ENEN90034 Environmental Applied Hydrology

Credit Points:	12.5
Level:	9 (Graduate/Postgraduate)
Dates & Locations:	2016, Parkville This subject commences in the following study period/s: Semester 1, Parkville - Taught on campus.
Time Commitment:	Contact Hours: 48 hours (Lectures: 34 hours per semester, Workshops: 12 hours per semester; Laboratory: 2 hours per semester). Total Time Commitment: 200 hours
Prerequisites:	None
Corequisites:	None
Recommended Background Knowledge:	Learning and understanding in this subject will be enhanced by the knowledge gained in the following subjects:

Subject	Study Period Commencement:	Credit Points:
MAST20029 Engineering Mathematics	Summer Term, Semester 1, Semester 2	12.50
CVEN30010 Systems Modelling and Design	Semester 2	12.50

Non Allowed Subjects:	This subject is a replacement for the following: CVEN90012 Hydrological Processes 1
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:	Dr Rory Nathan
Contact:	Assoc. Prof. Rory Nathan **rory.nathan@unimelb.edu.au (mailto:rory.nathan@unimelb.edu.au)**
Subject Overview:	**AIMS** In this subject students will learn to analyse hydrologic data, to build computer models of catchments, and apply these to hydrologic analysis and real-world design problems. Quantitative analyses of physical hydrology are introduced and 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 earth systems. The subject builds on knowledge from ENEN20002 Earth Processes for Engineering where climate and water cycles are studied. It also complements knowledge of modelling and analysis from subjects such as ENEN90031 Quantitative Environmental Modelling and ENEN90028 Monitoring Environmental Impacts. The subject is of particular relevance to students wishing to establish a career in the catchment management or water resources fields, but is also relevant to a range of engineering disciplines where the water cycle should be considered. **INDICATIVE CONTENT**

	Topics covered include a range of engineering hydrology techniques, precipitation, evapotranspiration, runoff processes, flood hydrology, unsaturated zone, interaction between surface and subsurface water and hydrological modelling.
Learning Outcomes:	**INTENDED LEARNING OUTCOMES (ILO)** On completion of this subject the student is expected to: 1 Apply hydrologic analyses to engineering designs 2 Analyse the frequency and regime characteristics of streamflow 3 Describe the process of evapotranspiration and perform quantitative analyses on meteorological and environmental data to compute evapotranspiration 4 Describe precipitation measurements and perform quantitative analyses on precipitation to be used in engineering designs 5 Identify and apply techniques to assess the impact of land-use changes on streamflows 6 Describe and perform quantitative analyses on processes that control runoff and stream-flow at the hillslope and catchment scale 7 Describe and perform quantitative analyses on unsaturated zone processes 8 Develop quantitative models of these hydrological processes.
Assessment:	One 3-hour examination (50%) held at the end of semester. Intended Learning Outcomes (ILOs) 1 to 7 are addressed in the examination Three 1000 word assignments (40%) with associated computer modelling, due weeks 4, 9 and 12, each requiring 16 to 18 hours of work. ILOs 1 to 7 are addressed in these assignments One laboratory report (10%) due in week 7 or 8 and requiring 13 to 15 hours work. ILOs 5 and 6 are addressed by this report Hurdle Requirement: The examination component must be passed in order to pass the subject.
Prescribed Texts:	None
Recommended Texts:	Ladson, A, 2008. *Hydrology: An Australian introduction*. Oxford University Press Australia and New Zealand.
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:	# Ability to apply knowledge of science and engineering fundamentals # Ability to undertake problem identification, formulation and solution # Ability to utilise a systems approach to complex problems, design and operational performance # Capacity for lifelong learning and professional development.
Notes:	**LEARNING AND TEACHING METHODS** The subject is based principally on lectures and computer-based practical classes. A laboratory class is used to investigate aspects of catchment behaviour. Assignments allow students to practice hydrologic analyses on real-world data sets. **INDICATIVE KEY LEARNING RESOURCES** The following text is a useful reference: Ladson, A, 2008. *Hydrology: An Australian introduction*. Oxford University Press Australia and New Zealand. **CAREERS / INDUSTRY LINKS** Computer software packages used in this subject are standard industry tools and assignments are based on real-world data sets.
Related Course(s):	Doctor of Philosophy - Engineering Master of Environmental Engineering Master of Philosophy - Engineering
Related Majors/Minors/ Specialisations:	Integrated Water Catchment Management Integrated Water Catchment Management Master of Engineering (Civil) Master of Engineering (Environmental)