CHEN30005 Heat and Mass Transport Processes

Credit Points:	12.50
Level:	3 (Undergraduate)
Dates & Locations:	2011, Parkville This subject commences in the following study period/s: Semester 1, Parkville - Taught on campus.
Time Commitment:	Contact Hours: 4 x one hour lectures + 1 x one hour tutorial per week + 1 x 3 hours of laboratory work + 1 x 2 hour computer practical per semester Total Time Commitment: Estimated 120 hours
Prerequisites:	Students must have taken the following subjects prior to enrolling in this subject:

Subject	Study Period Commencement:	Credit Points:
CHEN20008 Chemical Process Analysis 2	Semester 2	12.50
CHEN20009 Transport Processes	Semester 2	12.50

As well as the following subject (or an equivalent):

Subject	Study Period Commencement:	Credit Points:
MAST20029 Engineering Mathematics	Summer Term, Semester 1, Semester 2	12.50

As well as the following subject:

(Note the following subject can also be taken concurrently)

Subject	Study Period Commencement:	Credit Points:
CHEM20018 Reactions and Synthesis	Semester 1	12.50

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/
Coordinator:	Prof Sandra Kentish
Contact:	Email: **sandraek@unimelb.edu.au (mailto:sandraek@unimelb.edu.au)**
Subject Overview:	The fundamental concepts of heat transfer are extended from that covered in earlier subjects to include natural and forced convection and two phase systems. Mass transfer concepts are extended to unsteady state mass transfer and Fick's Second Law, prediction of diffusivity and of mass transfer coefficients. These fundamental concepts are then applied to the design of processes and equipment including shell and tube, air-cooled and plate heat exchangers, evaporator systems, membrane devices, binary distillation systems, gas absorbers and cooling towers. Use of appropriate simulation packages such as HYSYS and ASPEN will be included.

Objectives:	On completion of this subject students should be able to: # Apply the principles of heat transfer to solve heat transfer problems, particularly those involving two phase systems. # Assess quantitatively the performance of heat exchanger and evaporation equipment. # Apply the principles of mass transfer to solve mass transfer problems and to membrane separation processes. # Describe the concepts of equilibrium stage and continuous contactor analysis and apply these concepts to simple distillation and gas absorption problems; # Assess quantitatively the performance of simple, conventional distillation, gas absorption and cooling tower equipment. # Use simulation software for the basic design of heat exchangers and distillation columns
Assessment:	One written 3-hour end-of-semester examination (70%);A 90-minute written class test one third of the way through the semester (20%);And assignments involving laboratory work expected to take about 10 hours due during the semester (10%).A mark of greater than 40% in the end-of-semester examination is required to pass the subject.
Prescribed Texts:	Coulson & Richardson's Chemical engineering Volumes 1 & 2, J. F. Richardson, J. H. Harker with J. R. Backhurst. Published Oxford : Butterworth-Heinemann, 2002-
Recommended Texts:	Information Not Available
Breadth Options:	This subject potentially can be taken as a breadth subject component for the following courses: # **Bachelor of Arts (https://handbook.unimelb.edu.au/view/2011/B-ARTS)** # **Bachelor of Commerce (https://handbook.unimelb.edu.au/view/2011/B-COM)** # **Bachelor of Environments (https://handbook.unimelb.edu.au/view/2011/B-ENVS)** # **Bachelor of Music (https://handbook.unimelb.edu.au/view/2011/B-MUS)** You should visit **learn more about breadth subjects (http://breadth.unimelb.edu.au/breadth/info/index.html)** and read the breadth requirements for your degree, and should discuss your choice with your student adviser, before deciding on your subjects.
Fees Information:	Subject EFTSL, Level, Discipline & Census Date, http://enrolment.unimelb.edu.au/fees
Generic Skills:	On completion of this subject students should be able to demonstrate an: # 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 use a systems approach to design and operational performance.
Related Course(s):	Bachelor of Science
Related Majors/Minors/ Specialisations:	B-ENG Chemical Engineering stream B-ENG Chemical and Biomolecular Engineering stream Chemical Systems Master of Engineering (Biomolecular) Master of Engineering (Chemical)