## MOHAMED SATHAK A J COLLEGE OF ENGINEERING

Siruseri IT park, OMR, Chennai - 603103

LESSON PLAN								
Department of Civil Engineering								
Name of the Subject	ENGINEERING GEOLOGY	Name of the handling Faculty	Mrs.S.Hemavathi					
Subject Code	CE8392	Year / Sem	П / ПІ					
Acad Year	2021-2022	Batch	2020-2024					
Course Objective								

## Course Objective

- 1. The students will be able to understand the importance of geological knowledge such as earth, earthquake, volcanism.
- 2 The students will be able to understand the mineral characteristics of rocks.
- 3. Students will understand about the classification of rocks.
- 4. Students will be able to understand the subsurface characteristics and investigation of rocks
- 5. Students will be able to understand the application part of geophysical investigation.

## **Course Outcome**

- 1. Explain the importance of geological knowledge such as earth, earthquake, volcanism and the action of various geological agencies.
- 2.Describe basics knowledge on properties of minerals.
- 3. Explain about types of rocks, their distribution and uses
- 4. Describe the methods of study on geological structure
- 5. Explain the importance of this knowledge in projects such as dams, tunnels, bridges, roads, airport and harbor

## Lesson Plan

		T / R*		Mode of Teaching			
Sl. No.	Topic(s)	Book	Periods Required	(BB / PPT / NPTEL / MOOC / etc )	Blooms Level (L1- L6)	СО	PO
UNIT I	PHYSICAL GEOLOGY		-			•	
1	Geology in civil engineering, branches of geology	Т5	1	NPTEL	L1	CO1	PO1
2	structure of earth and its composition	Т5	1	ВВ, РРТ	L2	CO1	PO2
3	weathering of rocks, scale of weathering	Т5	1	ВВ,РРТ	L2	CO1	PO2
4	soils	Т5	1	ВВ	L1	CO1	PO1
5	Soils, Landforms and processes associated with river, wind, groundwater and sea ,Relevance to civil engineering.	T5	2	BB	L2	CO1	PO1
6	Plate tectonics	Т5	1	ВВ,РРТ	L1	CO1	PO2
7	Earth quakes	Т5	1	вв,ррт	L2	CO1	PO2
8	Seismic zones in India	Т5	1	ВВ	L1	CO1	PO1

Suggested Activity: Quiz										
Suggesteu Acuvity: Quiz										
Evaluation method: 10 Questions, each carries 1 mark										
UNIT II MINEROLOGY										
9	Physical properties of minerals	Т5	1	NPTEL	L1	CO2	PO1			
10	Quartz group, Feldspar group, Pyroxene	Т5	1	вв,ррт	L1	CO2	PO1			
11	Hypersthene and augite	Т5	1	ВВ,РРТ	L2	CO2	PO2			
12	Amphibole	Т5	1	вв,ррт	L2	CO2	PO1			
13	Hornblende, Mica	Т5	2	ВВ,РРТ	L2	CO2	PO2			
14	Muscovite and biotite	Т5	1	вв,ррт	L2	CO2	PO2			
15	Calcite, Gypsum	Т5	1	вв,ррт	L2	CO2	PO1			
16	Clay minerals.	Т5	1	вв,ррт	L1	CO2	PO1			
Suggested	d Activity: Assignment									
Evaluatio	on method: Permeability of a Soil									
	·									
UNIT II	II PETROLOGY				T					
17	Classification of rocks	T5	1	NPTEL	L2	CO1	PO1			
18	Distinction between Igneous, Sedimentary and Metamorphic rocks.	T5	1	NPTEL	L2	CO3	PO1			
19	Engineering properties of rocks	Т5	1	NPTEL	L2	CO3	PO1			
20	Description, occurrence, engineering properties, distribution and uses of Granite, Dolerite	Т5	1	NPTEL	L1	CO3	PO2			
21	Description, occurrence, engineering properties, distribution and uses of Basalt, Sandstone	Т5	1	NPTEL	L1	CO3	PO2			
22	Description, occurrence, engineering properties, distribution and uses of Limestone, Laterite	Т5	2	NPTEL	L1	CO3	PO2			
23	Description, occurrence, engineering properties, distribution and uses of Shale, Quartzite, Marble	Т5	1	NPTEL	L1	CO3	PO2			

24	Description, occurrence, engineering properties, distribution and uses of Slate,	Т5	1	NPTEL	L1	CO3	PO2
Suggestee	d Activity: Assignment						
Evaluatio	on method : Literatures in settlement						
varuatio	n method . Eneratures in settlement						
U <b>NIT I</b>	V STRUCTURAL GEOLOGY AND GEOPE	HYSICAL ME	THODS				
25	Geological maps	Т5	1	ВВ,РРТ	L1	PO4	PO1
26	Attitude of beds, study of structures	Т5	1	вв,ррт	L1	PO4	PO1
27	Folds, faults and joints relevance to civil engineering.	Т5	1	вв,ррт	L2	PO4	PO2
28	Geophysical methods	Т5	2	вв,ррт	L1	PO4	PO1
29	Seismic method for subsurface investigations.  Electrical method for subsurface	T5	2	вв,ррт	L2	PO4	PO2
30	investigations.	T5	1	вв,ррт	L2	PO4	PO2
Evaluatio	on method: 10 Questions, each carries 1 mark						
	on method: 10 Questions, each carries 1 mark  APPLICATION OF GEOLOGICAL INVE	STIGATIONS	S				
		STIGATIONS T5	S 2	ВВ	L1	CO5	PO5
JNIT V	APPLICATION OF GEOLOGICAL INVE			BB BB	L1 L1	CO5	PO5
J <b>NIT V</b>	APPLICATION OF GEOLOGICAL INVE  Remote sensing for civil engineering applications  Geological conditions necessary for design and	Т5	2				
JNIT V 31 32	Remote sensing for civil engineering applications  Geological conditions necessary for design and construction of Dams, Reservoir.  Geological conditions necessary for design and	T5	2	ВВ	L1	CO5	PO5
31 32 33	APPLICATION OF GEOLOGICAL INVE  Remote sensing for civil engineering applications  Geological conditions necessary for design and construction of Dams, Reservoir.  Geological conditions necessary for design and construction of Tunnels, and Road cuttings  Hydrogeological investigations and mining  Coastal protection structures. Investigation of	T5 T5	2 2 1	BB BB	L1	CO5	PO5
31 32 33 34 35	APPLICATION OF GEOLOGICAL INVE  Remote sensing for civil engineering applications  Geological conditions necessary for design and construction of Dams, Reservoir.  Geological conditions necessary for design and construction of Tunnels, and Road cuttings  Hydrogeological investigations and mining	T5 T5 T5	2 2 1 2	BB BB	L1 L1 L2	CO5 CO5	PO5 PO5
31 32 33 34 35	APPLICATION OF GEOLOGICAL INVE  Remote sensing for civil engineering applications  Geological conditions necessary for design and construction of Dams, Reservoir.  Geological conditions necessary for design and construction of Tunnels, and Road cuttings  Hydrogeological investigations and mining  Coastal protection structures. Investigation of Landslides, causes and mitigation.	T5 T5 T5	2 2 1 2	BB BB	L1 L1 L2	CO5 CO5	PO5 PO5 PO2
31 32 33 34 35 Suggestee	APPLICATION OF GEOLOGICAL INVE  Remote sensing for civil engineering applications  Geological conditions necessary for design and construction of Dams, Reservoir.  Geological conditions necessary for design and construction of Tunnels, and Road cuttings  Hydrogeological investigations and mining  Coastal protection structures. Investigation of Landslides, causes and mitigation.	T5 T5 T5	2 2 1 2	BB BB	L1 L1 L2	CO5 CO5	PO5 PO5
31 32 33 34 35 Suggested	Remote sensing for civil engineering applications  Geological conditions necessary for design and construction of Dams, Reservoir.  Geological conditions necessary for design and construction of Tunnels, and Road cuttings  Hydrogeological investigations and mining  Coastal protection structures. Investigation of Landslides, causes and mitigation.  d Activity: Case Studies	T5 T5 T5	2 2 1 2	BB BB	L1 L1 L2	CO5 CO5	PO5 PO5 PO2
31 32 33 34 35 Suggested	Remote sensing for civil engineering applications  Geological conditions necessary for design and construction of Dams, Reservoir.  Geological conditions necessary for design and construction of Tunnels, and Road cuttings  Hydrogeological investigations and mining  Coastal protection structures. Investigation of Landslides, causes and mitigation.  d Activity: Case Studies	T5 T5 T5 T5	2 2 1 2	BB  BB  BB	L1 L1 L2	CO5 CO5	PO5 PO5
31 32 33 34 35 Suggestee	Remote sensing for civil engineering applications  Geological conditions necessary for design and construction of Dams, Reservoir.  Geological conditions necessary for design and construction of Tunnels, and Road cuttings  Hydrogeological investigations and mining  Coastal protection structures. Investigation of Landslides, causes and mitigation.  d Activity: Case Studies	T5 T5 T5 T5 T5 T5	2 2 1 2 2	BB  BB  BB	L1 L1 L2	CO5 CO5	PO5 PO5
31 32 33 34 35 Suggestee	Remote sensing for civil engineering applications  Geological conditions necessary for design and construction of Dams, Reservoir.  Geological conditions necessary for design and construction of Tunnels, and Road cuttings  Hydrogeological investigations and mining  Coastal protection structures. Investigation of Landslides, causes and mitigation.  d Activity: Case Studies	T5 T5 T5 T5 T5 Tools used Tools used in Text Boo	2 2 1 2 2 to design Data Remote sensols	BB BB BB	L1  L2  L2	CO5 CO5	PO5 PO5

2	Venkat Reddy. D. Engineering Geology, Vikas Publishing House Pvt. Lt, 2010.													
3	Gokhale KVGK, "Principles of Engineering Geology", B.S. Publications, Hyderabad 2011.  Chenna Kesavulu N. "Textbook of Engineering Geology", Macmillan India Ltd., 2009.													
4														
5	Parbin Singh. A "Text book of Engineering and General Geology", Katson publishing house, Ludhiana 2009.													
	Reference Books													
1	Muthiayya, V.D. " A Text of Geology", Oxford IBH Publications, Calcutta, 1969													
2	Blyth F.G.H. and de Freitas M.H., Geology for Engineers, Edward Arnold, London, 2010													
3	Bell .F.G "Fundamentals of Engineering Geology", B.S. Publications. Hyderabad 2011.													
4	Punmia, B.C. "Soil Mechanics and Foundations", Laxmi Publications Pvt. Ltd., New Delhi, 2005  Dobrin, M.B "An introduction to geophysical prospecting", McGraw Hill, New Delhi, 1988													
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						Bl	ooms Lev	el						
I	Level 1 ( l	L1): Ren	nemberin	g	Lower	Fixed		Le	evel 4 (L4	) : Analys	ing		Higher	Projects
I	Level 2 (L	2) : Unde	erstanding	g	Order	Hour		Le	vel 5 (L5)	: Evalua	ting		Order	er Mini
	Level 3	3 (L3) : A	pplying		Thinking	Exams		Le	evel 6 (L6	) : Creati	ng	1	Thinking	Projects
		Maj	pping sy	llabus w	rith Bloor	n's Taxo	nomy L(	T and I	ТОТ					
Uni	t No		Unit	Name		L1	L2	L3	L4	L5	L6	LOT	НОТ	Total
Un	it 1		PHYSICAI	L GEOLOG	Y	4	4					8	0	8
Un	it 2		MINEF	ROLOGY		3	5					8	0	8
Un	it 3		PETR	OLOGY		5	3					8	0	8
Un	it 4		UCTURAL COPHYSIC			3	3					6	0	6
Un	it 5	APPL	ICATION INVESTI	OF GEOLO		3	2					5	0	5
		To	otal			18	17	0				35	0	35
		Total Pe	ercentag	e		51.4286	48.5714	0				100	0	100
						CO	PO Mappi	ng						
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3											2	
CO2	3	2											2	
CO3	3	3											2	
CO4	2	3											2	
CO5	3	3			3								2	
Avg	2.8	2.8			3								2	
Justification for CO-PO mapping														

PO1: Engineering knowledge in Geology in civil engineering, branches of geology, Soils, Landforms and processes associated with river, wind, groundwater and sea ,Relevance to civil engineering, Seismic zones in India, PO2: Problem analysis in structure of earth and its composition, weathering of rocks, scale of weathering, Plate tectonics, Earth quakes. PSO1: Sustainable solution for Physical Geology

CO1

CO2	PO1 :Engineering knowledge in Physical properties of minerals, Quartz group, Feldspar group, Pyroxene, Amphibole, Calcite, Gypsum, Clay minerals. PO2 : Problem analysis in Hypersthene and augite, Hornblende, Mica, Muscovite and biotite, PSO1: Sustainable solution for Minerology									
СО3	PO1 : Engineering knowledge in Classification of rocks, Distinction between Igneous, Sedimentary and Metamorphic rocks, Engineering properties of rocksPO2 : Problem analysis in Description, occurrence, engineering properties, distribution and uses of Granite, Dolerite, Basalt, Sandstone, Limestone, Laterite, Shale, Quartzite, Marble, Slate, Gneiss and Schist. PSO1: Sustainable solution for Petrology									
CO4	PO1: Engineering knowledge in Geological mapss, Attitude of beds, study of structures, Geophysical methods PO2: Problem analysis in Folds, faults and joints relevance to civil engineering, Seismic method for subsurface investigations, Electrical method for subsurface investigations. PSO1: Sustainable solution forStructural geology and geophysical methods.									
CO5	PO1: Engineering knowledge in Coastal protection structures. Investigation of Landslides, causes and mitigation. PO2: Problem analysis in Hydrogeologicalinvestigations and miningPO5: Modern tool usage in Remote sensing for civil engineering applications, Geological conditions necessary for design and construction of Dams, Reservoir, Geological conditions necessary for design and construction of Tunnels, and Road cuttings, PSO1: Sustainable solution for Application of Geological investigations									
	3 High level 2 Moderate level 1 Low level									
Name &	Name & Sign of Faculty Incharge:									
Name &	Sign of Subject Expert :									
Head of	the Department :									

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