Course Type	Course Code	Name of Course	L	T	P	Credit
DE	NGLD308	Rock Slope Engineering	3	0	0	3

Course Objective
The primary objective of the course is to introduce fundamental aspects of rock slope engineering
Learning Outcomes
Upon completion of the course, students will be able to: • Understand the fundamentals of rock slope stability. • Carry out different types of slope failure analysis. • Understand the various numerical methods and its applications.

Unit No.	Topics to be Covered	Lecture Hours	Learning Outcome
1.	**Introduction:** Objective, scope and principles of rock slope engineering.	2	Introduce to fundamental aspects of rock slope engineering.
2.	**Site investigation, geological data collection and data interpretation:** Objectives of geological investigations, Planning an investigation program, Site reconnaissance, Geologic mapping, Effects of discontinuities on slope stability, Identification of modes of slope instability.	6	Know about collection of data through engineering geological field investigations.
3	**Rock strength properties and their measurement:** Shear strength of discontinuities, Laboratory testing of shear strength, Hoek–Brown strength criterion for fractured rock masses, Rock durability and compressive strength.	6	Know about strength and deformability of jointed rock mass.
4	**Rock mass Classification:** Rock mass classifications and their applications in support design, Predicting rock mass quality using AI/ML.	8	Concept of rock mass classification. Application of AI/ML in prediction of rock quality.
5	**Landslides:** Landslide classification, Causes, Natural landslides in soils and rocks, Landslide Hazard Zonation Mapping, Rockfall analysis, Landslides in India.	8	Know about the different kinds of slope failure types and its causes. The mechanics of mass movements.
6	**Types of slope failure:** Modes and mechanism of slope failure; Planar, wedge, topping and circular failures analyses, monitoring of slope movements, stabilization of rock slopes, application of AI/ML in rock slope engineering.	8	Concept of mechanism of slope failure. Prediction of stability of slopes using AI/ML.
7	**Numerical methods and its applications:** Numerical modeling of rocks and rock masses, Application to landslide hazard zonation, tunnels, underground structures and rock slopes.	4	Basic understanding of various numerical methods and its applications.
Total Classes		42	

Textbooks:

1. Hoek, E and Bray, J. (1981). Third Edition; Rock slope Engineering.
2. Duncan C. Wyllie and Chris Mah. (2005). Fourth Edition; Rock slope Engineering.

Reference Books:

1. Goodman, R.E. (1989), Introduction to Rock Mechanics, Second Edition, John Wiley & Sons.
2. Ramamurthy, T. (2014), Engineering in Rocks for Slopes, Foundation and Tunnels, Prentice Hall India Pvt. Ltd.