Sankalchand Patel University

Faculty of Engineering and Technology

Bachelor of Technology Semester III (Civil Engineering)

In Effect from Academic Year 2017-18

Subject Code : 1ET1060305	**Subject Title: ENGINEERING GEOLOGY**
Pre-requisite Subject	**Geological cycle, Basic rock types, Properties of materials etc.**

Course Objective:

1. To study and identify different types natural materials like rocks & minerals and soil.
2. To understand the various natural dynamic processes their influence on the surfacial features, natural material and their consequences.
3. To know the physical properties of rocks & minerals.
4. To know the importance of geological maps and language helpful for Civil Engineering projects.

Teaching Scheme (Hours per week)				**Evaluation Scheme (Marks)**				
				Theory		**Practical**		**Total (T+P)**
Lecture	**Tutorial**	**Practical**	**Credit**	**University Assessment**	**Continuous Assessment**	**University Assessment**	**Continuous Assessment**	
2	0	2	3	70	30	30	20	150

Subject Contents			
Sr. No	**Topic**	**Total Hours**	**Weight (%)**
01	**Introduction:** Branches and Scope of Geology	02	04
02	**Physical geology:** Branches and scope of Geology; Surface processes and landforms: **Weathering** and **Erosion**; Introduction to **geological agents** (river, wind, oceans, glaciers, groundwater) and their actions (erosion, transport and deposition). **Interior of the Earth**: internal structure of earth, study of core, mental and crust of the Earth. Processes responsible for **volcanism** (Process of volcanic eruption, types of volcanoes and volcanic hazard) and **earthquake** (Causes of earthquake occurrence, Distribution (seismic zoning), Seismo-tectonic setup of India, seismic hazard: Tsunamis, Active fault rupture, liquefaction). **Plate Tectonics**: Introduction to the concept of plate tectonics, mechanism responsible for plate movement, types of plate boundaries, processes and features associated with plate boundaries. Continental drift and sea floor spreading.	06	24
03	**Mineralogy and Petrology:** **Physical properties of minerals**, major rock forming minerals, occurrence and use of minerals. Introduction to major **rock types** (Igneous, sedimentary and metamorphic rocks); their **genesis, classification** and **structures**; **engineering properties of rocks**, advantages and disadvantages of different rock types at constructions sites.	06	24
04	**Geological time-scale and laws of stratigraphy:** Introduction to geological time scale and stratigraphy, Laws of stratigraphy.	01	02
05	**Structural geology:** Introduction to **primary** and **secondary** geological structures. Study of geological **faults, folds, joints** and **active faulting**. Their origin, types and engineering consideration. **Geological mapping:** study of Strike and dip using models and numerical problems, preparation of geological cross section.	06	24
06	**Hydrogeology:** Groundwater and occurrence, investigations, quality, artificial recharge	01	02
07	**Geology in Civil Engineering:** **Geological investigations** during planning for tunnels, dams-reservoirs-runways-roads and buildings. **Landslide** and mass movement: Introduction, types, mitigation	06	20

	and prevention of landslide and mass movement. **Remote sensing and Geographical Information System (GIS)**: Introduction to remote sensing and GIS, use of remote sensing and GIS in geological investigations and geological hazard mitigation.		

Course Outcome:

On the successful completion of this course:

1. The students will get the basic knowledge about natural material like rocks and minerals and their usage as well as their availability.
2. The students will get acquainted with natural dynamic processes and their actions.
3. The students will understand the influence of natural processes and geological factors on civil structures and help them to take decision while planning, design and execution stage of the structures in their professional life.
4. The students will know the significance of geological investigations for civil engineering projects and site selection as well as for the preparation of feasibility reports and others.
5. The knowledge of subject will also help them to understand the geological maps and language for the discussion on geological reports to resolve civil engineering issues.

List of References:

A. Text Books & Reference Books:

1. Mukharjee, P.K., A text book of Geology, The World Press Pvt. Ltd.
2. Kesavulu, C., Textbook of Engineering Geology, Macmillan India Ltd, 1993, NewDelhi
3. Bangar, K.M, Principles of Engineering Geology, Standard Publishers Distributors, 1995, New Delhi
4. Billings, M.P., Structural Geology, Prentice-Hall India, 1974, New Delhi
5. Blyth, F.G.H and de Freitas, M.H. Geology for Engineers, ELBS, 1974London
6. Gokhale, KVG.K and Rao, D.M., Experiments in Engineering Geology, Tata-McGraw Hill, 1981, New Delhi
7. Kesavulu, C. Textbook of Engineering Geology, Macmillan, India Ltd., 1993,New Delhi
8. Lilesand, T.M. and Ralph W. Keifer., Remote sensing and ImageInterpretation, John Wiley & Sons, 1987, New York. 9. Reddy, V. Engineering Geology for Civil Engineers; Oxford & IBH, 1997,New Delhi
9. Todd, D.K. Groundwater Hydrology, John Wiley & Sons, 1980, New York 11. Parbin Singh, Engineering Geology

B. Web Materials:

1. http://nptel.iitm.ac.in/video.php?subjectId=105105106
2. http://nptel.iitm.ac.in/courses.php?branch=Civil,
3. http://nptel.iitm.ac.in/video.php?courseId=1055&p=1
4. http://nptel.iitm.ac.in/video.php?courseId=1055&p=3
5. http://nptel.iitm.ac.in/video.php?courseId=1055&p=4

LIST OF EXPERIMENTS:

Experiment No	Name of Experiment
1	Study of physical properties of major rock forming minerals
2	Study of rock specimen
3	Study of Strike and dip using models
4	Numerical problems related to dip, strike and outcrop
5	Preparation of geological cross section
6	Case study: Geologic problems encountered during civil engineering projects
7	Interpretation of satellite data and use of GIS software

Field Visit: Geologic field tour to study different types of geological structures and rocks.