Course Name (English)	BIODIVERSITY GIS AND REMOTE SENSING APPROVED
Course Code	BDY513

MQF Credit	4

Course Description	This course is designed to cover the basic concepts, theory, and methods of remote sensing and Geographic Information Systems (GIS) to the students. Students will learn working knowledge of the principles of obtaining information that describes environment and their condition from remotely sensed data. In addition, students will gain familiarity with the acquisition and interpretation of remotely sensed imagery. Students will also be introduced to the construction, manipulation, display and analysis of spatial information using Geographic Information Systems (GIS). Lectures and reading assignments will be supplemented by lab exercises providing hands-on experience working with satellite imagery. Applications of remote sensing and GIS will also be discussed during lecture periods.

Transferable Skills	Skills and how they are developed and assessed, Project and practical experience and Internship: On completion of the course the student will be able to: 1. Apply the principle of biodiversity GIS and remote sensing to the management of the environment. 2. Able to analyze and interpret data using the GIS and remote sensing software. 3. Communicate effectively with others to solve some given situations and problems.

Teaching Methodologies	Lectures, Case Study, Discussion, Presentation

CLO		
	CLO1	Define and describe a basic, practical understanding of remote sensing and GIS concepts, technical issues, and applications
	CLO2	Identify and explain the important, uniqueness and how remote sensing and GIS fit in the world of environmental information systems
	CLO3	Apply the information on remote sensing using PCI Geomatica and ArcView, powerful and popular remote sensing and GIS packages, respectively
	CLO4	Conduct remote sensing and GIS projects, including image pre-processing, image classification, data input, building a database, performing basic remote sensing and GIS operations, and producing maps

Pre-Requisite Courses	No course recommendations

Topics
1. Concepts and foundations of remote sensing 1.1) What is remote sensing 1.2) Component in remote sensing 1.3) Type of sensor
2. Principles of electromagnetic energy 2.1) Electromagnetic wave 2.2) The electromagnetic spectrum 2.3) Properties of light important in remote sensing
3. Spectral response patterns of earth features 3.1) Surface interactions 3.2) Specular reflection 3.3) Spectral Reflectance
4. Digital image processing 4.1) How digital image work 4.2) Image Enhancement

5. Image classification
5.1) Types of classification
5.2) Classification schemes
5.3) Classification considerations

6. Remote sensing technologies
6.1) Remote sensing systems (in respect to the type of energy resources)
6.2) Remote sensing systems (in respect to wavelength regions)

7. Application of remote sensing
7.1) Global monitoring
7.2) Local environmental monitoring

8. Principles of geographical information system
8.1) Definitions of GIS
8.2) Component of GIS
8.3) GIS functions and questions

9. Geographic data and the database
9.1) Data and information
9.2) Concepts of data model
9.3) Characteristics of spatial data

10. Map as a model of geographic data
10.1) General elements of map
10.2) Types of map

11. Data collection techniques
11.1) Data capture
11.2) Data transfer

12. Data structure
12.1) Metadata
12.2) Methods of encoding
12.3) Data editing

13. Database in GIS analysis
13.1) Database concepts
13.2) Relational database systems
13.3) Database models

14. Application of GIS in environmental monitoring
14.1) Observations of natural systems
14.2) Natural resource exploration and assessment
14.3) Environmental monitoring and assessment

Assessment Breakdown	%
Continuous Assessment	50.00%
Final Assessment	50.00%

Details of Continuous Assessment	Assessment Type	Assessment Description	% of Total Mark	CLO
	Assignment	Topic 1 - 7	20%	CLO2
	Group Project	Project-based learning (discussion and presentation)	20%	CLO4
	Test	Topic 1 - 3	10%	CLO1

Reading List	Reference Book Resources	• Antenucci, J. C., K. Brown, et al. 1991, *Geographical Information Systems: A guide to the technology.*, Van Nostrand Reinhold • Lillesand, T.M. and R.W. Kiefer 2000, *Remote sensing and image interpretation.*, 4th Ed Ed., John Wiley and Sons NY • Jensen. J.R. 1995, *Introductory digital image processing: A remote sensing perspective.*, Prentice Hall New Jersey, U.S.A • Wilkie, D.S. and J.T. Finn 1996, *Remote sensing imagery for natural resources monitoring.*, Columbia Univ. Press NY
Article/Paper List	This Course does not have any article/paper resources	
Other References	This Course does not have any other resources	