ENEN90031 Quantitative Environmental Modelling

Credit Points:	12.50
Level:	9 (Graduate/Postgraduate)
Dates & Locations:	This subject is not offered in 2011.
Time Commitment:	Contact Hours: 48 hours (Lectures: 2 hours per week, Workshops: 2 hours per week) per semester Total Time Commitment: 120 hours
Prerequisites:	The prerequisite for this subject is:

Subject	Study Period Commencement:	Credit Points:
MAST20029 Engineering Mathematics	Summer Term, Semester 1, Semester 2	12.50

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 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/
Contact:	Assoc Prof Andrew Western **a.western@unimelb.edu.au (mailto:a.western@unimelb.edu.au)**
Subject Overview:	Environmental problems are highly complex and challenging to analyse. This subject focuses on environmental modelling methodology including the steps of model conceptualisation, model construction, model evaluation and model application. The relationship between theoretical and empirical understanding and their use in model conceptualisation and construction will be explored. This subject introduces a range of environmental modelling techniques applicable to different environmental problems. In this subject students will conceptualise and construct, evaluate and utilise their own model to undertake a technical evaluation of a specified range of potential solutions to an environmental problem Specific topic areas: # System conceptualisation # Model construction and validation (computational accuracy) # Model evaluation # Calibration and optimisation # Model uncertainty assessment techniques # Issues of appropriate model complexity # 2-3 examples of modelling approaches such as system simulation models, Bayes' networks, Geostatistical models, complex systems models or agent-based models (or other examples of a diverse range of model types)
Objectives:	On completion of this subject students should be able to: # select an appropriate approach to quantitative modelling of problems, given existing knowledge and data # develop a conceptual model designed to investigate and solve engineering problems # develop, calibrate and evaluate a quantitative model of the problem using generic modelling software

	# apply models to investigate problems and synthesise recommendations based on the modelling # write and present engineering reports of modelling studies
Assessment:	Two 1500 word group reports, due Week 6 and Week 11 (60%)One 1500-word individual report, due Week 12 (30%)One 10-minute oral presentation during the semester (10%)
Prescribed Texts:	None
Recommended Texts:	Environmental Modelling: Finding Simplicity in Complexity (J Wainwraight & M Mulligan) John Wiley 2004
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 undertake problem identification, formulation, and solution # Ability to utilise a systems approach to complex problems and to design and operational performance
Related Course(s):	Bachelor of Engineering (Environmental) and Bachelor of Arts Bachelor of Engineering (Environmental) and Bachelor of Commerce Master of Engineering Structures Master of Engineering Structures Master of Environmental Engineering Master of Environmental Engineering Postgraduate Certificate in Engineering
Related Majors/Minors/ Specialisations:	Energy Efficiency Modelling and Implementation Energy Studies Integrated Water Catchment Management Master of Engineering (Environmental) Waste Management