411-258 Transport Processes

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: 36 hours of lectures, 12 hours of tutorials and 4 hours of laboratory work Total Time Commitment: Not available
Prerequisites:	620-155 Calculus 2 or equivalent; ENGR10004 Engineering Systems Design 1
Corequisites:	-
Recommended Background Knowledge:	-
Non Allowed Subjects:	-
Core Participation Requirements:	-
Coordinator:	Dr Dalton Harvie
Contact:	-
Subject Overview:	This subjects 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 about Week 6, 6 assignments throughout semester worth a total of 15%, and an end of semester examination worth 70%
Prescribed Texts:	-
Recommended Texts:	Bird, R.B., Stewart, W.E., and Lightfoot, E.N., Transport Phenomena, second edition, Wiley, 2002 Coulson, J.M., and Richardson, J.F., Chemical Engineering,Volume 1, sixth edition, Butterworth-Heinemann, 1999
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
Notes:	This subject is available for science credit to students enrolled in the BSc (new degree only).
Related Course(s):	Bachelor of Engineering