

CVX7347 Applied Engineering Geology and Rock Mechanics

Level	7
Course Code	CVX7347
Course Title	Applied Engineering Geology and Rock Mechanics
Credit value	3
Core/Optional	Optional (Civil Engineering)
Course Aim/s	To introduce applications in Engineering Geology and both applications and concepts in Rock Mechanics
Course Learning Outcomes (CLO):	<p>At the completion of this course student will be able to:</p> <p>CLO1: Evaluate the possible impacts and hazard levels of different Engineering Geological features due to various construction activities; describe possible failure mechanisms of different geological regimes during the construction.[Multi-structural]</p> <p>CLO2: Identify earthquake prone areas, their distribution and hazard levels based on engineering geological effects; Apply migratory measures during the design and construction of particular structure to reduce the impacts of such earthquakes.[Uni-structural]</p> <p>CLO3: Describe different index properties of rocks; evaluate general engineering competence of a given in-tact rock sample. [Uni-structural]</p> <p>CLO4: Explain the behaviour of rocks under different stress and strain conditions; evaluate the deformability characteristics rocks. [Relational]</p> <p>CLO5: Describe behaviour of different rock masses with different rock mass characteristics; forecast possible hazard levels of a rock mass based on joint conditions. [Relational]</p> <p>CLO6: Perform simple classroom exercise on Stereographic projections of discontinuities; perform a kinematic stability analysis for a given rock mass. [Multi-structural]</p> <p>CLO7: Explain different testing techniques adopted in measuring different in-situ rock conditions; develop in-situ rock testing programme for a given construction project. [Relational]</p> <p>CLO8: Evaluate possible failure mechanisms of a given rock mass under different construction conditions; Analyse and Design safe rock excavation and stabilization criteria for different structures. [Relational]</p>
Content (Main topics, sub topics)	<p>Outline Syllabus:</p> <p>Unit 1: Applications in Engineering Geology</p> <p> Session 01: Effects of Engineering Geological Conditions on Construction</p> <p> Session 02: Engineering Geological Considerations for Buildings and Aggregates</p> <p> Session 03: Engineering Geological Considerations for Roads, Cut-slopes and Bridges</p> <p> Session 04: Engineering Geological Considerations for Reservoirs, Dams and Tunnels</p> <p> Session 05: Engineering Geological Considerations for Dewatering, Shuttering and Grouting</p> <p> Session 06: Engineering Geological Considerations for Construction in Earthquake Prone Areas</p> <p>Unit 2: Rock Mechanics</p> <p> Session 07: Introduction and Index Properties of Rocks</p> <p> Session 08: Stress and In-situ Stress in Rocks</p> <p> Session 09: Strain and Relevance to Rocks</p> <p> Session 10: Rock Strength and Failure Criteria</p> <p> Session 11: Discontinuities</p> <p> Session 12: Deformability of Rocks</p> <p> Session 13: Permeability</p>

	<p>Session 14:Rock Mass and Classification Session 15:Rock Testing Techniques Unit 3: Applications in Rock Mechanics Session 16:Rock Excavation Principals Session 17:Rock Stabilization Principals Session 18:Rock Slope Engineering Failure, Analysis and Design Session 19:Underground Rock Excavation Failure, Analysis and Design Session 20:Foundations on Rocks</p>
	<p>Laboratory Work:</p> <ol style="list-style-type: none"> 1. Perform simple stereographic projects to present joint geometrical conditions, including angle of internal friction; evaluate the stability of given rock mass. 2. Perform standard laboratory tests to determine uni-axial compressive strength and point load strength Index of a given rock sample; compute core recovery, rock quality designation and fracture index of a given rock core sample set. <p>Field visit:</p> <p>Carry out a field visit to identify different geological structural features, minerals and their occurrence in Sri Lanka; explain geological background of Sri Lanka and its relationship with Sri Lankan Geomorphology and Mineralization</p>