CHEN90007 Advanced Thermo & Reactor Engineering

Credit Points:	12.50
Level:	9 (Graduate/Postgraduate)
Dates & Locations:	2010, Parkville This subject commences in the following study period/s: Semester 2, Parkville - Taught on campus.
Time Commitment:	Contact Hours: 36 hours of lectures and 12 hours of tutorials Total Time Commitment: Estimated 120 hours
Prerequisites:	# 411433 Reactor Enginering # 411441Heat and Mass Transport Processes or equivalent
Corequisites:	none
Recommended Background Knowledge:	None
Non Allowed Subjects:	None
Core Participation Requirements:	For the purposes of considering request for Reasonable Adjustments under the Disability Standards for Education (Cwth 2005), and Students Experiencing Academic Disadvantage Policy, academic requirements for this subject are articulated in the Subject Description, Subject Objectives, Generic Skills and Assessment Requirements of this entry.The University is dedicated to provide support to those with special requirements. Further details on the disability support scheme can be found at the Disability Liaison Unit website: http://www.services.unimelb.edu.au/disability/
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Subject Overview:	Revision of Laws of Thermodynamics, chemical potential and activity coefficient. Gas and liquid phase equilibria in one and two component systems, solubility, construction of phase diagrams. Chemical reaction equilibria, stoichiometric number, reaction coordinate. Evaluation of equilibrium constant and effect of composition. Temperature and pressure effects on equilibria, freezing point depression, boiling point elevation. Graphical representations of reaction equilibria. Thermodynamics of interfaces. Non-ideal flow in reactors. Rate controlling mechanisms: film resistance control, chemical reaction control, surface and pore diffusion control, ash layer diffusion, shrinking core mechanisms, effectiveness factors and Thiele modulus. Kinetic regimes for fluid-fluid and gas-fluid reactions. Fluid-particle reaction design. Catalytic reactor systems.
Objectives:	On completion of this subject students should be able to: • discuss a range of approaches to estimate fluid phase equilibria in one and two component systems • estimate the physical properties of mixtures • understand different rate controlling mechanisms in reactor design • solve problems in the design of solid/fluid reacting systems and in particular catalytic reactor systems.

Assessment:	One written three hour end-of-semester examination (70%); A written 1-hour mid-semester test (15%); problem sheets distributed across the semester (15%). A mark of 40% or more in the end of semester examination is required to pass the subject
Prescribed Texts:	None
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:	• In-depth technical competence in at least one engineering discipline • Ability to undertake problem identification, formulation, and solution • ability to utilise a systems approach to design and operational performance • capacity for lifelong learning and professional development
Related Course(s):	Bachelor of Engineering