3rd Semester

HONOR SUBJECT

ROCK EXCAVATION ENGINEERING

Module-I (8 Hours)
Introduction: Scope and importance of rock excavation engineering in mining and construction industries; physico-mechanical and geotechnical properties of rocks vis-à-vis excavation method; selection of excavation method. Rock breaking processes: Primary, Secondary and Tertiary, Energy consumption computations

Module-II (8 Hours)
Drilling: Advances in drilling equipment, pneumatic versus hydraulic, design and operating parameters of surface and underground drilling; evaluation of drill performance; mechanism of bit wear; bit selection; economics of drilling.

Module-III (12 Hours)
Blasting: Explosives and their selection criteria for rock excavation; blast design for surface excavations and optimisation; advanced blast initiation systems; blast performance evaluation; cast blasting; techno-economic and safety aspects of surface and underground blasting; advances in blast design for underground excavations; contour blasting; computer aided blast designs. Under water drilling and blasting

Module-IV (12 Hours)
Rock Cutting: Theories of rock tool interaction for surface excavation machinery-rippers, dozers, scrapers, BWE, continuous surface miners, auger drills; theories of rock tool interaction for underground excavation machinery-ploughs, shearers, roadheaders, continuous miners and tunnel boring machines; selection criteria for cutting tools; advanced rock cutting techniques-high pressure water jet assisted cutting. **Recent Developments** in rock excavation machinery

Text Books:

1. Principles of Rock Drilling by K U M Rao and B.Misra, Oxford & IBH
2. Surface and Underground Excavations Methods, Techniques and Equipment by R RTatiya, A ABalkema
3. Rock Blasting and Explosive Engineering by P A Persson et al., CRC Press

Reference Books:

1. SME Hand Book
2. Rock Blasting Effects and Operations by P P Ray, Oxford & IBH
3. Engineering Rock Blasting Operations by S Bhanari, CRC Press