

**KL UNIVERISTY
FIRST SEMESTER 2010-11
Course Handout
Academic Division**

Dated: 07-07-2010

Course No. : CE C205
Course Title : Engineering Geology
Course Structure : 3-1-0
Course coordinator : Dr K Rajasekhara Reddy
Instructors : Dr K Rajasekhara Reddy

1. Course Description:

Engineering Geology deals with origin of earth, composition of earth, process of weathering and erosion, physical properties of minerals, origin of minerals, origin of igneous, sedimentary and metamorphic rocks, structures and textures exist in rocks.

It covers Engineering properties of rocks, various structures exist in rocks, causes and effects of earth quakes, earthquake sensitive zones and civil engineering considerations, various geophysical investigations for study of subsurface, occurrence and distribution of ground water.

It also deals with selection of suitable sites for construction of dams and tunnels and geological considerations.

2. Scope and Objective of the Course:

Application of geological knowledge in planning, designing and construction of big civil engineering projects is very essential to a civil engineer.

The basic objectives of Engineering Geology course are

It enables a Civil Engineer to understand engineering implications of certain conditions related to the area of construction, which are essentially geologic in nature

It enables a Civil Engineer to understand the nature of geological information which that is absolutely essential for a safe design and construction of civil engineering project.

3. Books:

(i) Textbook:

1. Engineering and General Geology by Parbin Singh; S. K. Kataria & Sons, New Delhi.
2. Principles of Engineering Geology by KVGK Gokhale, B.S. Publications, Hyderabad.

(ii) Reference Book:

1. Principles of Engineering Geology by K.M. Bangar, Standard Publications, Distributors, 1705-B, Nai sarak, New Delhi.
2. A text Book of Engineering Geology by N. Chennakesavulu; Macmillan India Ltd., Delhi.
3. Rock Mechanics for Engineers by Dr. B.P.Varma, Khana Publishers, Delhi-6.

4. Syllabus:

UNIT – 1

1. INTRODUCTION:

Branches of geology, Importance of geology from Civil engineering point of view, Internal structure of the earth

2. PHYSICAL GEOLOGY:

Introduction; Weathering Process of rocks and its importance in civil engineering; Soil formation, Soil profile; Geological action of Rivers and wind

UNIT – 2

3. MINERALOGY:

Definition of mineral; Significance of different physical properties of minerals. Study of Common rock forming minerals and their identification; Clay minerals, Study of common economic minerals – Hematite, Magnetite, Galena. Graphite, Bauxite, Coal.

4. PETROLOGY:

IGNEOUS ROCKS:

Introduction; Rock Cycle

Formation and Classification of Igneous rocks; Structures and textures of Igneous rocks.

SEDIMENTARY ROCKS:

Formation and Classification of Sedimentary rocks; Structures and textures of Sedimentary Rocks.

METAMORPHIC ROCKS:

Classification of Metamorphic rocks; Structures and textures of Metamorphic rocks.

ENGINEERING PROPERTIES OF ROCKS:

Different Engineering property of rocks. Study of common Rocks – Granite - Basalt – Dolerite – Pegmatite – Sand Stone – Lime Stone – Shale – Laterite - Granite gneiss – schist – Marble - quartzite – khondalite – Charnockite.

UNIT – 3

5. STRUCTURAL GEOLOGY:

Introduction; Strike and Dip; Outcrop.

Types of Folds; Faults; Joints; Unconformities and their importance in Civil Engineering constructions.

6. EARTHQUAKES:

Terminology; Classification, Causes and effects of earthquakes; Seismic belts; Civil Engineering considerations in seismic areas.

7. LAND SLIDES:

Classification; Causes and effects of Landslides; Preventive measures of Landslides.

UNIT – 4

8. GEOPHYSICAL INVESTIGATIONS:

Introduction; Methods of site investigations; Classification of Geophysical methods – Electrical method, Seismic method and their importance in Civil Engineering; Sight for location of a well point, Remote sensing.

9. HYDRO GEOLOGY:

Hydrological Cycle, occurrence and moment of ground water; Springs, occurrence of water in various lithological formations.

UNIT – 5

10. DAMS:

Dams terminology; Types of dams; Geological considerations for selection of Dam sites; Geology of some Indian Dam sites.

11. TUNNELS:

Purpose of tunneling; Geological considerations for tunneling; Over break; Geology of some tunnel sites;

5.Course Plan:

Lecture No	Learning objectives	Topics to be covered	Chapter in the text book
1	To understand the importance of studying Engineering Geology	Introduction to Engineering Geology	1.4 of T1
2	To understand the importance of studying Engineering Geology and different branches of Geology	Branches of geology, Importance of geology from Civil engineering point of view	1.3 of T1
3	To understand the internal structure and composition of earth	Internal structure of the earth	2.5 of T1
4	To understand the process of weathering and its importance in Civil Engineering	Weathering Process of rocks and its importance in civil engineering;	3.3 of T1
5	To understand the process of soil forming and its importance in Civil Engineering	Soil formation, Soil profile	21 of T1
6	To understand the geological action of rivers	Geological action of Rivers	3.2of T1
7	To understand the geological action of winds	Geological action of winds	4.0 of T1
8	To understand various physical properties of minerals helpful in identification of minerals	Definition of mineral; Significance of different physical properties of minerals	9.2 and 9.3 of T1
9	To understand various physical properties of minerals helpful in identification of minerals	Significance of different physical properties of minerals	9.2 and 9.3 of T1
10	Study of properties of minerals and Identification of minerals	Study of Common rock forming minerals and their identification;	11 of T1
11	Study of properties of minerals and Identification of minerals	Study of Common rock forming minerals and their identification	11 of T1
12	Study of economic minerals	Clay minerals, Study of common economic minerals – Hematite, Magnetite, Galena. Graphhite, Bauxite,	15.7 of T1

		Coal	
13	To understand the process of formation of igneous rocks	<u>IGNEOUS ROCKS:</u> Introduction; Rock Cycle Formation	12.0 of T1
14	To understand the classification of igneous rocks	Classification of igneous rocks	12.0 of T1
15	To understand the structures and textures exist in igneous rocks	Structures and textures of Igneous rocks	12.0 of T1
16	To understand the structures and textures exist in igneous rocks	Structures and textures of Igneous rocks	12.0 of T1
17	To understand the process of formation of sedimentary rocks and their classification	<u>SEDIMENTARY ROCKS:</u> Formation and Classification of Sedimentary ro	13.0 of T1
18	To understand the structures and textures exist in sedimentary rocks	Structures and textures of Sedimentary Rocks	13.0 of T1
19	To understand the classification metamorphic rocks	<u>METAMORPHIC ROCKS:</u> Classification of Metamorphic rocks	14.0 of T1
20	To understand the structures and textures exist in metamorphic rocks	Structures and textures of Metamorphic rocks	14.0 of T1
21	To know the engineering properties of rocks	<u>ENGINEERING PROPERTIES OF ROCKS:</u> Different Engineering property of rocks	17.0 of T1
22	To understand engineering properties of rocks	. Study of common Rocks – Granite - Basalt – Dolerite – Pegmatite – Sand Stone – Lime Stone – Shale – Laterite - Granite gneiss – schist – Marble - quartzite – khondalite – Charnockite.	17.0 of T1
23	To understand strike and dip and their importance To know different types of folds, faults, joints and unconformities in rocks and their importance in civil engineering	<u>STRUCTURAL GEOLOGY:</u> Introduction; Strike and Dip; Outcrop. Types of Folds; Faults; Joints; Unconformities and their importance in Civil Engineering constructions.	6.0 and 7.0 of T1
24	To know different types of folds, faults, joints and unconformities in rocks and their importance in civil engineering	Types of Folds and their importance in Civil	6.0 and 7.0 of T1
25	To know different types of folds, faults, joints and	Types of Faults and their importance in Civil	6.0 and 7.0 of T1

	unconformities in rocks and their importance in civil engineering		
26	To know different types of folds, faults, joints and unconformities in rocks and their importance in civil engineering	Types of Joints; Unconformities and their importance in Civil	6.0 and 7.0 of T1
27	To understand causes and effects of earth quake , seismic zones and its application in civil engineering	EARTHQUAKES: Terminology; Classification, Causes and effects of earthquakes; Seismic belts; Civil Engineering considerations in seismic areas.	19.9 of T1
28	To understand causes and effects of earth quake , seismic zones and its application in civil engineering	EARTHQUAKES: Terminology; Classification, Causes and effects of earthquakes; Seismic belts; Civil Engineering considerations in seismic areas.	19.9 of T1
29	To understand the causes , effects of land slides and measures to be taken to prevent the same	LAND SLIDES: Preventive measures of Landslides	20 of T1
30	To understand various geophysical methods adopted for subsoil investigations and their importance in civil engineering	GEOPHYSICAL INVESTIGATIONS: Introduction; Methods of site investigations; Classification of Geophysical methods – Electrical method, Seismic method and their importance in Civil Engineering; Sight for location of a well point, Remote sensing.	22 of T1
31	To understand the electrical resistivity method adopted for sub soil investigations	Electrical resistivity method and its importance in Civil Engineering	22 of T1
32	To understand the seismic method adopted for sub soil investigations	Seismic method and its importance in Civil Engineering	22 of T1
33	To have basic idea of remote sensing and its importance in civil engineering	Remote sensing	22 of T1
34	To understand occurrence and distribution of ground water	HYDRO GEOLOGY: Occurrence and moment of ground water;	18 of T1

35	To understand occurrence of water in different rock types	Springs, occurrence of water in various lithological formations	18 of T1
36	To understand occurrence of water in different rock types	Springs, occurrence of water in various lithological formations	18 of T1
37	To know the terminology used in dams and types of dams	DAMS: Dams terminology; Types of dams	23 of T1
38	To understand the geological considerations for selection of dam site	Geological considerations for selection of Dam sites; Geology of some Indian Dam sites.	23 of T1
39	To understand the geological considerations for selection of dam site	Geological considerations for selection of Dam sites; Geology of some Indian Dam sites.	23 of T1
40	To understand the geological considerations for selection of dam site	Geological considerations for selection of Dam sites; Geology of some Indian Dam sites.	23 of T1
41	To understand the geological considerations for selection of site for tunnel and study of some tunnel sites	TUNNELS: Purpose of tunneling; Geological considerations for tunneling; Over break; Geology of some tunnel sites;	24 of T1
42	To understand the geological considerations for selection of site for tunnel and study of some tunnel sites	TUNNELS: Purpose of tunneling; Geological considerations for tunneling; Over break; Geology of some tunnel sites;	24 of T1
43	To understand geology of some tunnel sites	Geology of some tunnel sites	24 of T1
44	To know the the type of questions expected	Review of old question papers	
45	To know the the type of questions expected	Review of old question papers	

6.Self learning material:

Unit No	Topics	Source
I	Branches of Geology	Engineering and General Geology by Parbin Singh
II	METAMORPHIC ROCKS: Classification of Metamorphic rocks	Engineering and General Geology by Parbin Singh

III	LAND SLIDES: Classification; Causes and effects of Landslides;	Engineering and General Geology by Parbin Singh
IV	Hydrological Cycle	Engineering and General Geology by Parbin Singh
V	Geology of some Indian dam sites	Principles of Engineering Geology by KVGK Gokhale,

7.Evaluation Scheme:

Component	Duration (minutes)	% Weightage	Marks	Date & Time	Venue
Test-1	50 Min	10	10	12.08.10 09.30 to 10.20 AM	CSE005,101 ,104,105, 106,201,202 ,204,205,20 9,301,309, 502,509
Test-2	50 Min	10	10	16.09.10 09.30 to 10.20 AM	CSE005,101 ,104,105, 106,201,202 ,204,205, 209,301,309 ,502,509
Assignment submission		5	5	Continuous	
Assignment Test	50 Min	5	5	28.10.10 09.00 to 10.20 AM	CSE005,101 ,104,105, 106,201,202 ,204,205, 209,301,309 ,502,509
Quiz	30 Min	5	5	28.10.10 09.00 to 10.20 AM	CSE005,101 ,104,105, 106,201,202 ,204,205, 209,301,309 ,502,509
Regular Lab Evaluation	Continuou s	0	0		
Comprehensive Lab Exam	3 Hrs	0	0		
Comprehensive Exam	3 Hrs	60	60		
Attendance for Theory & Tutorial		5	5	Continuous	
Attendance for Lab		0	0	Continuous	

8. Chamber consultation hour: Informed in the class in first week.

9. Notices: All notices regarding the course will be put in E-learning website.

10.Tutorial: Tutorial will be conducted by the respective in charge faculty. The tutorials are planned to supplement the material taught in the lectures and clear doubts. Student must attend registered section for tutorial in the respective classroom. Class assignment, class tests and other evaluation components will also be conducted during tutorials. Students must actively participate in the tutorial and come prepared for it.

Course Coordinator