

Course Type	Course Code	Name of Course	L	T	P	Credit
DE	OMED613	Drilling & Blasting Technology	3	0	0	3

Course Objective

1. Introduce basics of rock geology relevant to drilling applications in excavation.
2. Explain fundamentals of drilling and blasting processes for surface and sub-surface operations.
3. Cover engineering principles and economic feasibility of rock excavation techniques.
4. Teach selection and operation of drilling machines, accessories, and special methods.
5. Analyze explosives properties, explosive-rock interactions, and blast economics.
6. Examine blast-induced ground vibrations, measurement, analysis, and structural damage prevention.

Learning Outcomes

1. Students will understand rock geology, drillability, and drilling mechanisms for excavation projects.
2. Students will select appropriate rock drills, machines, accessories, and special drilling methods.
3. Students will evaluate economics of drilling operations and explosive applications.
4. Students will analyze explosive properties and their interactions with rock formations.
5. Students will measure and analyze blast-induced ground vibrations using established predictors.
6. Students will assess structural damages from vibrations and implement mitigation strategies.
7. Students will apply drilling and blasting knowledge to engineering feasibility studies.
8. Students will design safe and economical excavation processes for surface and sub-surface works.

Unit No.	Topics to be Covered	lecture Hours	Video time (Minutes)	Learning Outcome
1.	Rock Geology, Mechanism of Rock Drilling and Drillability	5	122	Rock Geology & Drillability
2.	Drilling Machines, Selection of Rock Drill and its accessories.	5	146	Selection of Rock Drill
3.	Special Drilling Method and economics of drilling	5	161	Special Drilling Method
4.	Explosives and accessories	5	145	Type of Explosives
5.	Explosive properties and explosive-rock interaction	5	169	Explosive properties
6.	Rock blasting methods and designs	5	152	Rock blasting
7.	Underground blast design and results	5	183	Underground blast
8.	Safety, Environmental impact and economics of rock blasting	5	158	Safety, Environmental impact
9.	Special blasting techniques – 1: Techniques of boulder blasting, Deck charging techniques, Consideration of rock mass conditions for surface and underground blasting	5	175	Special blasting techniques – 1
10.	Special blasting techniques – 2 : Controlled blasting techniques, Cast blasting techniques, Hot hole blasting techniques, Underwater blasting, Demolition blasting	5	168	Special blasting techniques – 2

11.	Blast induced ground vibration and structural damages: Basics of vibration and blast vibration, Measurement of blast vibration and analysis, Vibration predictors, Structural damage and ground vibration	5	176	Blast induced ground vibration
12.	Safety in rock blasting and tutorials: Safety essentials in blasting process, SOP and SWP, Environmental impacts, gasses and noise, Tutorial for surface and underground rock blasting	5	173	Safety in rock blasting
	total	60	1928	

Text Books:

1. Drilling and Blasting of Rocks, Carlos Lopez Jimeno et al., A.A. Balkema Publishers.
2. Engineering Rock Blasting Operations, Sushil Bhandari, Oxford & IBH Publishing Co. Pvt. Ltd.
3. Explosives and Blasting Techniques, G.K. Pradhan, Mahajan Publishers Pvt. Ltd.

Reference Books:

1. Rock Blasting Effects and Operations, Pijush Pal Roy, Taylor & Francis.