**Introduction to Earth Sciences**

**Course Code: GIS-120**

Credit Hours: 3 (2 + 1)

Prerequisite: NIL

**Objectives:**

* To introduce the concepts of Geosciences, the earth’s properties and its dynamic processes.

**Learning Outcomes:**

After studying this course, the students will be able to: -

1. Apprehend with the physical properties and the origin of the landforms of the Earth’s surface.

2. Familiarize with earth resources, managing the environment and natural hazards.

3. Understand the economic potential of different metallogenic zones of Pakistan.

**Course Outline:**

* Formation of the Earth and Solar System
* Structure and Composition of Earth;
* Geomorphology and Mountain Building Processes,
* Geological Hazards, Volcanoes, Earthquakes, Tsunamis, Floods, Landslides, Mass-movements,
* Geological Time Scale;
* Sequence stratigraphy
* Evolution of Life and the Atmosphere,
* Glaciation and glacial landforms
* Global Change in the Earth System,
* Clastic sedimentology,
* Mineralogy and geochemistry,
* Geological and geophysical surveys
* Exploration and Exploitation of Natural Resources,
* Aquifer types and groundwater systems
* Petroleum Basins of Pakistan.

**Lab/Field Outline:**

Identification of rocks and minerals in hand specimens, Identification of different rock units and geological structures in field, preparation of geological maps, and field visit to different geological sections and land for and hazard prone areas

**Teaching Methodology**

Lectures

* Field Survey
* Labs/Field
* Field Report

**Assessment**

* Mid Term (40%)
* Written (Long Questions, Short Questions, MCQs) 50%
* Field Report 20%
* Presentation 20%
* Labwork 10%
* Final Term (60%)
* Written (Long Questions, Short Questions, MCQs) 50%
* Field Report 20%
* Presentation 20%
* Labwork 10%

**Reference Material:**

1. Shah, S.M.I., and Khan, Imran, A., (2016). Lexicon of the Stratigraphy of Pakistan, Memoir Vol. 23, Geological Survey of Pakistan, 412 p.

2. Edward J. Tarbuck, Frederick Lutgens, Dennis Tasa. Earth: An Introduction to Physical Geology, Publication Date: February 18, 2007 ISBN-10: 0131566849 ISBN-13: 978-0131566842 Edition: 9

3. AGI - American Geological Institute, M. National Association of Geoscience Teachers, Richard M. Busch, Laboratory Manual in Physical Geology, Publication Date: February 7, 2011 | ISBN-10:0321689577 ISBN-13: 978-0321689573 Edition: 9

4. Frederick K. Lutgens, Edward J. Tarbuck, Dennis Tasa, Essentials of Geology (10th Edition), Publication Date: January 9, 2008 | ISBN10: 0136003761 ISBN-13: 978 0136003762 Edition: 10

5. Charles C. Plummer, Diane Carlson, McGeary David 2009, Physical Geology, (13th Edition), Cengage Publishers USA.

6. Richard J. Lisle, Peter Brabham, John W. Barnes (2011). Basic Geological Mapping. John Wiley

7. Tom W Argles, David A Rothery, Angela L. Coe (2011) Geological Field Techniques (4th Edition), Hodder and ...

8. McGeary, D., Plummer, C. C. & Carlson, D. H., (2004) Physical Geology: Earth revealed. McGraw-Hill, Boston.

9. Murphy, B and Nance D (1999). Earth Science Today. ITP, Brooks Cole Publishing, NYC. ISBN 0-534-52182-7.

10. Dutch, S. I; Monroe, J. S. and Moran, J. M. (1998). Earth Science, Wadsworth, ISBN: 0 314 20111 4.