COURSE CODE:	**GIE-341**	
COURSE NAME:	**GEOSCIENCES**	
CREDIT HOURS:	Theory	= 03
	Practical	= 00
	Total	= 03
CONTACT HOURS:	Theory	= 48
	Practical	= 00
	Total	= 48
PREREQUISITE:	Nil	

MODE OF TEACHING:

Instruction:	Three hours of lecture per week	100%

COURSE DESCRIPTION:

Introduction to Geosciences familiarizes students to applying a full range of geological, scientific, and mathematical skills to understand the earth's properties and dynamic processes. The course assumes that the students understand earth, our solar system, physics and chemistry, and mathematics. The course explains conceptual aspects of the earth, plate tectonics, hydrogeology, and glaciers. The course tries to underscore the importance of earth's atmosphere, hydrologic cycle, and other earth processes, to understand and manage all aspects of Earth and the environment, to discuss in detail the theory of Plate Tectonics and mountain building, and to learn other internal and the external earth processes. This course explains the use of modern tools and techniques used in geological, glacial, and mineral mapping. An attempt is made to discuss in brief the economic potential of different rock units with special reference to Geology of Pakistan.

COURSE OBJECTIVES:

Main objectives of this course are to:

a) Enable the students to acquire a core of knowledge in geology and allied natural sciences.

b) Communicate the essential understanding of Earth, Earth processes and environments.

c) Enable students to use concepts of Geoinformatics in Geosciences

RELEVANT PROGRAM LEARNING OUTCOMES (PLOs):

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

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

COURSE LEARNING OUTCOMES:

Upon successful completion of this course, students will be able to:

No.	CLO	Domain	Taxonomy Level	PLO
1	Comprehend the fundamental concepts of geological time, fossils and common geological processes.	Cognitive	2	7
2	Apply geospatial techniques to identify and map geological/ geomorphological features.	Cognitive	3	4

PRACTICAL APPLICATION:

At the end of the course students will be able to understand different hydrogeological and environmental phenomena like water and rock cycles, glaciers and climate change. They will be able to integrate Geoinformatics and Geosciences. They will be familiar with state-of the art tools and techniques used for identification and mapping of minerals, rocks, glaciers etc.

TOPICS COVERED:

Theory:

Week	Topic
1	Introduction to Geosciences
2	Geologic Time, Evolution and Fossils
3-4	Water, Deserts and Winds
5-6	Erosions and landslide
7	Glaciers and Climate. RS application in glaciers and climate
8-9	Rocks and Minerals
10	Tools and techniques used for identification of rocks and minerals (field visit to GARL)
11-12	Introduction to Hyperspectral remote sensing, Geology perspective
13	Geology of Pakistan
14	Geological Survey
15	Geological Mapping using GIT's, Latest trends
16	Mountain Belts and Continental Crust
17-18	**ESE**

TEXT AND MATERIAL:

Textbook (s):

a. Physical Geology (14thEdition) by Charles C. Plummer, Diane Carlson, Lisa Hemmersley, 2012. ISBN-10:0073369381, ISBN-13:978-0073369389.

References Material:

a. Jensen, J. R. (2009). Remote sensing of the environment: An earth resource perspective 2/e. Pearson Education India.

b. Prost, G. L. (2002). Remote sensing for geologists: a guide to image interpretation. CRC Press.
c. Earth: An Introduction to Physical Geology, (11thEdition) by Edward J. Tarbuck, Frederick Lutgens, Dennis Tasa, 2013, ISBN-10: 00321814061, ISBN-13: 978-0321814067.
d. Essentials of Geology, (11thEdition) by Frederick K. Lutgens, Edward J. Tarbuck, Dennis Tasa, 2011, ISBN-10: 0321714725, ISBN-13: 978-0321714725.
e. Basic Geological Mapping.by Richard J. Lisle, Peter Brabham, John W. Barnes, 2011.
f. Laboratory Manual in Physical Geology, (9thEdition) by Richard M. Busch, 2011, ISBN-10: 0321689577 | ISBN-13: 978- 0321689573 Prentice Hall.
g. Geological Field Techniques by Angela L. Coe (editor), 2010, Wiley-Blackwell.

ASSESMENT SYSTEM:

1. **CLOs Assessment**

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

2. **Relative Grading**

Theoretical/Instruction			100%
	Assignments10%		
	Quizzes10%		
	Mid Semester Exam30%		
	End Semester Exam50%		
Total			**100%**