

<b>Semester:</b>	5		
<b>Course Code:</b>	ENCM 41713		
<b>Course Name:</b>	Geo-informatics for Environmental Management		
<b>Credit Value:</b>	3		
<b>Status:</b>	Compulsory for BSc Honours in ENCM degree		
<b>Pre-requisite:</b>	ENCM 21743		
<b>Co-requisite:</b>	None		
<b>Hourly Breakdown:</b>	Theory	Practical	Independent Learning
	30	45	75
<b>Intended Learning Outcomes:</b>			
<p>At the end of the course unit, student will be able to:</p> <ol style="list-style-type: none"> <li>1. explain and apply atmospheric, hydrological, land-use analysis and ecological models in Geographical Information Systems (GIS),</li> <li>2. develop GIS projects in environmental management studies,</li> <li>3. discuss geo-statistical applications of interpolation and spatial patterns in GIS, and</li> <li>4. demonstrate the competency in analyzing satellite images for environmental applications.</li> </ol>			
<b>Course Content:</b>			
<p>GIS overview. GIS project management. Analytical modelling in GIS; Spatial process modelling. Spatial process modelling; Multi Criteria Evaluation (MCE) applications in environmental management. Spatial database management. Nature of data. Georeferencing systems. Geo-statistics; Interpolation and Moran Index. Spatial sampling and spatial patterns. Remote sensing data analysis; Image enhancement and image pixel-based classification and sub pixel-based classification. Satellite remote sensing image indices: NDVI, VI, NDWI etc. Terrain analysis; Hydrologically correct DEMs, Terrain attributes. Environmental Applications; Hydrological modeling, land use analysis and modeling, atmospheric modeling, ecological modeling.</p> <p>Laboratory sessions using a GIS software: Data analysis: Weighted overlay applications in environmental management, image classification, remote sensing image indices, Moran Index and spatial distribution. Derivation of DEM, derivation of catchment area. Individual case studies on environmental management using geoinformatics. Hands on experiences with Q-GIS and Google earth engine software.</p>			
<b>Teaching /Learning Methods:</b>			
A combination of lectures, practical sessions, computer-based learning, assignments, case studies and group discussions.			
<b>Assessment Strategy:</b>			
Continuous assessment and end of semester examination. Percentage given for each sub-component indicates the percent contribution to the final marks.			
Continuous Assessment 30 %		Final Assessment 70 %	
Details:		Theory	Practical
Assignments	10	50	20
Case study	20		-

**Recommended Readings:**

1. Burrough, P. A. & R. A. McDonnell (2011). Principles of Geographical Information Systems; Spatial Information Systems and Geostatistics. 2nd edition. Oxford University Press. UK.
2. Fu, P. (2010). Web GIS: Principles & Applications. ESRI press, USA.
3. Gorr, W. L. (2013). GIS tutorial 1; Basic workbook, 10.1 Edition. ESRI press, USA.
4. Heywood, I., S. Cornelius & S. Carver (2013). An Introduction to Geographical Information Systems. 4th edition. Pearson, UK.
5. Law, M (2013). Getting to know ArcGIS for desktop. ESRI press, USA.
6. Recently published relevant scholarly reviews and research paper articles from peer reviewed scientific journals.