MERI College of Engineering and Technology
(MERI - CET)

Session: 2020–21

# Lesson Plan

Name of the Faculty : Mr. Pardeep
Discipline : Mechanical Engineering
Semester : 3rd
Subject : Thermodynamics (PCC-ME- 213G)
Lesson Plan Duration : 15 Weeks (from Aug. 2020 to Nov. 2020)
** Work Load (Lecture) per week (in hours): Lectures-02, Practicals-00

| Week | Theory | | Practical | |
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| | Lecture Day | Topic (including assignment/test) | Practical day | Topic |
| 1st | 1st | Fundamentals - System & Control volume; Property, State & Process. | | No Practical |
| | 2nd | Exact & Inexact differentials; Work-Thermodynamic definition of work; examples. | | |
| 2nd | 3rd | Displacement work; Path dependence of displacement work and illustrations for simple processes. | | |
| | 4th | electrical, magnetic, gravitational, spring and shaft work. | | |
| 3rd | 5th | Temperature, Definition of thermal equilibrium and Zeroth law. | | |
| | 6th | Temperature scales; Various Thermometers- Definition of heat. | | |

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| 4th | 7th | examples of heat/work interaction in systems- First Law for Cyclic & Non-cyclic processes. | | |
| | 8th | Concept of total energy E ; Demonstration that E is a property. | | |
| 5th | 9th | Various modes of energy, Internal energy and Enthalpy. | | |
| | 10th | Definition of Pure substance, Ideal Gases and ideal gas mixtures. | | |
| 6th | 11th | Real gases and real gas mixtures. | | |
| | 12th | Compressibility charts- Properties of two-phase systems - Const. temperature and Const. pressure heating of water. | | |
| 7th | 13th | Definitions of saturated states; P-v-T surface. | | |
| | 14th | Use of steam tables and R134a tables; Saturation tables; Superheated tables. | | |
| 8th | 15th | Identification of states & determination of properties, Mollier's chart. | | |
| | 16th | First Law for Flow Processes - Derivation of general energy equation for a control volume. | | |

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| 9th | 17th | Steady state steady flow processes including throttling. | | |
| | 18th | Examples of steady flow devices; Unsteady processes. | | |
| 10th | 19th | Examples of steady and unsteady I law applications for system and control volume. | | |
| | 20th | Second law - Definitions of direct and reverse heat engines. | | |
| 11th | 21th | Definitions of thermal efficiency and COP; Kelvin-Planck and Clausius statements. | | |
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| | 22nd | Definition of reversible process; Internal and external irreversibility. | | |
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| 12th | 23nd | Carnot cycle; Absolute temperature scale. | | |
| | 24nd | Clausius inequality; Definition of entropy S; Demonstration that entropy S is a property. | | |
| 13th | 25nd | Evaluation of S for solids, liquids, ideal gases and ideal gas mixtures undergoing various processes; Determination of s from steam tables. | | |
| | 26nd | Principle of increase of entropy; Illustration of processes in Ts coordinates; Definition of Isentropic efficiency for compressors, turbines and nozzles. | | |
| 14th | 27nd | Irreversibility and Availability, Availability function for systems and Control volumes undergoing different processes, Lost work. | | |
| | 28nd | Second law analysis for a control volume. Exergy balance equation and Exergy analysis. | | |

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| 15th | 29nd | Thermodynamic cycles - Basic Rankine cycle; Basic Brayton cycle | | |
| | 30nd | Basic vapor compression cycle and comparison with Carnot cycle. | | |