



APATI INSTITUTE OF ENGINEERING & TECHNOLOGY(Polytechnic), JAGATPUR, CUTTACK  
DEPARTMENT OF MECHANICAL ENGINEERING.

LESSON PLAN-2026 SUMMER

Discipline: <b>MECHANICAL ENGG</b>	Semester: <b>4<sup>th</sup></b>	Name of the Teaching Faculty: <b>BHABANI SANKAR SAHOO</b>
Subject: <b>THERMAL ENGINEERING-II</b> [MEPC-204 Th:2]	No. of days/per week Class allotted: <b>03</b>	Semester From date: <b>22.12.2025</b> To Date : <b>18.04.2026</b> No. of Weeks: <b>15</b>
Week	Class Day	Theory Topics
<b>1<sup>ST</sup></b>	<b>1<sup>ST</sup></b>	I. Gas Turbines: Air-standard Brayton cycle; Description with P-V and T-S diagrams.
	<b>2<sup>ND</sup></b>	Gas turbines Classification: open cycle gas turbines and closed cycle gas turbines.
	<b>3<sup>RD</sup></b>	Comparison of gas turbine with reciprocating I.C. engines and steam turbines. Applications and limitations of gas turbines.
<b>2<sup>ND</sup></b>	<b>1<sup>ST</sup></b>	General lay-out of Open cycle constant pressure gas turbine P-V and T-S diagrams and working
	<b>2<sup>ND</sup></b>	General lay-out of Closed cycle gas turbine; P-V and T-S diagrams and working.
	<b>3<sup>RD</sup></b>	Jet Propulsion: Principle of jet propulsion; Fuels used for jet propulsion; Applications of jet propulsion
<b>3<sup>RD</sup></b>	<b>1<sup>ST</sup></b>	Working of a turbojet engine.
	<b>2<sup>ND</sup></b>	Principle of Ram effect; Working of a Ram jet engine.
	<b>3<sup>RD</sup></b>	Principle of Rocket propulsion; Working principle of a rocket engine.
<b>4<sup>TH</sup></b>	<b>1<sup>ST</sup></b>	Applications of rocket propulsion; Comparison of jet and rocket propulsions.
	<b>2<sup>ND</sup></b>	II. Properties of Steam: Formation of steam under constant pressure. Industrial uses of steam
	<b>3<sup>RD</sup></b>	Basic definitions: saturated liquid line, saturated vapor line, liquid region, vapor region, wet region, superheat region, critical point, saturated liquid, saturated vapor, saturation temperature
<b>5<sup>TH</sup></b>	<b>1<sup>ST</sup></b>	Sensible heat, latent heat, wet steam, dryness fraction, wetness fraction, saturated steam, superheated steam, degree of superheater.
	<b>2<sup>ND</sup></b>	Determination of enthalpy, internal energy, internal latent heat, entropy of wet, dry and superheated steam at a given pressure using steam tables
	<b>3<sup>RD</sup></b>	Determination of enthalpy, internal energy, internal latent heat, entropy of wet, dry and superheated steam at a given pressure using Mollier chart
<b>6<sup>TH</sup></b>	<b>1<sup>ST</sup></b>	Isochoric process, Isobaric process
	<b>2<sup>ND</sup></b>	Hyperbolic process, Isothermal process,
	<b>3<sup>RD</sup></b>	Isentropic process, Throttling process, Polytropic process
<b>7<sup>TH</sup></b>	<b>1<sup>ST</sup></b>	Simple direct problems on the above using tables and charts; .
	<b>2<sup>ND</sup></b>	Steam calorimeters: Separating, throttling, Combined Separating and throttling calorimeters – problems
	<b>3<sup>RD</sup></b>	CLASS TEST
	<b>1<sup>ST</sup></b>	III. Steam Generators: Function and use of steam boilers; Classification of steam

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8 <sup>TH</sup>		boilers with examples
	2 <sup>ND</sup>	Brief explanation with line sketch of Cochran. Brief explanation with line sketch of Babcock and Wilcox Boilers;
	3 <sup>RD</sup>	Boiler mountings: Pressure gauge, water level indicator, fusible plug, blow down cock, stop valve, safety valve, (dead weight type, spring loaded type, high pressure and low water safety alarm)
9 <sup>TH</sup>	1 <sup>ST</sup>	Boiler accessories: feed pump, economizer, super heater and air preheater
	2 <sup>ND</sup>	Study of steam traps & separators; Explanation of the terms: Actual evaporation, equivalent evaporation, factor of evaporation, boiler horse power and boiler efficiency
	3 <sup>RD</sup>	Formula for the above terms without proof; Simple direct problems on the above
10 <sup>TH</sup>	1 <sup>ST</sup>	Draught systems (Natural, forced & induced).
	2 <sup>ND</sup>	IV. Steam Nozzles: Flow of steam through nozzle.
	3 <sup>RD</sup>	Velocity of steam at the exit of nozzle in terms of heat drop using analytical method
11 <sup>TH</sup>	1 <sup>ST</sup>	Velocity of steam at the exit of nozzle in terms of heat drop using Mollier chart
	2 <sup>ND</sup>	Simple numerical problems
	3 <sup>RD</sup>	Discharge of steam through nozzles
12 <sup>TH</sup>	1 <sup>ST</sup>	Critical pressure ratio
	2 <sup>ND</sup>	Methods of calculation of cross-sectional areas at throat and exit for maximum discharge
	3 <sup>RD</sup>	Effect of friction in nozzles and Super saturated flow in nozzles. Working steam jet injector. Simple numerical problems
13 <sup>TH</sup>	1 <sup>ST</sup>	Simple numerical problems.
	2 <sup>ND</sup>	CLASS TEST
	3 <sup>RD</sup>	V. Steam Turbines: Classification of steam turbines with examples; Difference between impulse & reaction turbines
14 <sup>TH</sup>	1 <sup>ST</sup>	Principle of working of a simple De-lavel turbine with line diagrams- Velocity diagrams
	2 <sup>ND</sup>	Expression for work done, axial thrust, tangential thrust, blade and diagram efficiency, stage efficiency, nozzle efficiency
	3 <sup>RD</sup>	Methods of reducing rotor speed; compounding for velocity, for pressure or both pressure and velocity
15 <sup>TH</sup>	1 <sup>ST</sup>	Working principle with line diagram of a Parson's Reaction turbine-velocity diagrams; Simple problems on single stage impulse turbines (without blade friction)
	2 <sup>ND</sup>	Reaction turbine including data on blade height. Bleeding, re-heating and re-heating factors(Problems omitted)
	3 <sup>RD</sup>	Governing of steam turbines: Throttle, By-pass & Nozzle control governing.

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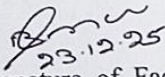
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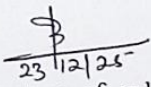
## Learning Resources:


SL.NO.	Name of the Book	Author Name	Publisher
01.	A Course in Thermal Engineering	S. Domkundwar & C. P. Kothandaraman	Dhanpat Rai & Publication, New Delhi
02.	Thermal Engineering	P. L. Ballaney	Khanna Publishers, 2002
03.	Treatise on Heat Engineering in MKS and SI Units	V. P. Vasandani & D.S. Kumar	Metropolitan Book Co. Pvt. Ltd, New Delhi.
04.	Thermal Engineering	R. K. Rajput	Laxmi publications Pvt Ltd, New Delhi.

*Prepared By*

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