine. 2.2 Identify the governing system of turbine. 2.3 Observe manufacture's specification of water turbine. 2.4 Operate the Pelton wheel at different speed.	

<p><b>3</b></p>	<p><b>STEAM POWER PLANT</b>  <b>3.1 Define Steam power plant.</b>  <b>3.2 Discuss various thermodynamic vapor power cycle with P-V and T-S diagram.</b>  <b>3.3 Describe the operation of a steam power plant with schematic diagram.</b>  <b>3.4 Mention the considering factors of site selection for steam power plant.</b>  <b>3.5 Describe the process of coal storage, coal handling, coal pulverizing, coal burning and ash handling.</b>  <b>3.6 Define draught and cooling tower.</b>  <b>03</b>  <b>07</b>  <b>3.7 Explain the classification of chimney draught.</b>  <b>3.7 Express the deduction of formulae to calculate chimney height.</b>  <b>3.9 Describe the basic working principle of a cooling tower.</b>  <b>3.10 Solve the problems related to chimney draught.</b></p>			<p><b>Job no:- 03</b></p> <p><b>Observe the gas turbine model</b>  <b>3.1 Identify the components of gas turbine.</b>  <b>3.2 Start the gas turbine model with compressed air.</b>  <b>3.3 Observe the operation of gas turbine.</b></p>	
<p><b>4</b></p>	<p><b>GAS TURBINE AND COMBINED CYCLE POWER PLANT</b>  <b>4.1 Define gas turbine power plant.</b>  <b>4.2 Mention the various types of gas turbine power plant.</b>  <b>4.3 Describe the operation of open and closed cycle type gas turbine plant with schematic diagram.</b>  <b>4.4 Describe the gas turbine cycle efficiency.</b>  <b>4.5 Describe the construction and operation of gas engine power plant.</b>  <b>4.6 Mention the advantages and disadvantages of gas turbine power and gas engine power plant.</b>  <b>4.7 Describe the starting and shut down procedure of gas turbine power plant.</b>  <b>4.8 Define combined cycle power plant.</b>  <b>4.9 Explain the working procedure of a combined cycle power plant with Heat Recovery Steam Generator.</b>  <b>4.10 Mention the advantages of a combined cycle power plant.</b></p>	<p>CT-1</p>		<p><b>Job no:-04</b></p> <p><b>Observe the steam power plant</b>  <b>4.1 Draw the schematic diagram of reheat cycle, regenerative cycle &amp; reheat - regenerative cycle of steam power plant.</b>  <b>4.2 Identify vapor cycle components.</b></p>	

5	<p><b>DIESEL POWER PLANT</b></p> <p>5.1 Describe the operation of a diesel power plant.</p> <p>5.2 Draw the schematic diagram of a diesel power plant.</p> <p>5.3 Mention the advantages and disadvantages of a diesel power plant.</p> <p>5.4 Describe the starting and shut down procedure of a diesel power plant.</p> <p>5.5 Explain the fuel storage and handling method for large scale diesel power plant.</p> <p>5.6 Describe the operation of portable power generation unite.</p> <p>5.7 Point out the considering factors to select the site of a diesel power plant.</p>			<p><b>Job no:-05</b></p> <p>Observe the diesel power plant</p> <p>5.1 Identify the components of diesel power plant.</p> <p>5.2 Identify the cooling system of diesel power plant.</p> <p>5.3 Identify the lubricating system of diesel engine.</p> <p>5.4 Identify the starting system of diesel power plant.</p>	
6	<p><b>HYDRO-ELECTRIC POWER PLANT</b></p> <p>6.1 Define hydro-electric power plant.</p> <p>6.2 Describe the operating principle of hydro-electric power plant.</p> <p>6.3 Describe the various types of hydraulic turbine.</p> <p>6.4 Describe the various elements of hydro-electric power plant.</p> <p>6.5 Explain various types of draft tube used in hydro-electric power</p> <p>03</p> <p>8</p> <p>plant.</p> <p>6.6 Mention the factors to be considered in selecting the site of a hydro-electric power plant.</p> <p>6.7 Compare the hydro-electric power plant with others power plant.</p> <p>6.8 Solve problems related to hydro-electric power plant.</p>	QT-1		<p><b>Job no:06</b></p> <p>Portable power generation unit</p> <p>6.1 Disassemble a Portable power generation unit.</p> <p>6.2 Identify the components of a Portable power generation unit.</p> <p>6.3 Assemble a Portable power generation unit.</p>	
7	<p><b>NUCLEAR POWER PLANT</b></p> <p>7.1 Explain fission, fusion &amp; chain reaction.</p> <p>7.2 Describe the essential units of a nuclear plant.</p> <p>7.3 Describe the working principle of some common type nuclear reactor.</p> <p>7.4 Describe the method of waste disposal.</p> <p>7.5 Describe the safety measure of a nuclear power plant.</p>			<p><b>Job no:07</b></p> <p>Measure Voltage, Current for Series and Parallel Combination of Solar Panel</p> <p>7.1. Select the appropriate solar panel, Battery, Cable and multi-meter.</p> <p>7.2. Connect the three or more solar panel in series.</p>	

				<p>7.3. Record data in the table</p> <p>7.4. Connect the three or more solar panel in parallel.</p> <p>7.5. Record data in the table.</p>	
8	<p>7.6 Mention the advantages and disadvantages of nuclear power plant.</p> <p>7.7 Mention the factors to be considered in selecting the site of a nuclear power plant.</p> <p>7.8 Point out the maintenance and safety procedure of a nuclear power plant.</p> <p>7.9 Study the nuclear power plant established in Bangladesh.</p>			<p>Job no:08</p> <p>Observe Steam power plant</p> <p>8.1 Visit stream power plant</p> <p>8.2 Observe steam power plant</p> <p>8.3 Prepare a power point presentation regarding observation</p> <p>8.4 Present power point</p>	
9	<p><b>Midterm Examination</b></p>				
10	<p>RENEWABLE ENERGY SOURCES</p> <p>8.1 Discuss the potential renewable Energy sources in Bangladesh.</p> <p>8.2 Describe the promising practices of renewable energy in Bangladesh and worldwide.</p> <p>8.3 Discuss different types of solar cell.</p> <p>8.4 Explain the operating principle of solar cell.</p> <p>8.5 State the Common species recommended for biomass.</p> <p>8.6 State the environmental merits and de merits using renewable Energy.</p>			<p>Job no:09</p> <p>9.1 Visit Gas turbine power plant</p> <p>9.2 Observe Gas turbine power plant</p> <p>9.3 Prepare a power point presentation regarding observation</p> <p>9.4 Present power point</p>	
11	<p>Understand the features of Biomass SOLAR POWER PLANT</p> <p>9.1 List general terms associated with solar energy.</p> <p>9.2 Describe solar radiation geometry, Declination, Hour Angle, Altitude angle, Incident angle, Zenith angle and Solar azimuth angle.</p> <p>9.2 Describe the Construction and working principle of typical flat plate collector and solar concentrate collector.</p> <p>9.3 Discuss the basic principles of Photovoltaic cell and fuel cell.</p> <p>9.4 Mention different types of</p>			<p>Job no:-10</p> <p>Observe Hydro-electric/Nuclear/solar power plant</p> <p>8.1 Visit power plant</p> <p>8.2 Observe power plant</p> <p>8.3 Prepare a power point presentation regarding observation</p> <p>8.4 Present power point</p>	

	<p>Photovoltaic cell and Fuel cell.</p> <p>9.5 Describe the photo voltaic energy conversion system.</p> <p>9.6 Mention the applications of Photovoltaic cell and Fuel cell in 02 04 Residential, Community and central station.</p> <p>9.7 Draw a Block diagram of solar power plant.</p> <p>9.8 Describe the advantages and limitations of solar power plant.</p>				
<b>12</b>	<p>WIND AND BIOMASS POWER PLANT</p> <p>10.1 Draw the schematic diagram of a wind mill power plant.</p> <p>10.2 Mention the factors to be considered in selecting the site for the wind mill power plant.</p> <p>10.3 Describe the principle of electricity generation with the help of wind energy.</p> <p>10.4 Describe the Method for obtaining energy from biomass.</p> <p>10.5 Classify biomass</p> <p>10.6 State Gasified, Fixed bed and fluidized.</p> <p>10.6 List Biomass digester.</p> <p>10.7 Compare between biomass and conventional fuel.</p>	CT-2		<b>Review Job no:-1&amp;2</b>	
<b>13</b>	<p>ECONOMICS OF POWER PLANT</p> <p>11.1 Define connected load, firm power, cold reserve, hot Reserve and spinning reserve.</p> <p>11.2 Mention the Load curve, load duration curve and integrated duration curve.</p> <p>11.3 Describe load factor, demand factor, diversity factor, plant capacity factor and plant use factor.</p>			<b>Review Job no:3&amp;4</b>	
<b>14</b>	<p>11.4 Describe the affecting factors the cost of power plant</p> <p>11.5 Explain load dispatch, center-capacity and load scheduling.</p> <p>11.6 Explain load management of power plant.</p> <p>11.7 Solve the problems related to power plant economics.</p>	QT-2		<b>Review Job no:5&amp;6</b>	

<b>15</b>	<b>Revision(Theory&amp; Discuss the Students Problem Topics)</b> Practical: Revision-1,2,3,4&5			<b>Review Job no:7&amp;8</b>	
<b>16</b>	<b>Revision(Theory&amp; Discuss the Students Problem Topics)</b> Practical: Revision-6,7,8,9&10.			<b>Review Job no:9&amp;10</b>	

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