

411-204 Chemical Engineering Thermodynamics

Credit Points:	12.50
Level:	2 (Undergraduate)
Dates & Locations:	2009, This subject commences in the following study period/s: Semester 2, - Taught on campus.
Time Commitment:	Contact Hours: Forty-eight hours Total Time Commitment: Not available
Prerequisites:	610-141 and 610-142 Chemistry and 100-level Mathematics
Corequisites:	-
Recommended Background Knowledge:	-
Non Allowed Subjects:	-
Core Participation Requirements:	-
Coordinator:	Assoc Prof David Shallcross
Contact:	-
Subject Overview:	<p>Review of the First Law and the Second Law of Thermodynamics, definition of terms associated with these laws, primary thermodynamic functions (P, V, T, U and S) and the Maxwell relations, auxiliary thermodynamic functions (H, G and A), P-V-T diagrams of pure substances, ideal gas and departure from ideality, equations of state and state functions. Calculations of thermodynamic properties and thermodynamic charts, application of thermodynamics to flow processes, vapour and gas power cycles, compressors and turbines, refrigeration and gas liquefaction.</p> <p>Partial molar quantities, chemical potential and activity coefficient. Gas mixtures and liquid mixtures, dilute solution. Solubility of a gas in a liquid and a solid in a liquid. The phase rule, phase equilibria in one component systems, two component systems.</p> <p>Chemical reaction equilibria, stoichiometric number, reaction coordinate. Effect of temperature and pressures on equilibrium constant, evaluation of equilibrium constant, relationship between equilibrium constant and composition. Graphical representation of standard free energy change. Ellingham diagrams. Non-standard conditions. Thermodynamics of Interfaces.</p>
Objectives:	<p>On completion of this subject students should be able to:</p> <ul style="list-style-type: none"> # apply the first and second laws of thermodynamics to engineering problems # calculate thermodynamic properties and functions for both non-ideal gas and liquid mixtures # solve problems involving chemical reaction equilibria
Assessment:	A mid-semester test worth 20% held in or about Week 6 and end of semester examination worth 80%.
Prescribed Texts:	-
Recommended Texts:	Information Not Available
Breadth Options:	This subject is not available as a breadth subject.
Fees Information:	Subject EFTSL, Level, Discipline & Census Date, http://enrolment.unimelb.edu.au/fees

Generic Skills:	<ul style="list-style-type: none"># ability to apply knowledge of basic science and engineering fundamentals# in-depth technical competence in at least one engineering discipline# ability to undertake problem identification, formulation and solution# ability to identify incorrect conclusions and procedures through application of Thermodynamic principles# ability to predict state functions and variables such as temperature and pressure in chemical engineering substances
Related Course(s):	Bachelor of Engineering (Chemical) and Bachelor of Arts Bachelor of Engineering (Chemical) and Bachelor of Commerce Bachelor of Engineering (Chemical) and Bachelor of Laws Bachelor of Engineering (Chemical) and Bachelor of Science