CHEN20009 Transport Processes

Credit Points:	12.50
Level:	2 (Undergraduate)
Dates & Locations:	This subject is not offered in 2013.
Time Commitment:	Contact Hours: 3 x one hour lectures + 1 x one hour tutorial per week + 2 x 90 minutes of laboratory work per semester Total Time Commitment: Estimated 120 hours
Prerequisites:	Students must have completed ONE OF the following subject prior to enrolling in this subject: **Subject** / **Study Period Commencement:** / **Credit Points:** MAST10006 Calculus 2 / Not offered 2013 / 12.50 MAST10009 Accelerated Mathematics 2 / Not offered 2013 / 12.50 and must have completed ONE OF the following subjects: **Subject** / **Study Period Commencement:** / **Credit Points:** MAST10007 Linear Algebra / Not offered 2013 / 12.50 MAST10008 Accelerated Mathematics 1 / Not offered 2013 / 12.50
Corequisites:	None
Recommended Background Knowledge:	None
Non Allowed Subjects:	None
Core Participation Requirements:	For the purposes of considering applications for Reasonable Adjustments under the Disability Standards for Education (Cwth 2005) and Students Experiencing Academic Disadvantage Policy, this subject requires all students to actively and safely participate in laboratory activities. Students who feel their disability may impact upon their participation are encouraged to discuss this with the Subject Co-ordinator and the Disability Liaison Unit. http://www.services.unimelb.edu.au/disability
Contact:	Email: **daltonh@unimelb.edu.au (mailto:daltonh@unimelb.edu.au)**
Subject Overview:	This subject covers fundamental concepts of diffusion and conservation within momentum, heat and mass transport. Within momentum transport specific topics include Newton's law of viscosity, viscosity of gases and liquids, conservation of momentum, velocity distributions in simple laminar flows, boundary layer concepts and turbulence and the Reynolds number. Within heat transport specific topics include Fourier's law of conduction, thermal conductivities of gases, liquids and solids, conservation of thermal energy, steady-state temperature distributions in simple geometries, heat transfer resistance, thermal boundary layer concepts, the Nusselt and Prandtl numbers and definition and use of heat transfer coefficients. Within mass transport specific topics include Fick's first law of diffusion, diffusivities of gases, liquids and solids, binary mixture diffusion and conservation of mass, concentration distributions in simple binary systems including identifying appropriate boundary conditions, concentration boundary layer concepts, Schmidt and Sherwood numbers, definition and use of mass transfer coefficients
Objectives:	On completion of this subject students should be able to # Describe the fundamental concepts of momentum, heat and mass transfer # Apply these principles to the solution of problems in process engineering

	# Continue study in the area of heat and mass transport with a solid foundation
Assessment:	A mid-semester test worth 15% held in or around Week 6 of the semester Two lab-based assignments spread throughout semester and worth a total of 10% Five assessable questions spread throughout semester and worth a total of 5% An end of semester examination worth 70%
Prescribed Texts:	None
Recommended Texts:	Bird, R.B., Stewart, W.E., and Lightfoot, E.N., *Transport Phenomena*, second edition, Wiley, 2002 and onwards Coulson, J.M., and Richardson, J.F., *Chemical Engineering Volume 1*, sixth edition, Butterworth-Heinemann, 1999
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/2013/B-ARTS)** # **Bachelor of Commerce (https://handbook.unimelb.edu.au/view/2013/B-COM)** # **Bachelor of Environments (https://handbook.unimelb.edu.au/view/2013/B-ENVS)** # **Bachelor of Music (https://handbook.unimelb.edu.au/view/2013/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:	None
Notes:	This subject is available for science credit to students enrolled in the BSc (new degree only).
Related Majors/Minors/ Specialisations:	B-ENG Chemical Engineering stream B-ENG Chemical and Biomolecular Engineering stream Master of Engineering (Biomolecular) Master of Engineering (Chemical) Science-credited subjects - new generation B-SCI and B-ENG. Core selective subjects for B-BMED.
Related Breadth Track(s):	Chemical Engineering