

Course Number and Name												
<b>BCE305 - ENGINEERING EARTH SCIENCE</b>												
Credits and Contact Hours												
<b>3 &amp; 45</b>												
Course Coordinator's Name												
Dr.S.Buvaneshwari												
Text Books and References												
<b>TEXT BOOKS:</b>												
1. Parbin Singh, "Engineering and General Geology ", Katson Publication House.												
2. P. C. Varghese, "Engineering Geology for Civil Engineers". PHI Learning Pvt. Ltd.,												
<b>REFERENCES:</b>												
1. Legeet, " Geology and Engineering ", McGraw Hill Book Company, 1998.												
2. Blyth, " Geology for Engineers ", ELBS, 1995.												
Course Description												
<ul style="list-style-type: none"> <li>To understand the importance of geological knowledge such as earth, earthquake and to apply this knowledge in projects such as dams, tunnels, bridges, roads, airport and harbor as well as to choose types of foundations.</li> <li>An ability to function on multi-disciplinary teams.</li> <li>Graduates will be capable of utilizing their backgrounds in engineering and earth science to provide solutions to engineering problems within the context of the natural world.</li> <li>Areas of geological engineering practice might include fluid flow and contaminant transport in the subsurface; geo-mechanics (i.e., the behavior of earth materials), geo-engineering (i.e., design with earth materials); and discovery, development, and utilization of energy resources.</li> </ul>												
Prerequisites						Co-requisites						
+2 level science						NIL						
required, elective, or selected elective (as per Table 5-1)												
Course Outcomes (COs)												
CO1	To understand the role of geology in the design and construction process of underground openings in rock											
CO2	Be able to apply geologic concepts and approaches on rock engineering projects.											
CO3	Be able to identify and classify rock using basic geologic classification systems.											
CO4	Be able to use the geologic literature to establish the geotechnical framework needed to properly design and construct heavy civil works rock projects.											
CO5	To assign projects which test student knowledge and application of intact rock and rock mass properties in geotechnical engineering											
Student Outcomes (SOs) from Criterion 3 covered by this Course												
	COs/SOs	a	b	c	d	e	f	g	h	i	j	k
	CO1	H			H		H	H		M		

CO2	H			H		H	H		M		
CO3	H			H		H	H		M		
CO4	H			H		H	H		M		
CO5	H			H		H	H		M		

**List of Topics Covered**

**UNIT I GENERAL GEOLOGY 9**

Geology in Civil Engineering - Branches of geology - Earth Structure and Composition - Elementary knowledge on continental drift and plate tectonics. Earth processes - Weathering - Work of rivers, wind and sea and their engineering importance – origin, occurrence of earthquake- Mode of occurrence - prospecting –Ground water - Importance in civil engineering.

**UNIT II MINERALOGY 9**

Elementary knowledge on symmetry elements of crystallographic systems - physical properties of minerals - study of the following rock forming minerals - Quartz family. Feldspar family, Augite, Hornblende, Biotite, Muscovite, Calcite, Garnet - properties, process of formation of all minerals - Coal and Petroleum - Their origin and occurrence in India.

**UNIT III PETROLOGY 9**

Classification of rocks - Distinction between Igneous, Sedimentary and Metamorphic rocks. Description – occurrence, properties and distribution of following rocks. Igneous rocks - Granite, Syenite, Diorite, Gabbro, Pegmatite, Dolerite and Basalt. Sedimentary rocks - sandstone, Limestone, Shale, Conglomerate and breccia. Metamorphic rocks - Quartzite, Marble, Slate, Gniess and Schist.

**UNIT IV STRUCTURAL GEOLOGY AND ROCK MECHANICS 9**

Attitude of beds - Outcrops - Geological maps - study of structures - Folds, Faults and Joints - Their bearing on Engineering Construction -Rock mechanics - physical properties and mechanical properties of rocks – porosity – permeability - density – strength – hardness – elasticity – plasticity - dynamic property of rocks - types of wave theory – factors influencing wave velocity - static and dynamics moduli of elasticity – grouting.

**UNIT V GEOLOGICAL AND GEOPHYSICAL INVESTIGATION IN CIVIL ENGINEERING**

**9**

Site investigations - Geological methods - Exploration techniques - geophysical methods – Seismic and electrical methods – direct penetration – core boring – logging of cores – geological condition necessary for construction of dams – tunnels – building – Road cutting.