

| Course Code | Course Name | L-T-P-Credits | Year of Introduction |
|-------------|---------------------|---------------|----------------------|
| CE205 | ENGINEERING GEOLOGY | 3-0-1-4 | 2016 |

Prerequisite: NIL

Course Objectives

Awareness about earth resources and processes to be considered in various facets of civil engineering

1. Appreciation of surface of earth as the fundamental foundation structure and the natural phenomena that influence its stability

Syllabus :

Relevance of geology in Civil Engineering. Subdivisions of Geology. Interior of the earth. Weathering, its engineering significance and laboratory tests used in civil engineering. Soil profile. Hydrogeology-occurrence of groundwater, Types of aquifers and their properties. Engineering significance of subsurface water in construction. Methods to control of subsurface water. Minerals- Properties that affect the strength of minerals. Physical properties and chemical composition of common rock forming minerals
Earth quakes- in relation to internal structure of earth and plate tectonics
Types of rocks. Brief account of selected rocks. Rock features that influence the strength of rocks as construction material. Rock types of Kerala. Engineering properties of rocks.
Attitude of geological structures- strike and dip. Deformation structures and their engineering significance. Geological factors considered in the construction of engineering structures.
Introduction to natural hazards and their management. Coastal Processes and protection strategies. Soil erosion and conservation measures.

Expected Outcomes:

1. The course would help the student to understand of the factors that determine the stability of earth's surface
2. The student would comprehend better the earth resources used as building materials

Text Books / References:

1. Duggal, SK,Rawal,N and Pandey, HK (2014) Engineering Geology, McGraw Hill Education, New Delhi
2. Garg, SK (2012) Introduction to Physical and Engineering Geology, Khanna Publishers, New Delhi
3. Gokhale, KVGK (2010) Principles of Engineering Geology, BS Publications, Hyderabad
4. Kanithi V (2012) Engineering Geology, Universities Press (India) Ltd., Hyderabad
5. Singh, P (2004) Engineering and General Geology, S. K. Kataria and Sons, New Delhi
6. Bennison, GM, Olver, PA and Moseley, KA (2013) An introduction to geological structures and maps, Routledge, London
7. Gokhale, NW (1987) Manual of geological maps, CBS Publishers, New Delhi

| COURSE PLAN | | | |
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| Module | Contents | Hours | End Sem.Exam Marks % |
| I | Relevance of geology in Civil Engineering. Subdivisions of Geology. Weathering, types and its engineering significance. Laboratory tests used in civil engineering for assessing intensity of weathering. Engineering classification of weathered rock masses. Soil profile. Geological classification of soils. | 8 | 15 |
| II | Hydrogeology-occurrence of groundwater, Types of aquifers, permeability / hydraulic conductivity. Engineering significance of subsurface water-problems created in construction, as an erosional agent. Methods to control of subsurface water-barriers and liners, drains and wells.(Resistivity survey of groundwater may be demonstrated) | 11 | 15 |
| FIRST INTERNAL EXAMINATION | | | |
| III | Minerals- Properties that affect the strength of minerals. Physical properties and chemical composition of following minerals -quartz, feldspars (orthoclase and plagioclase), micas (biotite and muscovite), amphibole (hornblende), pyroxene (augite and hypersthene), gypsum, calcite, clay minerals (kaolinite), their chemical formulae. Earth quakes- in relation to internal structure of earth and plate tectonics | 8 | 15 |
| IV | Rocks as aggregates of minerals. Basic concepts-igneous, sedimentary and metamorphic rocks, Brief account of following rocks- granite, basalt, sandstone, limestone, shale, marble and quartzite. Rock features that influence the strength of rocks as construction material-concepts of lineation and foliation-schistosity and gneissosity. Rock types of Kerala. Brief account of engineering properties of rocks used as construction material (building and foundation) and road aggregates. Assessment of these properties.(Students should be taught to identify common rock forming minerals and common rocks based on their physical properties). | 10 | 15 |
| SECOND INTERNAL EXAMINATION | | | |
| V | Attitude of geological structures- strike and dip. Brunton compass. Deformation structures and | 11 | 20 |

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| | their engineering significance- folds, faults and joints. Geological factors considered in the construction of dams and reservoirs, tunnels. (Simple exercises based on geological/topographic maps for determination of dip, apparent dip and thickness of lithological beds and preparation of geological cross sections should be performed. The students should be instructed in handling clinometer/Brunton compass to determine strike and dip) | | |
| VI | Introduction to natural hazards-Mass movements (Landslides), floods, their common management strategies. Coastal Processes- waves, currents and landforms. Types of coastal protection strategies. Soil erosion- causes and types and soil conservation measures. | 8 | 20 |
| END SEMESTER EXAMINATION | | | |

QUESTION PAPER PATTERN (End semester exam)

Maximum Marks :100

Exam Duration: 3 Hrs

The question paper shall have three parts.

Part A -Module I & II : Answer 2 questions out of 3 questions (15 marks each)

Part B - Module III & IV: Answer 2 questions out of 3 questions (15 marks each)

Part C - Module V & VI : Answer 2 questions out of 3 questions (20 marks each)

Note : 1.Each part should uniformly cover the two modules in that part.

2. Each question can have a maximum of 4 subdivisions (a,b,c,d), if needed.