CVEN90014 Hydrological Processes 2

Credit Points:	12.50
Level:	9 (Graduate/Postgraduate)
Dates & Locations:	2010, Parkville This subject commences in the following study period/s: Semester 1, Parkville - Taught on campus.
Time Commitment:	Contact Hours: 48 hours Total Time Commitment: 120 hours per semester
Prerequisites:	Admission into a postgraduate course OR

Subject	Study Period Commencement:	Credit Points:
421-316 Engineering Hydraulics & Hydrology	Not offered 2010	

OR

Subject	Study Period Commencement:	Credit Points:
421-516 Hydraulics and Hydrology	Not offered 2010	

Corequisites:	None
Recommended Background Knowledge:	None
Non Allowed Subjects:	421-491 Quantification of Physical Processes B
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:	At the conclusion of this subject students should be capable of undertaking quantitative analyses of physical processes related to subsurface hydrology. Emphasis will be placed on the application of fundamental principles of mathematics and physics to the conceptualisation and analysis of the complex interactions that are the hallmark of environmental systems. Students should also be able to build computer models of these interactions and interpret the output from such models. Topics covered include interaction between surface and subsurface water, the unsaturated zone, groundwater hydrology, numerical groundwater modelling, contaminant transport in groundwater, and contaminated site remediation

Objectives:	At the conclusion of this subject students should be able to: # Describe the physics of water flow in soils and compare and contrast flow behaviour under different conditions and for different soil types # Describe and apply Richard's Equation to solve unsaturated flow problems # Solve infiltration problems using analytic infiltration models # Describe the different types of aquifer systems and summarise their properties # Formulate and solve various aquifer storage and flow problems analytically, including use of superposition and analysis of pump test data # Discuss the theoretical and numerical basis numerical groundwater models and use them to undertake simulations # Estimate subsidence associated with groundwater pumping # Describe and distinguish between advective and dispersive transport processes # Compare and contrast the behaviour of conservative, non-conservative and retarded solutes and analyse groundwater solute transport problems for these solute types # Describe and contrast the behaviour of different non-aqueous phase liquids interacting with groundwater # Discuss example groundwater contaminant management problems # Describe approaches to risk assessment and management in the context of groundwater # Summarise assumptions made in any of the above analyses and justify their applicability
Assessment:	One 3-hour written end of semester examination (70%)Three assignments totalling less than 2,000 words (24%)Two 30-minute tests (6%) throughout the semester
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:	On completion of this subject students should have developed the following generic skills: # 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 utilise a systems approach to design and operational performance # Capacity for independent critical thought, rational inquiry and self-directed learning # Ability to communicate effectively both with the engineering team and the community at large
Notes:	# This is a companion subject to *Hydrological Processes 1* # This subject replaces 421-491 Quantification of Physical Processes B # This subject is co-taught to both undergraduate and postgraduate students # Subject is offered for the last time in 2010
Related Course(s):	Bachelor of Engineering (EngineeringManagement) Environmental Bachelor of Engineering (Environmental Engineering) Bachelor of Engineering (Environmental) and Bachelor of Arts Bachelor of Engineering (Environmental) and Bachelor of Commerce Bachelor of Engineering (Environmental) and Bachelor of Laws Bachelor of Engineering (Environmental) and Bachelor of Science Graduate Certificate in Engineering (Environmental Engineering) Master of Environment Master of Environment Master of Environmental Engineering Master of Environmental Engineering Master of Water Resource Management Master of Water Resource Management Postgraduate Certificate in Engineering Postgraduate Certificate in Environment

	Postgraduate Diploma in Environment
Related Majors/Minors/ Specialisations:	Energy Studies Integrated Water Catchment Management