

Year & Sem: E1S2	Course Code:CH1201	Course Name: <b>Chemical Engineering Thermodynamics I</b>	No. of Credits: 4	L	T&PS	P
				2	2	0
<p><b>Unit I:</b> Scope and limitations of thermo dynamics, definition and fundamental concepts, pressure, work, energy, heat. Equilibrium state and phase rule</p> <p><b>Unit II:</b> Zeroth law of thermodynamics First law of Thermodynamics: General statement, thermodynamic state and state functions, Internal energy, Enthalpy. The steady-state steady-flow process, Mass and energy balances, equilibrium, the phase rule, the reversible process, constant-V and constant- P processes, heat capacity, isobaric, isochoric, isothermal, adiabatic and polytropic processes.</p> <p><b>Unit III: Volumetric properties of pure substances:</b> The PVT behavior of pure substances, virial equations, the ideal gas, the applications of the virial equations. Cubic equations of state, generalized correlations for gases, generalized correlations for liquids. <b>Heat effects:</b> Sensible heat effects, Internal energy of ideal gases: Microscopic view, Latent heats of pure substances, heat effects of industrial reactions, heat effects of mixing processes. Standard heat of reaction, Standard heat of formation, Standard heat of combustion, temperature dependence of heat of reaction</p> <p><b>Unit IV:</b> Second law of Thermodynamics-Statement, Heat engines, thermodynamic temperatures scales, thermodynamic temperature and the ideal gas scale. Entropy, Entropy changes of an ideal gas, mathematical statement of the second law, entropy from the microscopic view point, calculation of ideal work and lost work.</p> <p><b>Unit V:</b> Third law of Thermodynamics, Maxwell Relations</p> <p><b>Unit VI:</b> Power Cycles-Carnot cycle, Rankine cycle, Otto cycle, Diesel cycle Refrigeration and liquefaction: The Carnot refrigerator, the vapor compression cycle, the comparison of refrigeration cycles, the choice of refrigerant, absorption refrigeration, the heat pump, liquefaction processes.</p> <p><b>References/Text Books:</b></p> <ol style="list-style-type: none"> <li>1. Introduction to Chemical Engineering Thermodynamics, 6<sup>th</sup> ed., J.M. Smith, H.C. Van Ness and M.M. Abbott, Tata McGraw-Hill, New Delhi, 2003.</li> <li>2. Chemical Engineering Thermodynamics, Pradeep Ahuja, PHI Learning Pvt. Ltd., New Delhi, 2009</li> <li>3. A Text Book of Chemical Engineering Thermodynamics, K.V. Narayanan, PHI Learning Pvt. Ltd., New Delhi, 2001.</li> </ol> <p><b>Lecture Plan:</b> Unit-I &amp; -II syllabus for MID-I, Unit-III &amp; -IV syllabus for MID-II and Unit-V &amp; -VI syllabus for MID-III examinations.</p> <p><b>Video Lectures (Web Links):</b></p> <ol style="list-style-type: none"> <li>1.</li> </ol>						