UNIVERSITI TEKNOLOGI MARA
EVT571: ENVIRONMENTAL REMOTE SENSING

Course Name (English)	ENVIRONMENTAL REMOTE SENSING APPROVED
Course Code	EVT571

MQF Credit	3

Course Description	This course is designed to introduce students to remote sensing of the environment by discussing the fundamental characteristic of electromagnetic radiation, energy interactions with the atmosphere and Earth's surface and ways to extract meaningful geophysical information from remote sensing data to solve environmental problems. Digital image processing techniques and algorithms involved in the measurement, analysis and interpretation of electromagnetic energy collected by remote sensing instruments are demonstrated through in practical class and hands on exercise using the image processing system/software. The goal is for students to develop an understanding of inventorying, mapping and monitoring the earth-atmosphere system and its resources through the measurement, analysis and interpretation of electromagnetic energy emanating from features of interest.

Transferable Skills	image satellite processing

Teaching Methodologies	Lectures, Lab Work, Discussion, Presentation

CLO	CLO1 State the concept of remote sensing technology CLO2 Analyze information from remotely sensed data CLO3 Demonstrate the skill of applying image processing on remotely sensed data on selected environmental application

Pre-Requisite Courses	No course recommendations

Topics
1. Physical Basis of Remote Sensing 1.1) Electromagnetic radiation. 1.2) Electromagnetic spectrum/types of sensors /data acquisition
2. Remote Sensing Technology 2.1) Passive sensors. 2.2) Active sensors.
3. Interaction of EMR With the Earth's Atmosphere and Surface 3.1) Interaction of EMR with atmosphere. 3.2) Interaction of EMR with earth surface
4. Image Pre_processing 4.1) Radiometric correction 4.2) Sensor error and calibration 4.3) Atmosphere effect 4.4) Geometric correction
5. Digital Image processing 5.1) image interpretation 5.2) image enhancement
6. Thematic Information Extraction 6.1) Classification consideration 6.2) Unsupervised classification 6.3) Supervised classification 6.4) Post-classification analysis

7. Change detection analysis
7.1) Change detection algorithm.
7.2) Unsupervised classification.
7.3) Supervised classification.
7.4) Post-classification analysis
8. Environmental Applications
8.1) Observations of natural systems
8.2) Natural resource exploration & assessment
8.3) Environmental monitoring & assessment

Assessment Breakdown	%
Continuous Assessment	100.00%

Details of Continuous Assessment	Assessment Type	Assessment Description	% of Total Mark	CLO
	Assignment	The assignments given to the students is to provide a practice exposure and knowledge enhancement of a subject	24%	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	24%	CLO3
	Quiz	A random quiz is given to the student to encourage students to pay attention to all of the material in class. Hopefully motivating them to study more and helping them allocate their study time effectively by focusing on the information that still needs more practice.	4%	CLO1
	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	16%	CLO1
	Test	Test 2 and 3 are 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 5, 6, 7, 8, 9, 10	32%	CLO2

Reading List	Reference Book Resources	• Belmont. Lillesand, T.M. and Kiefer, W.R 1999, *Remote sensing and image interpretation*, 4 Ed., John-Wiley and Sons Inc
		• Jensen, J.R., 2000, *Remote sensing of the Environment: An Earth R*, New Jersey: Prentice Hall
		• Barret, E.C and Curtis, L.F., 1999, *Introduction to Environmental Remote Sensing*, Stanley Thorne.
		• Jensen, J.R., 2007, *Introductory Image Processing*, Prentice Hall
		• *International Journal of Remote Sensing*, Taylor & Francis
Article/Paper List	This Course does not have any article/paper resources	
Other References	This Course does not have any other resources	