

MIPC3003 UNDERGROUND METAL MINING (3-0-0)

Course Objectives

To impart knowledge of underground metal mining methods, including development techniques, stoping operations, and mechanization. The course covers classification of stoping methods, caving techniques, and techno-economic analysis to equip students with skills for efficient and safe underground metal mining operations in compliance with regulatory standards.

Module-I: (09 Hours)

General Development of property level, crosscuts, raises and winzes, drifting and tunnelling, mining equipment and production machine used below ground. Provision of MMR 1961

Module - II: (09 Hours)

Classification and choice of stoping methods, Methods of stoping: open stoping, supported stoping – breast, underhand and overhand stoping,

Module -III: (07 Hours)

Shrinkage stoping, cut and fill stoping method, sub-level stoping

Module - IV: (09 Hours)

Introduction to caving methods: top slicing, sub-level caving, block caving

Module - V: (11 Hours)

Stope mechanization and level interval. Techno-economic analysis on choice of stoping methods, high productivity methods

Course Outcomes:

- CO1: Describe the development processes (drifting, tunneling, raises) and equipment used in underground metal mining. (Remembering/Understanding)
- CO2: Classify and compare various stoping methods (open, supported, shrinkage, cut-and-fill) based on geological and operational conditions. (Analysis)
- CO3: Explain the principles and applications of caving methods (top slicing, sub-level caving, block caving). (Understanding)
- CO4: Analyze techno-economic factors influencing the selection of stoping methods for optimal productivity. (Evaluation)
- CO5: Design a stope layout considering mechanization, level intervals, and safety regulations. (Creation)

Books:

1. Y. P. Chacharkar, A study of Metalliferous Mining Methods, Lovely prakshan Dhanbad, 1994
2. D. J. Deshmukh, Elements of Mining Technology, Vol - II, Central Techno Publications, Nagpur, 2001
3. B. C. Arthur, SME Mining Engineers Hand Book, American Institute of Mining, Metallurgical and Petroleum Engineers New York, 1973.
4. K. S. Stout, Mining Methods and Equipment, McGraw hill New York, 1980