CO 3	✓	✓		✓
CO 4	✓			✓

16. ENVIRONMENTAL INFORMATICS

Discipline	COMPUTER SCIENCE				
Course Code	UK1MDCCSC106				
Course Title	ENVIRONMENTAL INFORMATICS				
Type of Course	MDC				
Semester	I				
Academic Level	1 -				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours/Week
	3	3 hours	-	-	3 hours
Pre-requisites	Basic knowledge on Environmental science is desirable.				
Course Summary	This course provides students with knowledge and skills related to the use of information technology and computational methods for addressing environmental challenges and promoting sustainability.				

Detailed Syllabus:

Module	Unit	Content	Hrs (L)
I		**Introduction to Environmental Informatics**	**9**
	1	Introduction, Definitions for Environmental Information Systems, Classification of Environment Information System, Industrial Environmental Management Information systems, Background and Issues of Environmental Informatics	

	2	Data Collection and processing: Remote sensing technologies, Ground-based sensors, Weather stations and monitoring networks, Citizen science and crowdsourced data	
II	**Environmental Information Systems**		**9**
	3	Decision Support Systems (DSS) for Environmental Management: Concept and components of DSS, Multi-criteria decision analysis, Scenario analysis and modelling	
	4	Remote Sensing: Principles of remote sensing and image interpretation, Satellite sensors and platforms for environmental monitoring	
III	**Geographic Information Systems**		**9**
	5	The nature of GIS; Definition; GISystems, GIScience and GIS applications; Spatial Data and Geo Information; Models: Models and Modelling, Maps, Databases, Spatial Databases and Spatial Analysis	
	6	Geographic Information and Spatial Data types: Model, Geographic Phenomena: Definition, Types, Geographic fields: Data types and values, Geographic objects, Geographic boundaries; Computer representation of Geographic Information; Topology and spatial relationships	
IV	**GIS Software Tools**		**9**
	7	GIS software tools and functionalities: ArcGIS, QGIS (Quantum GIS), GRASS GIS, MapInfo Professional, GeoServer, PostGIS, Google Earth Engine, ENVI	
V	**Flexi Module (Not included for end semester exam)**		**9**
	8	Applications: Urban and Landscape Development, Waste Management and Logistics, Prevention and Management of Environmental Hazards	

References

1. Claus Rautenstrauch and Susanne Pattig, “Environmental Information systems in Industry and Public Administration” , IDEA Group Publishing
2. Otto Huisman and Rolf.A.Day, “Principles of Geographic information systems: An introductory book”

3. Qihao Weng, Remote Sensing and GIS Integration: Theories, Methods, and Applications, McGrawHill

Case Study

1. Classify various tools available in Environmental Information systems
2. Prepare a report on various Environmental Information systems and its functionalities.

Course Outcomes

No.	Upon completion of the course the graduate will be able to	Cognitive Level	PSO addressed
CO1	Summarise the basic concepts of Environmental Informatics	U	PSO-1
CO2	Illustrate the role of Decision Support Systems and Remote Sensing	Ap	PSO-1, 3
CO3	Demonstrate the concept of Geographic Information System.	Ap	PSO-1, 3
CO4	Comprehend the role of GIS tools in various applications	U	PSO-1

R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create

Note: 1 or 2 COs/module

Name of the Course: ENVIRONMENTAL INFORMATICS

Credits: 3:0:0 (Lecture: Tutorial: Practical)

CO No.	CO	PO/PSO	Cognitive Level	Knowledge Category	Lecture (L)/ Tutorial (T)	Practical (P)
CO1	Summarise the basic concepts of Environmental Informatics	PO-6,7 PSO-1	U	F, C	L	-
CO2	Illustrate the role of Decision Support Systems and Remote Sensing	PO-4, 5, 6, 7 PSO-1, 3	Ap	F, C, P	L	-
CO3	Demonstrate the concept of Geographic	PO-4, 5, 6,7 PSO-1, 3	Ap	F, C, P	L	-

	Information System.					
CO4	Comprehend the role of GIS tools in various applications	PO-6,7 PSO-1	U	F, C	L	-

F-Factual, C- Conceptual, P-Procedural, M-Metacognitive

Mapping of COs with PSOs and POs :

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PSO 1**	**PSO 2**	**PSO 3**	**PSO 4**
CO 1	-	-	-	-	-	1	1	-	2	-	-	-
CO 2	-	-	-	2	2	2	2	-	2	-	1	-
CO 3	-	-	-	2	2	2	2	-	2	-	1	-
CO 4	-	-	-	-	-	2	2	-	2	-	-	-

Correlation Levels:

Level	**Correlation**
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

Assessment Rubrics:

- Quiz / Assignment/ Quiz/ Discussion / Seminar
- Midterm Exam
- Lab Assignments

- Final Exam

Mapping of COs to Assessment Rubrics :

	Internal Exam	**Assignment**	**Case Study**	**End Semester Examination**
CO 1	✓	✓		✓
CO 2	✓		✓	✓
CO 3	✓		✓	✓
CO 4	✓	✓		✓