



UNIVERSITI TEKNOLOGI MARA

EVT730: ENVIRONMENTAL SPATIAL MODELLING

Course Name (English)	ENVIRONMENTAL SPATIAL MODELLING APPROVED
Course Code	EVT730
MQF Credit	3
Course Description	This course aims to provide students with knowledge to simulate spatially and temporally variable environmental impacts via spatial environmental modeling. Simulation provides to ask the answer 'what if' questions that can be used to guide decision-making strategies of complex environmental problem that do not respect political or physical boundaries: eg., forest fire, deforestation, flood prone, nonpoint source (NPS) pollution. It also covers various data mining technique and soft computing approaches for environmental modeling using GIS technique. Data mining principles in GIS, processing, modeling, interpretation, mapping will also discussed. Furthermore, the course will also discuss on the uncertainty that can also result from data error. In this course the student will have hands-on practical of using specific software to simulate a model on selected environmental application.
Transferable Skills	Model development using specific software Thematic map production
Teaching Methodologies	Lectures, Lab Work, Case Study, Discussion, Presentation
CLO	<p>CLO1 Interpret the various types of data mining approaches, some practical implication on environmental modelling and prediction</p> <p>CLO2 Explain on environmental modeling approaches using various GIS-based techniques for example fuzzy logic, artificial neural network, likelihood ratio and bivariate logistic regression models for environmental modeling and prediction</p> <p>CLO3 Organize datasets obtained from different source of data input: e.g., imaging, non-imaging, field sampling and laboratory analytical studies and able to configure these in suitable format for higher level data analysis using computer tool such as a geographical Information System (GIS)</p> <p>CLO4 Execute a selected spatial model for future prediction on selected environmental application.</p> <p>CLO5 Generate a map produced from executed model for decision-making strategies</p>
Pre-Requisite Courses	No course recommendations
Topics	
<p>1. 1.0 Course overview</p> <p>1.1) 1.1 Definition</p> <p>1.2) 1.2 The needs of modelling in environmental studies</p> <p>1.3) 1.3 Modelling application</p>	
<p>2. 2.0 Fundamental of environmental modelling</p> <p>2.1) 2.1 Types of modelling</p> <p>2.2) 2.2 Modelling and application</p> <p>2.3) 2.3 Prediction and management</p>	

3. 3.0 Geospatial Data for Environmental Studies 3.1) 3.1 Geospatial data 3.2) 3.2 Geographical Information Technologies 3.3) 3.3 Geographical Information System 3.4) 3.5 Component of Geographical Information System 3.5) 3.6 Spatial data model 3.6) 3.7 Spatial data structures 3.7) 3.8 Primary and Secondary Spatial Data Acquisition 3.8) 3.9 Geospatial data processing and data integration techniques 3.9) 3.10 Data Quality and Standard 3.10) 3.11 Attribute Data Management
4. 4.0 Spatial Data Modelling and Analysis 4.1) 4.1 Introduction to Spatial Analysis 4.2) 4.2 Elements of Geospatial Modelling 4.3) 4.3 Data Exploration 4.4) 4.4 Vector-based Analysis 4.5) 4.5 Raster-Based Analysis 4.6) 4.6 Analysis of Surfaces or 3D Analysis 4.7) 4.7 Spatial Interpolation
5. 5.0 Types of Models 5.1) 5.1 Static Model 5.2) 5.2 Individual and Aggregate Models 5.3) 5.3 Technology for Modelling
6. 6.0 Multicriteria Methods 6.1) n/a
7. 7.0 Geovisualization 7.1) n/a
8. 8.0 Analysis of Surfaces or 3D Analysis 8.1) n/a
9. 9.0 Applications of Modelling 9.1) n/a

Assessment Breakdown	%
Continuous Assessment	70.00%
Final Assessment	30.00%

Details of Continuous Assessment	Assessment Type	Assessment Description	% of Total Mark	CLO
	Assignment	Giving assignments to the students is to provide a practice exposure and knowledge enhancement of a subject	20%	CLO1
	Lab Exercise	Laboratory experiences may help students learn to address the challenges inherent in directly observing and manipulating the material world, including troubleshooting equipment used to make observations, understanding measurement error, and interpreting and aggregating the resulting data	15%	CLO3
	Lab Exercise	Laboratory experiences may help students learn to address the challenges inherent in directly observing and manipulating the material world, including troubleshooting equipment used to make observations, understanding measurement error, and interpreting and aggregating the resulting data	15%	CLO5
	Test	Test 1 is to measure students' understanding of specific content or the effective application of critical thinking skills. Such tests are used to evaluate student learning, skill level growth and academic achievements at the end of Lecture 1, 2, 3 and 4	20%	CLO2

Reading List	Recommended Text
	<ul style="list-style-type: none"> • Allan Brimicombe 2003, <i>GIS Environmental Modelling and Engineering</i>, CRC Press [ISBN: 9780415259231] • Kang_tsung Chang 2014, <i>Introduction to GIS</i>, 7th Ed., Connet Learn Succeed Singapore [ISBN: 1259010613] • Paul A. Longley, Michael Batty 1996, <i>Spatial Analysis: Modeling in a GIS Environment</i>, John Wiley & Sons Halsted Press [ISBN: 0470236159] • Michael F. Goodchild, Louis T. Steyaert, Bradley O. Parks 1996, <i>GIS and Environmental Modeling</i>, John Wiley & Sons [ISBN: 0470236779] • Manfred M Fischer 1996, <i>Spatial Analytical</i>, CRC Press [ISBN: 074840340X]
Article/Paper List	This Course does not have any article/paper resources
Other References	This Course does not have any other resources