NILASAILA INSTITUTE OF SCIENCE & TECHNOLOGY
SERGARH-756060, BALASORE (ODISHA)
(Approved by AICTE& affiliated to SCTE&VT, Odisha)

# LESSON PLAN

## SUBJECT: TH-4 (THERMAL ENGINEERING I)

**Name Of The Faculty :-** Er. Bishnu Charan Jena
**Branch :-** Mechanical Engineering **Semester :-** 3rd
**Session :-** 2024-25 **Examination :-** 2024 (w)

## CHAPTER WISE DISTRIBUTION OF PERIODS

| Sl.No. | Name of the chapter as per the Syllabus | No. of Periods as per the Syllabus | No. of periods actually needed |
|---|---|---|---|
| 1 | Thermodynamic concept & Terminology | 12 | 12 |
| 2 | Laws of Thermodynamics | 12 | 14 |
| 3 | Properties Processes of perfect gas | 10 | 12 |
| 4 | Internal combustion engine | 8 | 10 |
| 5 | Air Standard Cycle | 10 | 12 |
| 6 | Fuels and Combustion | 8 | 12 |
| | Total Period | 60 | 72 |

Bishnu ch. Jena
Sign of Faculty
29/06/2024

Sign of H.O.D.
29/06/24

| Discipline: MECHANICAL ENGINEERING | Semester: 3rd | Name of the Teaching Faculty: Er.Bishnu Charan Jena | |
|---|---|---|---|
| | | SESSION:2024-25 | EXAMINATION:2024(W) |
| **Week** | **Class Day** | **Topics to be covered** | |
| 1st | 1st | 1.1 Thermodynamic Systems (closed, open, isolated) | |
| | 2nd | 1.2 Thermodynamic properties of a system (pressure, volume, temperature, entropy | |
| | 3rd | 1.2 Thermodynamic properties of a system (pressure, volume, temperature, entropy | |
| | 4th | 1.3 Intensive and extensive properties | |
| 2nd | 1st | 1.4 Define thermodynamic processes, path, cycle , state, path function, point function. | |
| | 2nd | 1.4 Define thermodynamic processes, path, cycle , state, path function, point function. | |
| | 3rd | 1.5 Thermodynamic Equilibrium. | |
| | 4th | 1.6 Quasi-static Process | |
| 3rd | 1st | 1.7 Conceptual explanation of energy and its sources | |
| | 2nd | 1.8 Work , heat and comparison between the two. | |
| | 3rd | 1.9 Mechanical Equivalent of Heat | |
| | 4th | 1.10Work transfer, Displacement work | |
| 4th | 1st | 2.1 State & explain Zeroth law of thermodynamics. | |
| | 2nd | 2.1 State & explain Zeroth law of thermodynamics. | |
| | 3rd | 2.2 State & explain First law of thermodynamics. | |
| | 4th | 2.3 Limitations of First law of thermodynamics | |
| 5th | 1st | 2.4Application of First law of Thermodynamics (steady flow energy equation and its application to turbine and compressor) | |
| | 2nd | 2.4Application of First law of Thermodynamics (steady flow energy equation and its application to turbine and compressor) | |
| | 3rd | 2.5 Second law of thermodynamics (Claucius & Kelvin Plank statements) | |
| | 4th | 2.5 Second law of thermodynamics (Claucius & Kelvin Plank statements) | |
| 6th | 1st | 2.5 Second law of thermodynamics (Claucius & Kelvin Plank statements) | |
| | 2nd | 2.6 Application of second law in heat engine, heat pump, refrigerator & determination of efficiencies & C.O.P (solve simple numerical) | |
| | 3rd | 2.6 Application of second law in heat engine, heat pump, refrigerator & determination of efficiencies & C.O.P (solve simple numerical) | |
| | 4th | 2.6 Application of second law in heat engine, heat pump, refrigerator & determination of efficiencies & C.O.P (solve simple numerical) | |

| Week | Class Day | Topics to be covered |
|---|---|---|
| 7th | 1st | 2.6 Application of second law in heat engine, heat pump, refrigerator & determination of efficiencies & C.O.P (solve simple numerical) |
| | 2nd | 2.6 Application of second law in heat engine, heat pump, refrigerator & determination of efficiencies & C.O.P (solve simple numerical) |
| | 3rd | 3.1 Laws of perfect gas:<br>Boyle's law, Charle's law, Avogadro's law, Dalton's law of partial |
| | 4th | 3.2 Explain specific heat of gas (Cp and Cv) |
| 8th | 1st | 3.2 Explain specific heat of gas (Cp and Cv) |
| | 2nd | 3.3 Relation between Cp & Cv. |
| | 3rd | 3.4 Enthalpy of a gas. |
| | 4th | 3.5 Work done during a non- flow process. |
| 9th | 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 Application of first law of thermodynamics to various non flow process(Isothermal,Isobaric, Isentropic and polytrophic process) |
| | 4th | 3.6 Solve simple problems on above. |
| 10th | 1st | 3.6 Solve simple problems on above. |
| | 2nd | 3.7 Free expansion & throttling process. |
| | 3rd | 4.Internal combustion engine |
| | 4th | 4.1 Explain & classify I.C engine. |
| 11th | 1st | 4.2 Terminology of I.C Engine such as bore, dead centers, stroke volume, piston speed &RPM. |
| | 2nd | 4.2 Terminology of I.C Engine such as bore, dead centers, stroke volume, piston speed &RPM. |
| | 3rd | 4.3 Explain the working principle of 2-stroke & 4- stroke engine C.I & S.I engine. |
| | 4th | 4.3 Explain the working principle of 2-stroke & 4- stroke engine C.I & S.I engine. |
| 12th | 1st | 4.3 Explain the working principle of 2-stroke & 4- stroke engine C.I & S.I engine. |
| | 2nd | 4.4 Differentiate between 2-stroke & 4- stroke engine C.I & S.I engine. |
| | 3rd | 4.4 Differentiate between 2-stroke & 4- stroke engine C.I & S.I engine. |
| | 4th | 4.4 Differentiate between 2-stroke & 4- stroke engine C.I & S.I engine. |
| 13th | 1st | **INTERNAL ASSESMENT** |
| | 2nd | **INTERNAL ASSESMENT** |
| | 3rd | 5.1 Carnot cycle |

| Week | Class Day | Topics to be covered |
|---|---|---|
| 13th | 4th | 5.1 Carnot cycle |
| 14th | 1st | 5.1 Carnot cycle |
| | 2nd | 5.2 Otto cycle. |
| | 3rd | 5.2 Otto cycle. |
| | 4th | 5.2 Otto cycle. |
| 15th | 1st | 5.3 Diesel cycle. |
| | 2nd | 5.3 Diesel cycle. |
| | 3rd | 5.3 Diesel cycle. |
| | 4th | 5.4 Dual cycle. |
| 16th | 1st | 5.5 Solve simple numerical. |
| | 2nd | 5.5 Solve simple numerical. |
| | 3rd | 6.1 Define Fuel. |
| | 4th | 6.2 Types of fuel. |
| 17th | 1st | 6.3 Application of different types of fuel. |
| | 2nd | 6.4 Heating values of fuel. |
| | 3rd | 6.4 Heating values of fuel. |
| | 4th | 6.5 Quality of I.C engine fuels Octane number, Cetane number. |
| 18th | 1st | 6.5 Quality of I.C engine fuels Octane number, Cetane number. |
| | 2nd | 6.5 Quality of I.C engine fuels Octane number, Cetane number. |
| | 3rd | Revision |
| | 4th | Revision |

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