**USHA RAMA COLLEGE OF ENGINEERING AND TECHNOLOGY**

*Department of Mechanical Engineering*

**LESSON PLAN::C0301**

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| **Academic Year** : 2016-16 | **Sem**  : I |
| **Course**: Thermal Engineering -II | |
| **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**: Nawab masid abdul,  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:** Introduction. |  |  |
| 2 | **14.6.16** | Rankine cycle - layout, thermodynamicanalysis. |  |  |
| 3 | **15.6.16** | Concept of mean temperature of heat addition. |  |  |
| 4 | **16.6.16** | Regeneration. |  |  |
| 5 | **17.6.16** | Reheating. |  |  |
| 6 | **18.6.16** | Combustion: fuels and combustion. |  |  |
| 7 | **20.6.16** | Concepts of heat of reaction. |  |  |
| 8 | **21.6.16** | Adiabatic flame temperature. |  |  |
| 9 | **22.6.16** | Stoichiometry. |  |  |
| 10 | **23.6.16** | Flue gas analysis. |  |  |
| 11 | **24.6.16** | **Unit-2:** Classification – working principles of L.P & H.P boilers withsketches. |  |  |
| 12 | **25.6.16** | Mountings. |  |  |
| 13 | **27.6.16** | Accessories. |  |  |
| 14 | **28.6.16** | Performance characteristics. |  |  |
| 15 | **29.6.16** | Heat balance – draught. |  |  |
| 16 | **30.6.16** | Classification – height of chimney for given draught and discharge. |  |  |
| 17 | **01.7.16** | Condition for maximum discharge. |  |  |
| 18 | **02.7.16** | Efficiency of chimney. |  |  |
| 19 | **04.07.16** | Artificial draught induced and forced. |  |  |
| 20 | **05.7.16** | **Unit-3:** **Nozzles:** applications - types, flowthrough nozzles. |  |  |
| 21 | **07.7.16** | Thermodynamic analysis– assumptions. |  |  |
| 22 | **08.7.16** | Velocity of fluid at nozzle exit. |  |  |
| 23 | **09.7.16** | Ideal and actual expansion in a nozzle. |  |  |
| 24 | **11.7.16** | Velocity coefficient. |  |  |
| 25 | **12.7.16** | Condition for maximum discharge. |  |  |
| 26 | **13.7.16** | Critical pressure ratio. |  |  |
| 27 | **14.7.16** | Super saturated flow, its effects. |  |  |
| 28 | **15.7.16** | Degree of super saturation. |  |  |
| 29 | **16.7.16** | Degree of under cooling - Wilson line. |  |  |
| 30 | **18.7.16** | problems |  |  |
| 31 | **19.7.16** | Problems |  |  |
| 32 | **20.7.16** | **Steam Turbines:** Classification – Turbines; mechanical details. |  |  |
| 33 | **21.7.16** | Velocity diagram. |  |  |
| 34 | **22.7.16** | Effect of friction. |  |  |
| 35 | **23.7.16** | Condition for maximum efficiency. |  |  |
| 36 | **25.7.16** | De-Laval turbine - methods -velocity compounding. |  |  |
| 37 | **26.7.16** | Pressure compounding. |  |  |
| 38 | **27.7.16** | Velocity & pressure compounding. |  |  |
| 39 | **28.7.16** | Combined velocity diagram. |  |  |
| 40 | **29.7.16** | Condition for maximum efficiency. |  |  |
| 41 | **30.7.16** | Problems. |  |  |
| 42 | **01.8.16** | Problems |  |  |
| 43 | **02.8.16** | Problems |  |  |
| 44 | **03.8.16** | Problems |  |  |
| 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-4:** **Reaction turbine**– mechanical details. |  |  |
| 49 | **17.8.16** | Principle of operation,thermodynamic analysis of a stag. |  |  |
| 50 | **18.8.16** | Degree of reaction –velocity diagram. |  |  |
| 51 | **19.8.16** | Parson’s reaction turbine. |  |  |
| 52 | **20.8.16** | Condition for maximum efficiency. |  |  |
| 53 | **22.8.16** | Calculation of blade height. |  |  |
| 54 | **23.08.16** | **Steam condensers**- Requirements of steam condensing plant. |  |  |
| 55 | **24.08.16** | Classification of condenser. |  |  |
| 57 | **26.8.16** | Working principles. |  |  |
| 58 | **27.8.16** | Air leakage, sources and its affects. |  |  |
| 59 | **29.8.16** | Air pump- cooling water requirement. |  |  |
| 60 | **30.08.16** | Problems |  |  |
| 61 | **31.08.16** | Problems |  |  |
| 62 | **1.9.16** | Problems |  |  |
| 63 | **2.9.16** | **Unit-5**: **Gas turbines** Plant – ideal cycle. |  |  |
| 64 | **3.9.16** | Essentialcomponents – parameters of performance. |  |  |
| 65 | **06.09.16** | Actual cycle. |  |  |
| 66 | **07.9.16** | Regeneration. |  |  |
| 67 | **8.9.16** | Inter cooling |  |  |
| 68 | **09.9.16** | Reheating. |  |  |
| 69 | **10.9.16** | Closed and semi-closed cycles – merits and demerits. |  |  |
| 70 | **13.9.16** | Types of combustion chambers. |  |  |
| 71 | **14.9.16** | **UNIT 6: Jet propulsion:** Principle of operation. |  |  |
| 72 | **15.9.16** | Classification of jet propulsiveengines. |  |  |
| 73 | **16.9.16** | Working principles with schematic diagrams and representation on t-s diagram. |  |  |
| 74 | **17.9.16** | Thrust, thrust power and propulsion efficiency. |  |  |
| 75 | **19.9.16** | Turbo jet engines– schematic diagram. |  |  |
| 76 | **20.9.16** | Thermodynamic cycle. |  |  |
| 77 | **21.9.16** | Performance evaluation, thrust augmentation – methods. |  |  |
| 78 | **22.9.16** | **Rockets:** Application – working principle. |  |  |
| 79 | **23.9.16** | Classification |  |  |
| 80 | **24.9.16** | Propellant type –thrust. |  |  |
| 81 | **26.9.16** | Propulsive efficiency- specific impulse. |  |  |
| 82 | **27.9.16** | Solid and liquid propellant rocket engines. |  |  |
| 83 | **28.9.16** | Revision. |  |  |
| 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. Thermodynamics and Heat Engines, Volume 2 - R.Yadav- Central book depot.
2. Gas Turbines – V.Ganesan /TMH
3. Heat Engineering – V.P Vasandani and D.S Kumar- Metropolitan Book Company, New Delhi

**REFERENCES:**

1. Gas Turbines and Propulsive Systems – P.Khajuria & S.P.Dubey - /Dhanpatrai.
2. Gas Turbines / Cohen, Rogers and Saravana Muttoo / Addison Wesley – Longman
3. Thermal Engineering-R.S Khurmi/JS Gupta/S.Chand.
4. Thermal Engineering-P.L.Bellaney/ Khanna publishers.
5. Thermal Engineering-M.L.Marthur & Mehta/Jain bros

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

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| Sub code | Sub Name | COs | Expected level of attainment  On 5 scale |
| C0301 | Thermal Engineering-II | 1. Understanding the concepts of working of steam and gas power plant cycles.  2. To analyze and evaluate the performance of individual components in a gas power plant.  3. Also to analyse the energy transfers and transformations in these components.  4. To understand the basic principles of Jet propulsion and rocket engineering. | 3.5  3.5  3.5  3.5 |

**Course Coordinator Head of the Department**