

Name of Programme: M. Sc. Applied Geology

Course Code: GEO-623

Title of the Course: Engineering Geology

No of Credits: 03

Effective from AY: 2023-24

Prerequisites for the course	Students should have undergone M.Sc. Semester I and II.	
Objective	To understand rock and soil mechanics. To study civil structures and their implications on the environment.	
Content	Module 1 Engineering properties of the soil, soil profile, size of the soil particles. Structure: Porosity, voids ratio and degree of saturation. Plasticity and Atterberg limits, clay swelling and tests to determine soil properties and geological characteristics of the sediment. Engineering properties of the rock: physical and mechanical properties, RQD, RMR.	15 hours
	Module 2 Site investigations: planning and design, aerial photography, engineering geophysics, borehole logging and in situ tests. Mass movement with emphasis on landslide, causes of hill slope instability and preventive measure. Coastal processes: coastal hazards and engineering structures.	15 hours
	Module 3 Dams and reservoirs: Types of dams, spillways, forces acting, criteria for site selection, causes of failure, reservoir siltation, reservoir induced seismicity and case studies. Tunnels and Bridges: Design and construction, identifying and managing geologic hazards - groundwater, problematic ground conditions, impacts to existing utilities and adjacent structures. Nuclear plants: Construction, nuclear reactor accidents and safety. Case studies.	15 hours
Pedagogy	Lectures, Case studies, Discussions and Assignments.	
References/ Readings	1. De Vallejo, L. G., & Ferrer, M. (2011). <i>Geological engineering</i>. CRC press. 2. Bodansky, D. (2007). <i>Nuclear energy: principles, practices, and prospects</i>. Springer Science & Business Media. 3. Krynine, D. P., Judd, W. R., & Krynine, D. P. (1957). <i>Principles of engineering geology and geotechnics</i>. New York: McGraw-Hill. 4. Meiswinkel, R., Meyer, J., & Schnell, J. (2013). <i>Design and construction of nuclear power plants</i>. John Wiley & Sons. 5. Bromhead, E. N. (1992). <i>The stability of slopes</i>. CRC Press. 6. Chandler, R. J. (Ed.). (1991). <i>Slope stability engineering: developments and applications: proceedings of the International Conference on Slope</i>	

	<i>Stability.</i> Thomas Telford.
Course outcomes	1. Students will be able to understand engineering properties of rocks and soils. 2. Students will learn engineering tests performed for rock and soil analysis. 3. They will be able to undertake site investigations and prepare technical reports as well as identify and manage geological hazards. 4. Learn about various engineering megastructures and their site selections.