TUNNEL DESIGN AND CONSTRUCTION

Code	Credit Hour
MinE-823	3-0

Course Description.

Introduction, Geotechnical Investigation for Underground Construction, Hydrology and Geological Assessment in Tunnelling, Tunnel Configuration, Rock and Soft Ground Tunnelling, Mixed Face Tunnelling, Ground Improvement Techniques, Instrumentation and Monitoring, Tunnel Contracting Methods, Risk Management for Tunnel Planning, Design and Construction

Textbooks

1. Pietro Lunardi (2008), Design and Construction of Tunnels.

References Book:

1. Bernhard Maidl, Markus Thewes, Ulrich Maidl (2013) Handbook of Tunnel Engineering I: Structures and Methods

Pre-Requisites:

Nil

ASSESSMENT SYSTEM FOR THEORY

Quizzes	15%
Assignment	5%
Mid Terms	30%
ESE	50%

Teaching Plan

Week No	Topics	Learning Outcomes
1	Introduction	CourseOutline,objectives,teachingplan,assessmentmethod, conceptsreview.
2	Tunnel Engineering	Introduction to Tunnel Engineering, Overview of Underground Construction, Importance of Geotechnical and Hydrological Factors
3-5	Geotechnical Investigation for Underground	Methods and Techniques for Geotechnical Investigation, Role of Site Investigations in Tunnel Design, Soil and

	Construction	Rock Sampling Techniques
6-8	Hydrology and Geological Assessment in Tunnelling	Importance of Hydrology in Tunnel Construction Geological Mapping and Assessment, Groundwater Management in Tunnelling Projects
9	**MID TERM EXAM**	
10-13	Tunnel Configuration	Types of Tunnels and their Uses, Design Considerations for Tunnel Alignment, Ventilation and Lighting Systems in Tunnels
13-15	Rock and Soft Ground	Tunnelling Techniques for Rock Tunnelling (Drill and Blast, TBM), Challenges and Solutions in Soft Ground Tunnelling, Ground Support Systems for Tunnels
15-17	Mixed Face Tunnelling, Ground Improvement Techniques, Instrumentation and Monitoring	Challenges and Strategies for Mixed Face Conditions, Ground Improvement Methods (Grouting, Jet Grouting), Importance of Instrumentation and Monitoring in Tunnel Construction
18	**END SEMESTER EXAM**	