Lesson plan

|  |  |
| --- | --- |
| **Subject:** | **Applied Thermodynamics.** |
| **Academic Year:** | **2019-20** |
| **Name of the Teacher:** | **Dr.V.S.JORAPUR.** |

|  |  |  |  |
| --- | --- | --- | --- |
| **Week No.** | **Topics** | **Module** | **Hours** |
| **Week 1** (01/07/19 – 05/07/19) | Microscopic and Macroscopic viewpoints in thermodynamics, thermodynamic system. Thermodynamic properties of system state, path. Processes and cycles, point function and path function. Internal energy and enthalpy, reversible and irreversible process. | **1** | **4** |
| **Week 2**  (08/07/19 – 12/07/19) | Quasi-static process, thermodynamic work, heat. Temperature, thermodynamic equilibrium and Zeroth law of thermodynamics. **First law of Thermodynamics:** Statement, First law applied to cyclic processes. First law applied to non-cyclic processes. | **1&2** | **4** |
| **Week 3**  (15/07/19 – 19/07/19) | Application to non-flow processes viz. Constant volume, constant pressure, Heat and work calculations. Application to non-flow processes viz. Constant volume, constant pressure, Heat and work calculations. Application to non-flow processes viz. polytrophic process. Heat and work calculations. Problems. | **2** | **4** |
| **Week 4**  (22/07/19 – 26/07/19) | **First law applied to open systems:** Flow work. Steady flow energy equation (SFEE). SFEE applied to nozzle, turbine. SFEE applied to compressor, boiler, condenser etc. | **2** | **4** |
| **Week 5**  (29/07/19 – 02/08/19) | Problems. **Second law of Thermodynamics:** Limitations of first law of thermodynamics, thermal reservoir. Heat engine, thermal efficiency, reversed heat engine. Heat engine, thermal efficiency, reversed heat engine. | **3** | **4** |
| **Week 6**  (05/08/19 – 09/08/19) | Kelvin-Planck and Clausius statements equivalence. PMM I and PMM II, Carnot cycle. Carnot’s theorem, its Corollaries. Problems. | **3** | **4** |
| **Week 7**  (12/08/19 – 16/08/19) | Unit Test 1 (Aug. 13, 14 and 16) –SE, TE. |  |  |
| **Week 8**  (19/08/19 – 23/08/19) | Problems continued… **Entropy:** Definition of entropy, a property, changes of entropy. **Entropy:** Definition of entropy, a property, changes of entropy. Principle of increase of entropy, entropy changes of an ideal gas during reversible processes. | **4** | **4** |
| **Week 9**  (26/08/19 – 30/08/19) | Principle of increase of entropy, entropy changes of an ideal gas during reversible processes. **Introduction to Availability and irreversibility:** Available and Unavailable energy. Dead state, Useful work and Maximum work. Problems. | **4** | **4** |
| **Week 10**  (02/09/19 – 06/09/19) | Mid-Term break |  |  |
| **Week 11**  (09/09/19 – 13/09/19) | Problems contd… **Properties of steam:** Dryness fraction, enthalpy, internal energy and entropy. **Properties of steam:** Dryness fraction, enthalpy, internal energy and entropy. Use of h-s diagram for calculating steam properties. | **5** | **4** |
| **Week 12**  (16/09/19 – 20/09/19) | **Vapor power cycle:** Rankine cycle, Modified Rankine cycle. Variables affecting the efficiency of Rankine cycle. | **5** | **4** |
| **Week 13**  (23/09/19 – 27/09/19) | Reheat cycle and Regenerative cycle. Problems. | **5** | **4** |
| **Week 14**  (30/09/19 – 04/10/19) | **Gas power cycle:** Otto cycle,Diesel cycle, Dual cycle, Brayton cycle. Comparison and representation on P-V and T-S diagram. **Problems.** | **6** | **4** |
| **Week 15**  (07/10/19 – 11/10/19) | University paper solutions | **All** | **4** |
| **Week 16**  (14/10/19 – 18/10/19) | Unit Test 2 (Oct. 14,15 and 16) – SE, TE |  |  |