MINE SAFETY ENGINEERING (3-0-0)

Module - I: (07 hours)
Terminology, Reason for preventing accidents: moral, cost, legal, Classification of mine accidents (fatal, serious, reportable, minor), trend analysis, and case studies of major Indian and global mining disasters.

Module - II: (09 hours)
Methodologies for root-cause analysis, accident reconstruction techniques, and corrective action planning. Accident proneness theories, human error identification (HEI), behavioural safety, and building institutional safety culture. Designing Zero Accident Plans (ZAP), Major Accident Hazards (MAP) protocols, and establishing active safety committees.

Module - III: (09 hours)
Concepts, Qualitative and Quantitative Approaches, Components of Risk Assessment, Risk Identification, Risk Estimation and Evaluation Risk analysis using FTA, HAZOP, ETA etc. Risk Analysis Software. Principles of reliability engineering, calculating failure rates of heavy machinery (HEMM), and system safety engineering. Safety Management Plans (SMP) as per statutory guidelines.

Module - IV: (11 hours)
Definition of health and safety, management's role. Function; evolution of management involvement, management's training, responsibility, cost of health and safety, role of labour organizations. Union impact and involvement, role of government. Statutory controls and directions, spot and regular inspections, enforcement of standards, penalties for violations, collection and distribution of statistical data.

Module - V: (09 hours)
Miner's occupational health and diseases, preventive medical examinations, various types of injuries, compensable diseases. Medical attention and removable of causative factors in the mines. Recommendations of inquiry committee carried out for safety and health issues in India.

Books:

1. D. P. Tripathy, Mine Safety Science and Engineering: Health and Disaster Management, 1st Edition, CRC Press, 2019.
2. N. J. Bahr, System Safety Engineering and Risk Assessment: A Practical Approach, Taylor and Francis, NY, 1997.
3. Principles and Practice in Mining Engineering (1st ed.); Abhay Kumar Soni, Ishwardas L. Muthreja, & Rajendra R. Yerpude (2023)
4. Environmental Engineering in Mines; V. S. Vutukuri & R. D. Lama (reprinted 2010)
5. Mine Hazards Identification, Prevention and Control; Xiangguo Kong, Dexing Li, & Xiaoran Wang (2023)
6. Mining Safety and Sustainability I & II; Longjun Dong, Yanlin Zhao, & Wenxue Chen (2022)