CHEMICAL ENGINEERING THERMODYNAMICS - IIT KGP

PROF. GARGI DAS Department of
Chemical Engineering
IIT Kharagpur

INTENDED AUDIENCE : Chemical Engg, Mechanical Engg, Chemistry, Biotechnology, Petroleum Refining, Metallurgy,
PRE-REQUISITES : Basic knowledge of Engineering Thermodynamics desirable

INDUSTRIES APPLICABLE TO : LIST OF COMPANIES/INDUSTRY THAT WILL RECOGNIZE/VALUE THIS ONLINE COURSE ,Refining and Petrochemical Industry (IOC, HPCL, BPCL etc.), G.A.I.L., O.N.G.C, Shell

COURSE OUTLINE :

This is an introductory course in Thermodynamics and is one of the basic subjects to understand interfacial mass transfer and separation processes like distillation, solvent extraction, etc. The course introduces the concepts of chemical potential and fugacity and emphasizes the principles governing equilibrium for single and multicomponent systems. It discusses ideal as well as non-ideal solutions and deals with the entire range of phase miscibility (completely miscible to totally immiscible). There is a well-balanced coverage of physical concepts, mathematical operations along with examples and exercise problems of practical importance. After completion of the course, the students will be able to apply the basic principles of thermodynamics, the laws, and the pertinent equations to engineering design of mass transfer equipment.

ABOUT INSTRUCTOR :

Prof. Gargi Das is Professor, Department of Chemical Engineering, Indian Institute of Technology Kharagpur, West Bengal. She has been teaching thermodynamics for the past 16 years to the students of Chemical Engg and Biotechnology as a core course. Students from Mechanical Engineering, Agricultural Engineering and Chemistry have opted it as a breadth course. She has contributed to NPTEL through her video based and web based courses on Multiphase Flow and Thermodynamics. Her areas of expertise are Multiphase Flow, Transport phenomena, CFD and Process Intensification. She has over 50 refereed research papers, two books and three book chapters.

COURSE PLAN :

Week 1: Introduction and First Law
Week 2: Second Law
Week 3: P-v-T behaviour of Gases
Week 4: Chemical Potential
Week 5: Chemical equilibrium
Week 6: Fugacity
Week 7: Partial molar properties
Week 8: Ideal solution
Week 9: Non-ideal solution
Week 10: Partially and completely immiscible systems, Hydrocarbon Thermodynamics
Week 11: Supplementary material to First and Second Law
Week 12: Chemical Reaction equilibrium