ENEN90032 Environmental Analysis Tools

Credit Points:	12.50
Level:	9 (Graduate/Postgraduate)
Dates & Locations:	This subject is not offered in 2013.
Time Commitment:	Contact Hours: 48 hours, comprising of two hours of lectures and two hours of tutorials per week Total Time Commitment: 120 hours
Prerequisites:	Admission to Master of Engineering OR

Subject	Study Period Commencement:	Credit Points:
MAST20029 Engineering Mathematics	Not offered 2013	12.50

Corequisites:	None
Recommended Background Knowledge:	Completion of the following subjects will assist in learning:

Subject	Study Period Commencement:	Credit Points:
CVEN30008 Risk Analysis	Not offered 2013	12.50
CVEN30010 Systems Modelling and Design	Not offered 2013	12.50

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
Contact:	Dr Dongryeol Ryu **dryu@unimelb.edu.au (mailto:dryu@unimelb.edu.au)**
Subject Overview:	The aim of this subject is to help students develop capability to effectively summarise environmental variables met in the course of research and design, to select appropriate statistical models describing the data structure, and to conduct statistical inference on underlying processes. Students will apply a variety of models from a conventional or Bayesian approach to solve the problems at hand and derive deterministic or stochastic inferences from them. The subject is composed of four wide-ranging topics from exploratory data analysis to spatial modelling. At the beginning of each topic, students are provided with a set of data from environmental research, and a number of analysis tools are conveyed in the lectures Specific topics are: 1. Exploratory Data Analysis # Summary statistics and probability models # Analysis of variability and hypothesis test # Linear regression and verification/validation

	2. Time Series Analysis # Introduction to multivariate analysis # Principle component analysis # Stochastic forecast and verification 3. Methods for Multivariate Data # Principle component analysis # Factor analysis 4. Analysis of Spatial Data # Simple spatial interpolations # Analysis of spatial variability # Spatial models and Kriging
Objectives:	On completion of this subject students should be able to: # Effectively summarise their analysis and design outputs # Use stochastic approach to make statistical inference about random environmental variables # Define and evaluate objective functions for their design target # Quantitatively test their hypothesis # Select the most appropriate statistical model describing the data at hand # Generate both deterministic and stochastic realisations of environmental variables
Assessment:	Two 2500-word reports, due mid-semester and week 12 (90%) Four 20-minute quizzes held every three weeks throughout the semester (10%)
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:	# Ability to apply knowledge of science and engineering fundamentals # Ability to undertake problem identification, formulation, and solution # Proficiency in engineering design # Ability to conduct an engineering project
Related Course(s):	Bachelor of Engineering (Environmental) and Bachelor of Arts Bachelor of Engineering (Environmental) and Bachelor of Commerce Master of Environmental Engineering Master of Environmental Engineering Master of Philosophy - Engineering Ph.D.- 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