# Ch. Ranbir Singh State Institute of Engineering & Technology, Jhajjar

**Department of Mechanical Engineering**

II Yr. IV Semester (Mechanical Engineering)

### LESSON PLAN

Program : **B. Tech**

Year & Sem. :  **II / IV**

Course No : **PCC-ME-202 G**

Course Title : **Applied Thermodynamics**

Max Marks **: 75**

No. of Total Lecture **: 46**

Schedule : **3L+1T=4**

Lecturer : **Dr. Parveen Kumar**

**Recommended Books:**

1. Moran, M. J. and Shapiro, H. N., 1999, Fundamentals of Engineering Thermodynamics, John Wiley and Sons.
2. 4. Nag, P.K, 1995, Engineering Thermodynamics, Tata McGraw-Hill Publishing Co. Ltd

**Lesson Plan:**

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| --- | --- | --- |
| Lect. No(s) | Ref. No. | Topics to be covered  |
|  |   | Unit II |
| 1 | 1.1 | Introduction |
| 2-3 | 1.2 | Vapor power cycles Rankine cycle with superheat, reheat and regeneration, |
| 4 | 1.3 | exergy analysis |
| 5 | 1.4 | Supercritical and ultra super-critical Rankine cycle |
| 6-7 | 1.5 | Gas power cycles, Air standard Otto |
| 8 | 1.6 | Diesel and Dual cycles |
| 9 | 1.7 | Air standard Brayton cycle |
| 10-11 | 1.8 | effect of reheat, regeneration and intercooling |
| 12 | 1.9 | Combined gas and vapor power cycles |
| 13 |  | Vapor compression refrigeration cycles |
| 14 |  | refrigerants and their properties |
|  |  | Unit IV |
| 15 | 4.1 | Reciprocating compressors |
| 16-17 | 4.2 | staging of reciprocating compressors, optimal stage pressure ratio, |
| 18 | 4.3 | effect of intercooling |
| 19-20 | 4.4 | minimum work for multistage reciprocating compressors |
| 21 | 4.5 | Analysis of steam turbines |
| 22 | 4.6 | velocity and pressure compounding of steam turbines |
| 23 | 4.7 | Problems |
|  |  | Unit III |
| 24 | 3.1 | Basics of compressible flow. |
| 25 | 3.2 | Stagnation properties |
| 26-27 | 3.3 | Isentropic flow of a perfect gas through a nozzle, choked flow, subsonic and supersonic flows |
| 28-29 | 3.4 | Normal shocks- use of ideal gas tables for isentropic flow and normal shock flow |
| 30 | 3.5 | Flow of steam and refrigerant through nozzle, |
| 31 | 3.6 | super saturation compressible flow in diffusers, |
| 32 | 3.7 | efficiency of nozzle and diffuser |
| 33 | 3.8 | Problems |
| 34 | 3.9 | Properties of dry and wet air |
| 35-36 | 3.10 | Use of pschyrometric chart, processes involving heating/cooling and humidification/dehumidification, dew point.  |
| 37 | 3.11 | Problems |
|  |  | Unit I |
| 38 | 4.1 | Introduction to solid, liquid and gaseous fuels |
| 39 | 4.2 | Stoichiometry, exhaust gas analysis |  |
| 40 | 4.3 | First law analysis of combustion reactions |
| 41-42 | 4.4 | Heat calculations using enthalpy tables |
| 43 | 4.5 | Adiabatic flame temperature |
| 44-45 | 4.6 | Chemical equilibrium and equilibrium composition calculations using free energy. |
| 46 | 3.14 | Problems |

 **(Dr. Parveen Kumar)**

Guest Faculty

Department of ME

CRSSIET, Jhajjar