

CE8003 ROCK ENGINEERING

DETAILED SYLLABUS

OBJECTIVE:

- To impart knowledge on fundamentals of rock mechanics and its application in solving simple problems associated with rock slopes and underground openings. Student gains the knowledge on the mechanics of rock and its applications in underground structures and rock slope stability analysis.

UNIT I CLASSIFICATION AND INDEX PROPERTIES OF ROCKS

Geological classification – Index properties of rock systems – Classification of rock masses for engineering purpose – Rock Mass Rating and Q System.

UNIT II ROCK STRENGTH AND FAILURE CRITERIA

Modes of rock failure – Strength of rock – Laboratory measurement of shear, tensile and compressive strength. Stress - strain behaviour of rock under Hydrostatic compression and deviatoric loading – Mohr –Coulomb failure criteria and Hock and Brown empirical criteria

UNIT III INITIAL STRESSES AND THEIR MEASUREMENTS

Estimation of initial stresses in rocks – influence of joints and their orientation in distribution of stresses – measurements of in-situ stresses – Hydraulic fracturing – Flat jack method – Over coring method

UNIT IV APPLICATION OF ROCK MECHANICS IN ENGINEERING

Simple engineering application – Underground openings – Rock slopes – Foundations and mining subsidence.

UNIT V ROCK STABILISATION

Introduction – Rock support and Rock reinforcement – Principles – Support reaction curves – Shotcreting.

TEXTBOOKS:

1. Goodman, P.E. "Introduction to Rock Mechanics", John Wiley and Sons, 1999.
2. Stillborg B., "Professional User Handbook for rock Bolting", Tran Tech Publications, 1996.
3. Ramamurthy T., "Engineering in Rocks for Slopes Foundations and Tunnels", PHI Learning Pvt. Ltd., 3rd Edition, 2014.

REFERENCES:

1. Brown, E.T. "Rock Characterisation Testing and Monitoring". Pergaman Press 1991.
2. Arogyaswamy, R.N.P., "Geotechnical Application in Civil Engineering", Oxford and IBH, 1991.
3. Brady, B.H.G. and Brown, E.T., "Rock mechanics for underground mining (Third Edition)", Kluwer Academic Publishers, Dordrecht, 2006.