GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering
Subject Code: 3162204
Semester –VI
Subject Name: Mine Hazards

Type of course: Mining

Prerequisite: Before learning this course student must know method of working in underground and surface mines.

Rationale: The course is designed to make students conversant with types of hazards viz. Fires, Explosion and Inundation which can take place inunderground mines, to give knowledge in details about the causes and mitigation measures for each of the hazard, to provide details of rescue operations to be conducted in mines after disasters and to make students understand problems of mine dust and illumination including the assessment and mitigatingmeasures.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
3	0	2	4	70	30	30	20	150

Content:

Sr. No.	Content	Total Hrs
1	**Mine Fires:** Causes of mine fires; spontaneous combustion - mechanism, stages of spontaneous combustion, susceptibility indices, factors affectingspontaneous combustion; detection and prevention of spontaneous heating; accidental fires – causes andprevention; dealing with mine fires - direct and indirect methods, fire stoppings; fires in quarries, coal stacks andwaste dumps, re-opening of sealed-off workings.	9
2	**Mine Explosions:** Firedamp and coal dust explosions – mechanisms, causes and prevention; stone-dust and waterbarriers; investigations after an explosion.	5
3	**Inundation:** Causes and prevention, precautions and techniques of approaching old workings; Dewatering of waterlogged working, safety boringapparatus, pattern of holes; design and construction of water dams, shaft dams, emergency bulk heads,strengthening of dams.	8
4	**Rescue and Recovery:** Rescue equipment and their uses, classification of rescue apparatus, rescue stations and rescue rooms; organization of rescueand recovery work, emergency preparedness and response system.	8
5	**Airborne respirable dust:**Generation, dispersion, measurement and control; classification,physiological effects, dust measurement, sampling of air-bone dust.	6
6	**Illumination:**It's effect on safety, efficiency and health; common types of safety lamps & their usesand limitations, maintenance and examination of lamps, their charging, cleaning, lighting, re-lighting ; lamp roomdesign and organization; lighting from mains – different types of illumination devices; illumination of pit bottoms, main roads, faces, pump houses and haulage rooms; standards of illumination in underground and opencast mines.	9

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Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
65 %	**20 %**	**10 %**	**2 %**	**2 %**	**1 %**

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Reference Books:1.Elements of Mining Technology,Voll-II, D.J.Deshmukh
2.Mine Disaster and Mine Rescue, M. A.Ramlu
3. Mine Ventilation, G. B. Mishra

Course Outcomes:

Sr. No.	CO statement	Marks % weightage
CO-1	To familiarize with the concept of hazards in mines and rescue operations.	25 %
CO-2	To understand the basic mechanism of hazards.	25 %
CO-3	To develop the ability of analyzing complex engineering problems associated with hazards.	25 %
CO-4	To be competent in designing components and processes dealing with hazards.	25 %

List of Experiments:

Sr. No.	**Practical**	**Approx. Hrs. Required**
1	Detect Spontaneous Heating of coals and its various stages and preventive measures.	4
2	Inspect and maintain different types of fire extinguishers.	4
3	To study and explain different types of fire stoppings and their constructional details.	4
4	Study of constructional features & working of Stone Dust Barriers.	4
5	Determination of air borne respirable dust concentration – konimeter, gravimetric dust sampler and personal dust samplers.	4
6	To study and explain different types of rescue apparatus.	4
7	To study and measurement of leakage in ventilation system by using smoke tube.	4