COURSE CODE	**GIE-342**
COURSE NAME	**GIS APPLICATIONS**
CREDIT HOURS	Theory: 02
	Practical: 01
	Total: 03
CONTACT HOURS	Theory: 32
	Practical: 48
	Total: 80
PREREQUISITE	GIE-101

MODE OF TEACHING:

Instruction:	Two hours of lecture per week	67%
Practical:	Three hours of Lab work per week	33%

COURSE DESCRIPTION:

This course is designed to impart understanding of the use of Remote Sensing and Geographic Information System for mapping, monitoring, analysis and management of natural hazards, disasters, natural resources, business etc. It introduces different natural hazards and disasters, followed by the examples and case studies about the usefulness and application of geospatial data and techniques for disaster monitoring, management, and mitigation.

COURSE OBJECTIVES:

a. Brief students with the GIS and RS applications in multi-disciplines.
b. Introduce students to the natural disasters and their threats to Pakistan.
c. Enabling students with the capabilities of identifying natural hazards and available natural resources for coping with disasters
d. Provide hands-on training with the software and spatial data.

RELEVANT PROGRAM LEARNING OUTCOMES (PLOs):

The course is designed so that students will achieve the PLOs:

1	Engineering Knowledge:	☐	7	Environment and Sustainability:	☐
2	Problem Analysis:	☑	8	Ethics:	☐
3	Design/Development of Solutions:	☑	9	Individual and Team Work:	☐
4	Investigation:	☐	10	Communication:	☐
5	Modern Tool Usage:	☐	11	Project Management:	☐
6	The Engineer and Society:	☐	12	Lifelong Learning:	☐

COURSE LEARNING OUTCOMES:

Upon successful completion of the course, students will be able to

S.No	CLO	Domain	Taxonomy Level	PLO
1	Analyze real world problems using appropriate GI techniques	Cognitive	4	2
2	Develop solutions for multidisciplinary problems by integrating geospatial data and GIS techniques	Cognitive	5	3

TOPICS COVERED:

Theory:

Week	Topics
1	Remote Sensing and GIS- Applications in Hazard and Natural Disaster-Types of Hazard and Disasters
2	Hazard Assessment, Mapping and Mitigation
3	Disaster Planning and Preparedness, Floods, Land Slides. Earthquake
4	Case Studies
5-6	Remote Sensing and GIS- Applications in Natural Resources -Managing Natural Resources
7	Forestry, Case Studies
8	Agriculture, Case Studies

9	Remote Sensing and GIS- Applications in Health-Mapping Health Information
10	Analyzing the Risk, Spread and Access to Health Facilities
11-12	Case Studies
13	Remote Sensing and GIS -Applications in Business-Concepts and theories of GIS in business
14	Marketing Spatial Analysis and Site Suitability Analysis, Case Studies
15	Remote Sensing and GIS -Applications in Utilities Management
16	Utilities Network Analysis
17-18	**ESE**

PRACTICAL APPLICATION

After the completion of the course student will be able to utilize RS and GIS skills in identifying and mapping natural hazards and natural resources. They will be able to manage natural resources with the help of RS and GIS. They will also be able to use RS and GIS for in addressing the issues related to Public Health and facilities. They will also be familiar with the RS & GIS application in Business.

Practical:

No.	Topics
1	Comparison of different GIS softwares module related to various GIS applications
2	Mapping different natural hazards/disasters
3	Multi hazard risk assessment
4	Multi hazard damage assessment
5-6	Mapping of Forestation/Deforestation
7	Mapping of Crop Phenological Stages, yield estimation, Soil Moisture
8	Disease Mapping Methods and analysis of Risk and Spread
9-10	Mapping and access analysis of health facilities
11	Marketing Spatial Analysis
12	Site Selection for Business
13	GIS for fleet management

14-15	Mapping and access analysis of Utilities
16	Utilities Management and Network Analysis (Water Supply, Telecomm, Sewerage)

TEXT AND MATERIAL:

Textbook (s):

1. Wing M, Bettinger P. *Geographic Information Systems*. Don Mills, Ont.: Oxford University Press; 2008.

References Material:

1. Cromley E, McLafferty S. GIS and Public Health. New York: The Guilford Press; 2012.
2. Lang L. Managing Natural Resources with GIS. Redlands, Calif.: Environmental Systems Research Institute; 1998.
3. Longley P, Clarke G. GIS for Business and Service Planning. Cambridge: GeoInformation International; 1995.
4. Maantay J, Ziegler J. GIS for the Urban Environment. Redlands, Calif.: ESRI Press; 2006.
5. Tomaszewski B. Geographic Information Systems (GIS) For Disaster Management. 2014.

ASSESMENT SYSTEM:

1. CLOs Assessment

Cognitive	**Psychomotor**	**Affective**
Spreadsheet	Rubrics	-

2. Relative Grading

Theoretical/Instruction			67%
	Assignments10%		
	Quizzes10%		
	Mid Exams30%		
	End Semester Exam50%		

Practical Work			33%
Laboratory Work		*70%*	
	Laboratory Attendance20%		
	Laboratory Report20%		
	Laboratory Quiz30%		
Viva/Quiz		*30%*	
Total			**100%**