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| **Discipline: MECHANICAL** | **Semester: 3rd** | **Name of the Teaching Faculty: ER. LITU BEHERA**  **Lecturer Mechanical** |
| **Subject: THERMAL ENGINEERING-I** | **No. of days/per week class allotted:**  **4** | **Semester From date: 01/07/2024**  **To date:08/11/2024**  **No of weeks: 15** |
| **Week** | **Class Day** | **Theory Topics:** |
| **1st** | **1st** | Thermodynamic concept & Terminology 1.1 Thermodynamic Systems (closed, open, isolated) |
| **2nd** | 1.2 Thermodynamic properties of a system (pressure, volume, temperature, entropy, enthalpy, Internal energy and units of measurement). |
| **3rd** | 1.3 Intensive and extensive properties |
| **4th** | 1.4 Define thermodynamic processes, path, cycle , state, path function, point function. |
| **2nd** | **1st** | 1.5 Thermodynamic Equilibrium. |
| **2nd** | 1.6 Quasi-static Process. |
| **3rd** | 1.7 Conceptual explanation of energy and its sources |
| **4th** | 1.8 Work , heat and comparison between the two. |
| **3rd** | **1st** | 1.9 Mechanical Equivalent of Heat. |
| **2nd** | 1.10Work transfer, Displacement work |
| **3rd** | Solve numerical |
| **4th** | Revision of Chapter-2 |
| **4th** | **1st** | Previous year question solutions |
| **2nd** | Laws of Thermodynamics 2.1 State Zeroth law of thermodynamics |
| **3rd** | Explain Zeroth law of thermodynamics. |
| **4th** | 2.2 State & explain First law of thermodynamics. |
| **5th** | **1st** | 2.3 Limitations of First law of thermodynamics |
| **2nd** | 2.4Application of First law of Thermodynamics (steady flow energy equation and its application to turbine and compressor) |
| **3rd** | 2.4 Second law of thermodynamics (Claucius & Kelvin Plank statements). |
| **4th** | 2.5 Application of second law in heat engine, heat pump, refrigerator & determination of efficiencies & C.O.P (solve simple numerical) |

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| **6th** | **1st** | Revision of Chapter-2 |
| **2nd** | Previous year question solutions |
| **3rd** | Properties Processes of perfect gas 3.1 Laws of perfect gas: Boyle’s law, Charle’s law, Avogadro’s law, |
| **4th** | Dalton’s law of partial pressure, Guy lussac law, |
| **7th** | **1st** | General gas equation, characteristic gas constant, Universal gas constant. |
| **2nd** | 3.2 Explain specific heat of gas (Cp and Cv) |
| **3rd** | 3.3 Relation between Cp & Cv. |
| **4th** | 3.4 Enthalpy of a gas. |
| **8th** | **1st** | 3.5 Work done during a non- flow process. |
| **2nd** | 3.6 Application of first law of thermodynamics to various non flow process (Isothermal, Isobaric, Isentropic and polytrophic process) |
| **3rd** | 3.6 Solve simple problems on above. |
| **4th** | 3.7 Free expansion & throttling process. |
| **9th** | **1st** | Revision of Chapter-3 |
| **2nd** | Previous year question solutions |
| **3rd** | Internal combustion engine 4.1 Explain & classify I.C engine. |
| **4th** | 4.2 Terminology of I.C Engine such as bore, dead centers, stroke volume. |
| **10th** | **1st** | 4.2 Terminology of I.C Engine such as piston speed &RPM. |
| **2nd** | 4.3 Explain the working principle of 2-stroke & 4- stroke engine |
| **3rd** | 4.3 Explain the working principle of C.I & S.I engine. |
| **4th** | 4.4 Differentiate between 2-stroke & 4- stroke engine. |

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| **11th** | **1st** | 4.4 Differentiate between C.I & S.I engine. |
| **2nd** | Revision of Chapter-4 |
| **3rd** | Previous year question solutions |
| **4th** | Gas Power Cycle 5.1 Carnot cycle |
| **12th** | **1st** | Solve simple numerical. |
| **2nd** | 5.2 Otto cycle. |
| **3rd** | Solve simple numerical. |
| **4th** | 5.3 Diesel cycle. |
| **13th** | **1st** | Solve simple numerical. |
| **2nd** | 5.4 Dual cycle. |
| **3rd** | 5.5 Solve simple numerical. |
| **4th** | Revision of Chapter-5 |
| **14th** | **1st** | Previous year question solutions |
| **2nd** | Fuels and Combustion 6.1 Define Fuel. |
| **3rd** | 6.2 Types of fuel. |
| **4th** | 6.3 Application of different types of fuel. |
| **15th** | **1st** | 6.4 Heating values of fuel. |
| **2nd** | 6.5 Quality of I.C engine fuels Octane number, Cetane number. |
| **3rd** | Revision of Chapter-6 |
| **4th** | Previous year question solutions |