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| 1. | Title of the course | Thermodynamics |
| 2. | Course number | ME201L |
| 3. | Structure of credits | 2-1-0-3 |
| 4. | Offered to | UG |
| 5. | New course/modification to | Modification To ME2101/8 |
| 6. | To be offered by | Department of Mechanical Engineering |
| 7. | To take effect from | July 2022 |
| 8. | Prerequisite | Nil |
| 9. | Course Objective(s): To describe various thermodynamic processes; To state the laws of thermodynamics and describe their significance; To understand the limitations of different energy conversion processes; To introduce concepts of irreversibly, entropy and maximum work; To establish the relation between commonly measurable properties and properties that can not be measured directly; To develop rules for determining non reactive gas mixture properties. | |
| 10. | Course Content: System, control volume, property, state and process, exact and Inexact differentials; Work - Thermodynamic definition of work, displacement work, path dependence of displacement work; Zeroth law, Heat - Definition, examples of heat/work interaction in systems; First Law - Cyclic and non-cyclic processes, concept of total energy; Pure substance - Two property rule, properties of water-steam system, definitions of saturated states, P-v-T surface, use of steam tables, saturation tables, superheated tables, identification of states and determination of properties; First law for flow processes - Derivation of general energy equation for a control volume, steady flow processes, unsteady processes; Second law - Kelvin-Planck and Clausius statements, definition of reversible process, Internal and external irreversibilities, Carnot cycle, absolute temperature scale; Entropy - Clausius inequality, definition of entropy, demonstration that entropy is a property, evaluation of entropy change for solids, liquids, and ideal gases undergoing various processes, available and unavailable energy | |
| 11. | Textbook(s): 1. Cengel Y A and Boles M A, <i>Thermodynamics:An Engineering Approach</i> , 8th Edition, McGraw Hill (2014). 2. Sonntag R E, Borgnakke C and Van wylen G J, <i>Fundamentals of Thermodynamics</i> , 7th Edition, Wiley (2009). | |
| 12. | Reference(s): 1. Moran M J and Shapiro H N, <i>Fundamental of Engineering Thermodynamics</i> , 7th Edition, John Wiley (2010). | |