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| Discipline  :**MECHANICALENGG** | Semester :**3rd** | Name of the Teaching Faculty: **SABYASACHI JAGANNATH MISHRA.** |
| Subject:**THERMAL ENGINEERING-I** | No. of days/per week class allotted:**04** | Semester From date : **15.09.2022** To Date:**22.12.2022** No. of Weeks: **15** |
| Week | Class Day | Theory / Practical Topics |
| 1ST | 1ST | Thermodynamic Systems (closed, open, isolated)  enthalpy, Internal energy and units of measurement). |
|  | 2ND | Thermodynamic properties of a system (pressure, volume, temperature, entropy, |
|  | 3RD | Thermodynamic properties of a system (pressure, volume, temperature, entropy, |
|  | 4TH | Intensive and extensive properties |
| 2ND | 1ST | Define thermodynamic processes, path, cycle , state, path function, point function |
|  | 2ND | Define thermodynamic processes, path, cycle , state, path function, point function |
|  | 3RD | Thermodynamic Equilibrium. |
|  | 4TH | Quasi-static Process. |
| 3RD | 1ST | Conceptual explanation of energy and its sources |
|  | 2ND | Work , heat and comparison between the two |
|  | 3RD | Mechanical Equivalent of Heat. |
|  | 4TH | Work transfer, Displacement work |
| 4TH | 1ST | State & explain Zeroth law of thermodynamics. |
|  | 2ND | State & explain First law of thermodynamics. |
|  | 3RD | Limitations of First law of thermodynamics |
|  | 4TH | Application of First law of Thermodynamics (steady flow energy equation and its application to turbine and compressor) |
| 5TH | 1ST | Application of First law of Thermodynamics (steady flow energy equation and its application to turbine and compressor) |
|  | 2ND | Second law of thermodynamics (Claucius& Kelvin Plank statements). |
|  | 3RD | Second law of thermodynamics (Claucius& Kelvin Plank statements). |
|  | 4TH | Application of second law in heat engine, heat pump,  refrigerator & determination of efficiencies & C.O.P |
| 6TH | 1ST | Application of second law in heat engine, heat pump, refrigerator & determination of efficiencies & C.O.P (solve simple numerical) |
|  | 2ND | (solve simple numerical) |
|  | 3RD | (solve simple numerical) |
|  | 4TH | (solve simple numerical) |
| 7TH | 1ST | Laws of perfect gas:  Boyle’s law, Charle’s law, Avogadro’s law, Dalton’s law of partial pressure, Guy lussac law, General gas equation, characteristic gas constant, Universal gas constant. |
|  | 2ND | Laws of perfect gas:  Boyle’s law, Charle’s law, Avogadro’s law, Dalton’s law of  partial pressure, Guy lussac law, General gas equation, characteristic gas constant, Universal gas constant. |

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|  | 3RD | Explain specific heat of gas (Cp and Cv) |
|  | 4TH | Relation between Cp&Cv |
| 8TH | 1ST | Enthalpy of a gas. |
|  | 2ND | Work done during a non- flow process. |
|  | 3RD | Application of first law of thermodynamics to various non flow  process (Isothermal, Isobaric, Isentropic and polytrophic process) |
|  | 4TH | Solve simple problems on above. |
| 9TH | 1ST | Solve simple problems on above. |
|  | 2ND | Free expansion & throttling process |
|  | 3RD | Explain & classify I.C engine. |
|  | 4TH | Terminology of I.C Engine such as bore, dead centers, stroke volume, piston speed &RPM. |
| 10TH | 1ST | Terminology of I.C Engine such as bore, dead centers, stroke volume, piston speed &RPM. |
|  | 2ND | Explain the working principle of 2-stroke & 4- stroke engine C.I & S.I engine |
|  | 3RD | Explain the working principle of 2-stroke & 4- stroke engine C.I  & S.I engine |
|  | 4TH | Explain the working principle of 2-stroke & 4- stroke engine C.I & S.I engine |
| 11TH | 1ST | Differentiate between 2-stroke & 4- stroke engine C.I & S.I engine |
|  | 2ND | Differentiate between 2-stroke & 4- stroke engine C.I & S.I engine |
|  | 3RD | Carnot cycle |
|  | 4TH | Otto cycle |
| 12TH | 1ST | Diesel cycle. |
|  | 2ND | Dual cycle |
|  | 3RD | Solve simple numerical |
|  | 4TH | Solve simple numerical |
| 13TH | 1ST | Solve simple numerical |
|  | 2ND | Solve simple numerical |
|  | 3RD | Solve simple numerical |
|  | 4TH | Solve simple numerical |
| 14TH | 1ST | Define Fuel. |
|  | 2ND | Types of fuel. |
|  | 3RD | Application of different types of fuel. |
|  | 4TH | Application of different types of fuel. |
| 15TH | 1ST | Heating values of fuel. |
|  | 2ND | Quality of I.C engine fuels Octane number, Cetane number. |
|  | 3RD | Quality of I.C engine fuels Octane number, Cetane number. |
|  | 4TH | Quality of I.C engine fuels Octane number, Cetane number. |

**Learning Resouces:**

1. Thermal Engineering, byR.S.Khurmi,S.Chand
2. Thermal EngineeringbyA.R.Basu, DhanpatRai
3. Thermal Engineering, byA.S.Sarao, Satya Prakash
4. Engineering Thermodynamics,byP.K.Nag, TMH
5. Thermal Engineeringby Mahesh M Rathore,TMH

Sabyasachi Jagannath Mishra Lect. In Mechanical Engineering Govt. Polytechnic Jagatsinghpur.