

4 <sup>th</sup> Semester	RMN4C002	Rock Mechanics	L-T-P 3-0-0	3 CREDITS
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Mining engineering involves exploration, extraction, utilization and storage of natural mineral resources that occur at surface as well as subsurface locations. The operation of these processes involve design of engineering structures in wide range of rock types and for the stability of these structures the knowledge of rock mechanics is essential. Rock Mechanics is a core course for undergraduate program in Mining Engineering.

This course provides students with the ability to apply principles of rock mechanics to the design of underground and surface mine excavations and associated infrastructure. This course provides the understanding and the tools necessary to rationally design stable structures in rock.

#### Course Objective:

- To determine and evaluate the engineering properties of rock material and rock mass.
- To critically analyse failure mechanism of various underground mine structures, rock slopes, large caverns from geotechnical information and evaluate the conditions required for improving the state of stability of the mining structures or opening.
- To apply knowledge of stress analysis and theories of rock failure to develop underground mine opening designs to specified factors of safety based on mine site rock mass conditions
- After going through this course, a student will be able to derive expressions for factor of safety, which help in the design of stable underground structures.
- After going through this course, a student will be able to calculate the strength properties of the rock.

#### Module-I: (9 Hours)

Introduction: Rock formation, soil & rock classification, soil properties.

#### Module-II: (9 Hours)

Determination of physico-mechanical and rheological properties of rock and their determination (static and dynamic)

#### Module-III: (9 Hours)

Swelling, elastic and time dependent behaviour of rock and their determination, rock deformability

#### Module-IV: (9 Hours)

Stress-strain analysis in 2D and 3D, failure criteria, effect of anisotropic behaviour of rock.

#### Module- V: (9 Hours)

Rock Mass classification, Rock Slope Classification, Support Criteria; introduction to numerical methods-FEM, DEM