Course Type	Course Code	Name of Course	L	T	P	Credit
DC	NGLC509	**Engineering Geology**	3	0	0	3

Course Objective
The student will gained knowledge for developments of engineering geological projects and geotechnical mitigation measures of natural hazards.
Learning Outcomes
Upon completion of the course, students will be able to: • Classify various geological strata for their engineering use. • Apply various techniques for development of various types engineering structures. • Determine expected loads and design and evaluate the capacity of support systems

Unit No.	Topics to be Covered	Lecture Hours	Learning Outcome
1	**Advances in Engineering geology:** Introduction, definition, development of subject, and significance and geotechnical ground	3	Concept, development history and types of geological strata
2	**Geological strata:** rocks, rock material, rock mass, and geomechanical classification of rock mass	3	Categorization of rock strata
3	Construction materials: definition, types of stones, parameters, testing, cement-aggregates reactions.	3	Construction materials and their specification
4	**Dams:** definition, elements, and classification.	2	Elements and types of dams.
5	**Geotechnical investigation for dam and reservoir sites:** geotechnical parameters, dam foundation, preparation and treatments.	3	Geotechnical condition, preparation and treatments of dam foundation structures
6	**Geotechnical stability of dams:** Forces acting on dam, parameters, causes of failure.	3	Various forces acting on dam and its stability condition.
7	**Methods of anchoring of strata:** grouting, grout, and classification of grouting	3	About grouting and related aspects.
8	**Tunnels:** definition: elements, parameters, and classification, geotechnical investigation.	2	Elements and types of tunnel, and geotechnical investigation.
9	**Methods of tunnelling:** Old methods, and modern methods.	2	Different methods of tunnel development.
10	**Ground reaction and support system:** types of ground, rock load, parameters and support system and strengthening of strata	4	Concept of rock loads and details of support system.
11	**Roads and Highways :** introduction, classification of roads, types of pavements, geotechnical investigation and methods of construction	3	Parts and types of roads and investigation for roads
12	**Bridges and buildings:** elements of bridge, types of bridge, and types of building foundation and geotechnical investigation	3	Components and types of bridge and building foundation and necessary geotechnical investigations.
13	**Mass movements and slope stability:** landslide, mines bench and dump.	3	Various types of slope stability problems
14	**Earthquakes and seismicity:** elements of earthquake, measurements, classification, seismic zones of India, impacts, and design, Induced seismicity and reservoir induce seismicity.	3	About types and measurements earthquakes, their impact, seismic zones of India.
15	**Shoreline geotechnics :** geotechnical condition of ground, problems, design and mitigation measures	2	Geotechnical condition and stability problems of shore lines & control measures
	Total	42	

Reference Books:

1. Rahm, P.H (1985). Engineering Geology. An Environmental Approach, Elsevier, XI, pp.1-589
2. Jaeger, J.C. and Cook, N.G.W. (1986). Fundamentals of Rock Mechanics. 2nd Ed, John Wiley and Sons.

Other References:

1. Reddy, D.V. (2016). Engineering Geology, Vikas Pbl, pp. 1-410.