

1.	Title of the course	Engineering Thermodynamics
2.	Course number	ME209L
3.	Structure of credits (L-T-P-C)	2-1-0-3
4.	New course/modification to	Modified with ME201L/THERMODYNAMICS
5.	To be offered by	Mechanical Engineering
6.	Prerequisite	None
7.	<b>Course Objective(s):</b> To discuss the laws of thermodynamics, concepts of irreversibility, entropy and their significance. To apply the concepts of thermodynamics to engineering problems.	
8.	<b>Course Content:</b> Concepts of thermodynamics: 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; 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: cyclic and non-cyclic processes, concept of total energy, 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.	
9.	<b>Textbook(s):</b> 1. Cengel Y A and Boles M A, Thermodynamics: An Engineering Approach, 9th Edition, McGraw Hill (2019)	
10.	<b>Reference(s):</b> 1. Moran M J, Shapiro H N, Boettner D D and Bailey M B, Principles of Engineering Thermodynamics, 8th Edition, John Wiley (2015)	