Course Type	Course Code	Name of Course	L	T	P	Credit
DE7	MND 406	MINE ENVIRONMENTAL ENGINEERING	3	0	0	9

Course Objective

This course will impart theoretical and practical knowledge for solving the real-life environmental hazards occurring both in underground and surface mines. In addition, the students will be acquainted with a number of case studies
demonstrating the intricate environmental hazards faced in Indian coal and non-coal mines and the development of methods for solving those problems.

Learning Outcomes

Upon successful completion of this course, students will:

- have a broad understanding of the workplace environmental hazards such as fires, explosions, flood inundation, illumination and dust in coal and non-coal mines
- be able to suggest suitable mitigating measures for improved safety of the workplace, including the human employed.

Sl. No.	Topic	No of lectures	Learning Outcome
1.	***Mine fires*:** Causes and classification of mine fires; Spontaneous combustion of coal- mechanism, stages of spontaneous combustion, susceptibility indices, factors affecting spontaneous combustion; Detection and prevention of spontaneous heating and accidental fires; Dealing with mine fires- direct and indirect methods; Fire stoppings; Re-opening of sealed-off fire areas; Fires in quarries, coal stacks and waste dumps.	12	Students will have a thorough understanding of ● mechanism of spontaneous combustion of coal and mine fires. ● factors affecting the susceptibility of coal to spontaneous combustion. ● methods of dealing with mine fires.
2.	***Mine explosions:*** Firedamp and coal dust explosions- causes and prevention, explosive limits; Explosion barriers; Explosion in quarries over developed pillars; Investigation after occurrence of explosion.	9	Students will learn: ● the causes and prevention of firedamp and coal dust explosions in underground mines. ● inflammability of methane and coal dust. ● methods of suppression of explosions in mines.
3.	***Inundation*:** Causes and prevention; Design and construction of water dams; Precautions and techniques for approaching old workings; Dewatering of waterlogged workings- pattern of holes, safety boring apparatus.	6	Students will learn: ● the causes and prevention of mine inundation due to surface and underground water sources. ● types of water dams and their design aspects. ● constructional features of safety boring apparatus and methods of dewatering old waterlogged mine workings.
4.	***Rescue and recovery:*** Rescue equipment and their uses, classification	6	Students will learn about the classification, constructional features and working of

Sl. No.	Topic	No of lectures	Learning Outcome
	of rescue apparatus; Resuscitation; Rescue stations and rescue rooms; Organisation of rescue work; Emergency preparedness and response system.		rescue apparatus used in mines rescue. They will also learn the types and organizational structure of mines rescue stations.
5.	***Airborne respirable dust*:** Dust generation and dispersion in mines; Physiological effects of dust, dust-related diseases; Maximum allowable respirable dust concentration; Sampling of respirable dust; Dust suppression and control.	5	Students will learn about the sources and control measures of dust in mines. They will also learn about the dust related diseases, permissible dust concentrations and different dust monitoring techniques in mines.
6.	***Illumination:*** Cap lamps; Layout and organisation of lamp rooms; Standards of illumination; Photometry and illumination survey in mines.	4	Students will learn about the sources of light in mines, standard of illumination in surface and underground mines, and modern cap lamp room layout.
	Total	42	

Text Books:

1. Mine Disasters and Mine Rescue by M.A. Ramlu

Reference Books:

1. Mine Environment and Ventilation by G.B. Misra
2. Mine Ventilation by S.P. Banerjee
3. Mine Environmental Engineering, Vol. 1 & Vol. 2 : Mritunjoy Sengupta
4. Environmental Engineering in Mines : V. S. Vutkuri and R. D. Lama
5. Advanced mine ventilation: Pramod Thakur
6. Prevention and combating mine fires: S.C. Banerjee