

# LESSON PLAN

**SUB: TE-II**

**BRANCH:- MECHANICAL ENGG.**

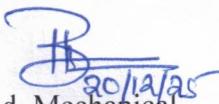
**SEMESTER: 4TH**

**NAME OF FACULTY: ER.SAGAR KUMAR BEHERA**

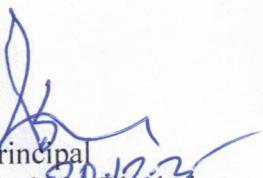


**GOVERNMENT POLYTECHNIC,  
BHADRAK**

**SESSION:2025-26**

  
Hod ,Mechanical

  
Academic Co-ordinator

  
Principal  
Govt. Polytechnic, Bhadrak

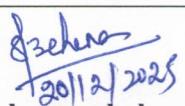
<b>Discipline:</b> <b>MECHANICAL</b>	<b>Semester</b> <b>:4<sup>th</sup></b>	<b>Name of the Teaching Faculty</b> <b>Sagar kumar behera</b> <b>Lecturer (Stage-II),Mechanical Engineering</b>
<b>Subject:</b> <b>Thermal Engineering-II (TH:2 )</b>	<b>No. of days/per week class allotted:</b> <b>3</b>	<b>Semester From date: 22/12/2025 To date: 18-04-26 No of weeks: 15</b>
<b>Week</b>	<b>Class Day</b>	<b>Theory Topics:</b>
<b>1<sup>st</sup></b>	<b>1<sup>st</sup></b>	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.
<b>2<sup>nd</sup></b>	<b>1<sup>st</sup></b>	Applications and limitations of gas turbines
	<b>2<sup>nd</sup></b>	General lay-out of Open cycle constant pressure gas turbine; P-V and T-S diagrams and working;
	<b>3<sup>rd</sup></b>	General lay-out of Closed cycle gas turbine; P-V and T-S diagrams and working.
<b>3<sup>rd</sup></b>	<b>1<sup>st</sup></b>	Principle of jet propulsion; Fuels used for jet propulsion;
	<b>2<sup>nd</sup></b>	Applications of jet propulsion; Working of a turbojet engine
	<b>3<sup>rd</sup></b>	Principle of Ram effect; Working of a Ram jet engine
<b>4<sup>th</sup></b>	<b>1<sup>st</sup></b>	Principle of Rocket propulsion; Working principle of a rocket engine
	<b>2<sup>nd</sup></b>	Applications of rocket propulsion; Comparison of jet and rocket propulsions.
	<b>3<sup>rd</sup></b>	Formation of steam under constant pressure; Industrial uses of steam;
<b>5<sup>th</sup></b>	<b>1<sup>st</sup></b>	Basic definitions: saturated liquid line, saturated vapor line, liquid region, vapor region, wet region, superheat region, critical point, saturated liquid, saturated vapor
	<b>2<sup>nd</sup></b>	Basic definitions: saturation temperature, sensible heat, latent heat, wet steam, dryness fraction, wetness fraction
	<b>3<sup>rd</sup></b>	Basic definitions: 2saturated steam, superheated steam, degree of superheat; Determination of enthalpy, internal energy, internal latent heat
	<b>1<sup>st</sup></b>	entropy of wet, dry and superheated steam at a given pressure using steam tables and Mollier chart for the following processes: Isochoric process, Isobaric process,

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6 <sup>th</sup>		Hyperbolic process.
	2 <sup>nd</sup>	Isothermal process, Isentropic process, Throttling process, Polytropic process;
	3 <sup>rd</sup>	Simple direct problems on the above using tables and charts
7 <sup>th</sup>	1 <sup>st</sup>	Steam calorimeters: Separating, throttling, Combined Separating and throttling calorimeters
	2 <sup>nd</sup>	Simple direct problems .
	3 <sup>rd</sup>	Function and use of steam boilers; Classification of steam boilers with examples
8 <sup>th</sup>	1 <sup>st</sup>	Brief explanation with line sketches of Cochran, Babcock and Wilcox Boilers;
	2 <sup>nd</sup>	Comparison of water tube and fire tube boilers; Description with line sketches and working of modern high pressure boilers Lamont and Benson 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; Study of steam traps & separators;
	2 <sup>nd</sup>	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 the above
10 <sup>th</sup>	1 <sup>st</sup>	Draught systems (Natural, forced & induced)
	2 <sup>nd</sup>	Flow of steam through nozzle; Velocity of steam at the exit of nozzle in terms of heat drop using analytical method
	3 <sup>rd</sup>	Flow of steam through nozzle; Velocity of steam at the exit of nozzle in terms of heat drop using Mollier chart
11 <sup>th</sup>	1 <sup>st</sup>	Discharge of steam through nozzles
	2 <sup>nd</sup>	Critical pressure ratio

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12 <sup>th</sup>	1 <sup>st</sup>	Effect of friction in nozzles
	2 <sup>nd</sup>	Super saturated flow in nozzles;
	3 <sup>rd</sup>	Working steam jet injector
13 <sup>th</sup>	1 <sup>st</sup>	Simple numerical problems.
	2 <sup>nd</sup>	Simple numerical problems.
	3 <sup>rd</sup>	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) and reaction turbine including data on blade height.
	2 <sup>nd</sup>	Bleeding, re-heating and re-heating factors(Problems omitted); Governing of steam turbines: Throttle, By-pass & Nozzle control governing.
	3 <sup>rd</sup>	PYQ solving

  
 20/12/2025  
 Sagar kumar behera

Lecturer (Stage-II)