ENEN90032 Environmental Analysis Tools

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, Problem Based Learning in computer laboratories: 2 hours per week) per semester Total Time Commitment: 120 hours
Prerequisites:	Admission to Master of Engineering OR

Subject	Study Period Commencement:	Credit Points:
MAST20029 Engineering Mathematics	Summer Term, Semester 1, Semester 2	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 2011	12.50
CVEN30010 Systems Modelling and Design	Not offered 2011	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 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:	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 # Probability models, summary statistics and objective function # Analysis of variability and hypothesis test # Bayesian inference 2. Linear models and statistical forecasting # Linear regression and validation # Stochastic ensemble forecasting # Forecast verification 3. Methods for multivariate data # Principle component analysis

	# Cluster 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:	One 2-hour examination, end of semester (50%)Two 1500 word reports, due mid-semester the week 12 (30%)Four x 20 minute quizzes held every three weeks during the semester (20%)
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 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