Course Outline

Course Type	Course Code	Name of the Course	L	T	P	Credits
ESO	MNE204	**Introduction to Mine Environment**	3	0	0	9

Course Objective
To introduce the fundamental aspects of environmental engineering pertaining to the surface and subsurface mines.
Learning Outcomes
Upon successful completion of this course, students will: • have an understanding of the nature and characteristics of different environmental problems in mines. • be able to identify, formulate, and solve the environmental problems associated with the mining operations.

Unit No.	Topics to be Covered	Lecture Hours	Learning Outcome
1	**Introduction:** Brief overview of environmental pollution in surface and subsurface mines. Sources and influencing factors of various pollutants in mines.	5	Overall idea about the pollutants generated due to the surface and subsurface mining and their environmental impacts
2	**Mine Atmosphere and Gases**: Characteristics and composition of mine atmosphere, different types of mine gases and their generation, physico-chemical properties, physiological effects, gas monitoring techniques, detection and control strategies of mine gases in surface and subsurface mines.	7	Exposure to mine atmosphere and the generation of various gases due to mining operations and their control
3	**Mine Dust:** Sources of dust in mines, characteristics of mine dust, dust hazards, physiological effects of mine dust, dust sampling, monitoring and control schemes in mines, Diesel particulate matter: source, generation, monitoring and control strategies.	7	Basic understanding of the mine dust and its sources, dust monitoring and control strategies in mines
4	**Mine Water and the Environment:** Overview of water quality in mines: Composition and characteristics of mine water including physical, chemical, and biological characteristics; Sources of water pollutants and their impact on water quality; water quality criteria and standards; water quality monitoring techniques and control strategies; Acid mine drainage and groundwater contamination.	7	Learn about the water pollution due to mining and their control measures
5	**Mining and Soil Contamination**: Impacts of mining on soil pollution, potential risk of soil pollution, soil quality assessment criteria, evaluation of soil pollution level, soil erosion and sinkholes, soil remediation strategies: bioaugmentation, phytoremediation and biochar application.	5	Understanding the role of mining on soil contamination and methods to monitor and control soil pollution
6	**Noise Pollution in Mines**: Sources of noise in mines, noise propagation characteristics, noise impact on human, noise mapping, noise level monitoring and control in mines.	4	Learn about various sources, impacts and control strategies of noise due to mining operations
7	**Environmental Impacts of Blasting in Mines:** Blasting mechanism, blast vibration propagation mechanism, danger from air blast and fly rocks, blast vibration monitoring techniques and standards, environmental impacts of blasting.	2	Brief overview of blasting effects on mine environment and various blast monitoring techniques
8	**Mine Reclamation and Closure:** Mine reclamation strategies, principles, planning, financial provisions, implementation, and standards for closure criteria, systems approach for mine closure and development of closure plan, socio-economic aspects of mining.	5	Importance of mine reclamation and closure along with its essential components to achieve eco-friendly and socially inclusive mining practices.

Text Books:

1. Mine Environment and Ventilation by G. B. Misra
2. Mine Disasters and Mine Rescue by M.A. Ramlu

Reference Books:

1. Subsurface Ventilation and Environmental Engineering by M.J. McPherson
2. Reclamation of Mine-impacted Land for Ecosystem Recovery by Nimisha Tripathi, Raj S. Singh and Colin D. Hills
3. Mining and the Environment: From ore to metal by K. Splitz and J. Trudinger