



LESSON PLAN-2026 SUMMER

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

23-12-25

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

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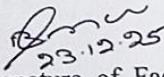
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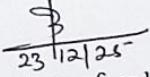
Learning Resources:

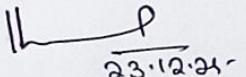
| SL.NO. | Name of the Book | Author Name | Publisher |
|--------|--|-------------------------------------|--|
| 01. | A Course in Thermal Engineering | S. Domkundwar & C. P. Kothandaraman | Dhanpat Rai & Publication, New Delhi |
| 02. | Thermal Engineering | P. L. Ballaney | Khanna Publishers, 2002 |
| 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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