

Nader JAND

Programme of "Termodinamica dell'Ingegneria Chimica" "Chemical Engineering Thermodynamics"		
Number of ECTS credits: 9 (WORKLOAD OF 90 HOURS OF TEACHING + WORK AT HOME; 1 credit = 25 hours)		
I0623, Compulsory 1st Cycle in Chemical Engineering Thermodynamics, 3 rd year, 1 st semester Teacher: Nader JAND		
1	Course objectives and Learning outcomes	<p>This course aims to connect the principles, concepts, and laws/postulates of classical thermodynamics to applications that require quantitative knowledge of thermodynamic properties from a macroscopic level. It covers their basic postulates of classical thermodynamics and their application to transient open and closed systems, criteria of phase equilibrium and chemical equilibrium, as well as constitutive property models of pure fluid and mixtures emphasizing molecular-level effects using the formalism of equation of states and the free excess energy models. Phase and chemical equilibrium of multicomponent systems are covered. Applications are emphasized through extensive problem work relating to practical cases.</p> <p>On successful completion of this course, the student should understand the fundamental concepts of classical thermodynamics and thermodynamics of solution and should be aware of potential applications of first and second laws in other fields as fluid mechanics, transport phenomena, chemical reaction engineering.</p>
2	Dublin descriptors	<p>Topics of the module include:</p> <p>On successful completion of this module, the student should</p> <ul style="list-style-type: none"> - have profound knowledge of classical thermodynamics, - have knowledge and understanding of how to calculate the thermodynamics properties of pure and fluid mixture in equilibrium. - understand and explain the thermodynamic network relations - understand the fundamental concepts of phase and chemical equilibrium for binary and multicomponent solution. - demonstrate skill in thermodynamic modelling of solutions and processes in equilibrium; in solving open problems and ability to developed code in some programming language as Maple, Visualbasic or Fortran 95. - demonstrate capacity for reading and understand other texts on following lecture in master thesis.
3	Prerequisites and learning activities	The student must know the basic notions of Mathematics Analysis and general chemistry.
4	Teaching methods and language	<p>Lectures and exercises. Language: Italian / English</p> <p>Ref. Text books (Italian)</p> <p>1- Vincenzo Brandani, Nader Jand, "TERMODINAMICA DELL'INGEGNERIA CHIMICA" vol.1, Libreria Universitaria, 2007 Isbn: 9788887182194</p> <p>2- Vincenzo Brandani, Nader Jand "100 ESERCIZI SVOLTI DI TERMODINAMICA DELL'INGEGNERIA CHIMICA" , Libreria Universitaria, 2007, Isbn: 9788887182248</p> <p>Text books (English)</p> <p><i>J. M. Smith, et al. " Introduction to Chemical Engineering Thermodynamics (7th edition), McGraw-Hill (2004).</i></p>
5	Assessment methods	Written and oral exam.

