421-581 Hydrological Processes 2

Credit Points:	12.50
Level:	9 (Graduate/Postgraduate)
Dates & Locations:	2009, This subject commences in the following study period/s: Semester 1, - Taught on campus.
Time Commitment:	Contact Hours: 48 hours; Non-contact time commitment: 84 hours Total Time Commitment: Not available
Prerequisites:	421-316 Engineering Hydraulics & Hydrology, 421-325 Field Data Acquisition and Analysis , 421-327 Computing for Land and Spatial Systems or admission into a postgraduate course
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 Student Support and Engagement Policy, academic requirements for this subject are articulated in the Subject Overview, Learning Outcomes, Assessment and Generic Skills sections of this entry. It is University policy to take all reasonable steps to minimise the impact of disability upon academic study, and reasonable adjustments will be made to enhance a student's participation in the University's programs. Students who feel their disability may impact on meeting the requirements of this subject are encouraged to discuss this matter with a Faculty Student Adviser and Student Equity and Disability Support: http://services.unimelb.edu.au/disability
Coordinator:	Assoc Prof Andrew William Western
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Subject Overview:	This is a companion subject to Hydrological Processes 1. 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%) and three assignments (24%) totalling less than 2,000 words and 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
Notes:	This subject replaces: 421-491 Quantification of Physical Processes B 421-581 Hydrological Processes 2 Please note that this subject is co-taught to both undergraduate and postgraduate students.
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 Master of Development Technologies Master of Energy Studies Master of Engineering Project Management Master of Engineering Structures Master of Environmental Engineering Master of Water Resource Management