**USHA RAMA COLLEGE OF ENGINEERING AND TECHNOLOGY**

*Department of Mechanical Engineering*

**LESSON PLAN:**

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| **Academic Year** : 2016-17 | **Sem**  : I |
| **Course**: Thermo Dynamics | |
| **Class** : III B.TECH | **Section** : ME A&B |
| **Date of commencement of Class work** :13/06/2016 | **Date of end of Class work** : 08/10/2016 |
| **Prepared By**: K Raaga Nitya, Assistant Professor | **Approved By**: HOD |

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| **Lecture**  **No** | **Date (As per Academic calendar)** | **Topics to be covered** | **Actual**  **Date of completion** | **Remarks** |
| 1 | **13.6.16** | **Unit-1 Intoduction: Basic Concepts :** System, Control Volume. |  |  |
| 2 | **14.6.16** | Surrounding,  Boundaries, Universe |  |  |
| 3 | **15.6.16** | Types of Systems |  |  |
| 4 | **16.6.16** | Macroscopic and Microscopic viewpoints, |  |  |
| 5 | **17.6.16** | Concept of Continuum |  |  |
| 6 | **18.6.16** | Thermodynamic Equilibrium, State, |  |  |
| 7 | **20.6.16** | Property, Process, Cycle - Reversibility - Quasi - static Process |  |  |
| 8 | **21.6.16** | Irreversible Process, Causes of Irreversibility |  |  |
| 9 | **22.6.16** | Energy in State and in Transition, Types, Work and Heat, Point and Path function |  |  |
| 10 | **23.6.16** | Zeroth Law of Thermodynamics |  |  |
| 11 | **24.6.16** | Concept of Temperature |  |  |
| 12 | **25.6.16** | - Principles of Thermometry -Reference Points |  |  |
| 13 | **27.6.16** | Const. Volume gas Thermometer |  |  |
| 14 | **28.6.16** | - Scales of Temperature |  |  |
| 15 | **29.6.16** | Ideal Gas Scale - PMM I. |  |  |
| 16 | **30.6.16** | UNIT-II Joule's Experiments |  |  |
| 17 | **01.7.16** | First law of Thermodynamics |  |  |
| 18 | **02.7.16** | Corollaries - First law |  |  |
| 19 | **04.07.16** | applied to a Process |  |  |
| 20 | **05.7.16** | applied to a flow system |  |  |
| 21 | **07.7.16** | Steady Flow Energy Equation |  |  |
| 22 | **08.7.16** | Throttling and free expansion processes |  |  |
| 23 | **09.7.16** | deviations from perfect gas model |  |  |
| 24 | **11.7.16** | vander Waals equation of state |  |  |
| 25 | **12.7.16** | compressibility charts |  |  |
| 26 | **13.7.16** | variable specific heats |  |  |
| 27 | **14.7.16** | gas tables |  |  |
| 28 | **15.7.16** | Revision |  |  |
| 29 | **16.7.16** | UNIT-III Limitations of the First Law |  |  |
| 30 | **18.7.16** | Thermal Reservoir, Heat Engine, Heat pump, |  |  |
| 31 | **19.7.16** | Parameters of performance |  |  |
| 32 | **20.7.16** | Second Law of Thermodynamics |  |  |
| 33 | **21.7.16** | Kelvin-Planck and Clausius Statements and their Equivalence / Corollaries |  |  |
| 34 | **22.7.16** | , PMM of Second kind, Carnot's principle |  |  |
| 35 | **23.7.16** | Carnot cycle and its specialties |  |  |
| 36 | **25.7.16** | Thermodynamic scale of Temperature |  |  |
| 37 | **26.7.16** | Clausius Inequality |  |  |
| 38 | **27.7.16** | Entropy, Principle of Entropy Increase |  |  |
| 39 | **28.7.16** | Energy Equation, Availability and Irreversibility |  |  |
| 40 | **29.7.16** | Thermodynamic Potentials |  |  |
| 41 | **30.7.16** | , Gibbs and Helmholtz Functions, |  |  |
| 42 | **01.8.16** | Maxwell |  |  |
| 43 | **02.8.16** | Relations - Elementary Treatment of the Third Law of Thermodynamics. |  |  |
| 44 | **03.8.16** | Revision |  |  |
| 45 | **04.08.16** | Revision |  |  |
| 46 | **05.08.16** | Revision |  |  |
| 47 | **06.8.16** | Revision |  |  |
|  | **08.8.16 To13.8.16** | MID EXAMINATIONS-I |  |  |
| 48 | **16.8.16** | Unit-IV Pure Substances, |  |  |
| 49 | **17.8.16** | , p-V-T- surfaces |  |  |
| 50 | **18.8.16** | T-S and h-s diagrams |  |  |
| 51 | **19.8.16** | Mollier Charts |  |  |
| 52 | **20.8.16** | Phase Transformations |  |  |
| 53 | **22.8.16** | Triple point at critical state properties during change of phase |  |  |
| 54 | **23.08.16** | Dryness Fraction |  |  |
| 55 | **24.08.16** | Clausius |  |  |
| 57 | **26.8.16** | Clapeyron Equation Property tables |  |  |
| 58 | **27.8.16** | Mollier charts - |  |  |
| 59 | **29.8.16** | Various Thermodynamic processes and |  |  |
| 60 | **30.08.16** | energy Transfer |  |  |
| 61 | **31.08.16** | Steam Calorimetry. |  |  |
| 62 | **1.9.16** | UNIT-V Mixtures of perfect Gases |  |  |
| 63 | **2.9.16** | Mole Fraction |  |  |
| 64 | **3.9.16** | Mass friction Gravimetric and  volumetric Analysis |  |  |
| 65 | **06.09.16** | Dalton's Law of partial pressure |  |  |
| 66 | **07.9.16** | Avogadro's Laws of additive volumes - |  |  |
| 67 | **8.9.16** | Mole fraction, Volume fraction and partial pressure |  |  |
| 68 | **09.9.16** | Equivalent Gas const. And Molecular Internal Energy, Enthalpy |  |  |
| 69 | **10.9.16** | , sp. Heats and Entropy of Mixture of perfect Gases and Vapour, |  |  |
| 70 | **13.9.16** | Atmospheric air - Psychrometric Properties - Dry bulb Temperature, Wet Bulb Temperature, Dew point Temperature |  |  |
| 71 | **14.9.16** | Thermodynamic Wet Bulb Temperature, Specific Humidity, Relative Humidity, saturated Air |  |  |
| 72 | **15.9.16** | Vapour pressure, Degree of  saturation |  |  |
| 73 | **16.9.16** | Adiabatic Saturation |  |  |
| 74 | **17.9.16** | Carrier's Equation - Psychrometric chart. |  |  |
| 75 | **19.9.16** | UNIT-VI **Power Cycles :** Otto, Diesel |  |  |
| 76 | **20.9.16** | , Dual Combustion cycles, Sterling Cycle,  Atkinson Cycle, |  |  |
| 77 | **21.9.16** | Ericcson Cycle, Lenoir Cycle - |  |  |
| 78 | **22.9.16** | Description and representation on P-V and T-S diagram, Thermal Efficiency, |  |  |
| 79 | **23.9.16** | Mean Effective Pressures on Air standard basis - comparison of Cycles. |  |  |
| 80 | **24.9.16** | **Refrigeration Cycles :** Brayton and Rankine cycles |  |  |
| 81 | **26.9.16** | Performance  Evaluation - combined cycles |  |  |
| 82 | **27.9.16** | Bell- Coleman cycle, Vapour compression cycle |  |  |
| 83 | **28.9.16** | Performance evaluation |  |  |
| 84 | **01.10.16** | Revision |  |  |
| 85 | **03.10.16** | Revision |  |  |
| 86 | **04.10.16** | Revision |  |  |
| 87 | **05.10.16** | Revision |  |  |
| 88 | **06.10.16** | Revision |  |  |
| 89 | **07.10.16** | Revision |  |  |
| 90 | **08.10.16** |  |  |  |
|  | **10.10.16 To 15.10.16** | Mid Exams-II |  |  |

**TEXT BOOKS :**

1. Engineering Thermodynamics , PK Nag 4th Edn , TMH.

2. Thermodynamics – An Engineering Approach with student

resources DVD – Y.A.Cengel & M.A.Boles , 7th Edn - McGrawHill

**REFERENCES :**

1. Engineering Thermodynamics – Jones & Dugan PHI

2. Thermodynamics – J.P.Holman , McGrawHill

3. Basic Engineering Thermodynamics – A.Venkatesh – Universities

press.

4. An Introduction to Thermodynamics - Y.V.C.Rao – Universities

press.

5. Thermodynamics – W.Z.Black & J.G.Hartley, 3rd Edn Pearson Publ.

6. Engineering Thermodynamics – D.P.Misra, Cengage Publ.

7. Engineering Thermodynamics – P.Chattopadhyay – Oxford Higher

Edn Publ.

**List the Course Outcomes (Cos):**

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| Sub code | Sub Name | COs | Expected level of attainment  On 5 scale |
|  | Thermal Engineering-II | 1. The student should be able to understand the basic concepts like  Thermo dynamic system.  2. To learn the law of thermodynamics.  3**:** should understand the process of steam formation and its  representation.  4. To understand the concept of air standard cycles. | 3.5  3.5  3.5  3.5 |

**Course Coordinator Head of the Department**