DISCIPLINE SPECIFIC CORE COURSE – DSC – 14: Engineering Geology ((L3, P1)

Credit distribution, Eligibility and Prerequisites of the Course

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical/ Practice		
DSC – 14: Engineering Geology (L3, P1)	**4**	**3**	**0**	**1**	**12th pass with science**	**Studied Stratigraphy, Earth System Science or Equivalent**

Learning Objectives

The main objective of this course is to provide a basic introduction on the role of geology in slope stability and civil engineering projects. It is aimed to provide various insights of topography, lithology and geological structures to ensure the stability and economy of engineering projects.

Learning outcomes

After going through this course, students will know the basic geological and geotechnical requirements for the site selection of engineering projects. They will be able to characterize the rock-mass strength of the site for various engineering projects and suggest the necessary support system. They will be able to identify the primary causative factors of the slope failure and suggest the preliminary mitigation measures. They will be able to investigate the various geological factors to assess environmental impacts of any engineering project.

SYLLABUS OF DSC- 14
Theory (45 Hours)

UNIT – I (9 hours)
Detailed contents
Introduction to engineering geology: Principles and scope of engineering geology: material, material fabrics and environmental factors. Geological and geotechnical investigations.

UNIT – II (9 hours)
Detailed contents
Engineering properties of geological material: Rock strength; Rock aggregates; Significance of rock as construction material; Rock mass: discontinuities, Rock mass classification; Soil: strength, standard penetration test and engineering bedrock.

UNIT – III (9 hours)
Detailed contents
Engineering structures: dams, tunnels and roads: Engineering structures: Dams, tunnels, road, their types, acting forces, ground conditions; tunnelling methods; geological considerations for site selection.

UNIT – IV (9 hours)
Detailed contents
Slope failure and mitigation measures: Concept of slope failure mechanism; Landslide types and causes, landslide mapping; Engineering treatment of slope and foundations: grouting, retaining walls, rock bolting and other support mechanisms.

UNIT – V (9 hours)
Detailed contents
Site investigation and assessment for engineering structures: Site investigation and characterization; Reconnaissance survey; Environment impact assessment (EIA); Detailed project report (DPR)

Practical Component- (30 Hours)
Merits, demerits & remedial measures based upon geological cross sections of project sites. Computation of Index properties of rocks and soil. Concept, significance and computation of Rock Mass Classification schemes like Rock Structure Rating (RSR), Rock Mass Rating (RMR)/ Tunnelling Quality Index (Q)/Rock Quality Designation (RQD).

Essential/recommended readings
Krynin, D.P. and Judd, W.R. (1957). Principles of Engineering Geology and Geotechnique, McGraw Hill (CBS Publ).
Gangopadhyay, S. (2013). Engineering geology. Oxford University Press.

Suggestive readings (if any)
Krynin, D.P. and Judd, W.R. (1957). Principles of Engineering Geology and Geotechnique, McGraw Hill (CBS Publ).
Gangopadhyay, S. (2013). Engineering geology. Oxford University Press.
Goodman, R.E. (1993). Engineering Geology: Rock in engineering constructions. Wiley& Sons, N.Y.
Waltham, T. (2009). Foundations of Engineering Geology (3rd Edn.) Taylor & Francis.
Bell, F.G. (2007). Engineering Geology, Butterworth-Heinema.
Anbalagan, R. Singh, B, Chakraborthy, D. and Kohli, A. (2007) "A filed Manual for Landslide investigations". DST, Government of India, New Delhi.
Duncan C. Wyllie and Christopher W. Mah. (2004). Rock Slope Engineering. CRC Press. London.
David George Price (2009). Engineering Geology: Principles and Practice. Springer-Verlag Berlin Heidelberg