GUJARAT TECHNOLOGICAL UNIVERSITY

BRANCH NAME: Mining Engineering
SUBJECT NAME: Mine Hazards
SUBJECT CODE: 2162204
B.E. 6th SEMESTER

Type of course: Mining

Rationale:

The degree holders in mining engineering will be responsible to keep mines safe from hazards and any type of danger. It is his responsibility to inspect and supervise all the working areas where any symptoms of any danger or hazardous situation may be arise. He should be able to select the suitable rescue apparatus. This subject provides him knowledge of mine fires, hazards in mines preventive measures and its rescue and recovery operation.

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)	
					PA	ALA	ESE	OEP		
4	0	2	6	70	20	10	20	10	20	150

Content:

Sr. No.	Content	Total Hrs	% Weightage
1	**Mine fires and spontaneous combustion: Surface fires -** its effects; causes and prevention; **Underground fires:** • spontaneous combustion, its causes, detection and preventive measures; • Accidental fires causes and prevention. Physical and chemical characteristics of coal liable to spontaneous heating, Detection by practical and scientific method, preventive measures and dealing with underground fires.	**10**	**20 %**
2	**Study of atmosphere behind sealed off area, factors of conditions for reopening:** Different method of reopening, difficulties, dangers and safety measures various mean for fires fighting. Firefighting organization.	**10**	**20 %**

3	**Dust in mines:** Dangers, formation, prevention and suppression. Dust sampling apparatus - construction and applications.	**6**	**7 %**
4	**Explosion:** Methane layering. **Types, causes of explosions and preventive measures:** • **Fire damp explosion** – Causes, limits of explosibility of fire damp, factor affecting the limit of explosibility, sources of initiation of fire damp explosion. • **Coal dust explosion** – Causes, relative inflammability of coal dust, its measurements. Factors affecting relative inflammability; safeguards against coal dust explosion, water treatment, composition of stone dust and method of dusting; water barriers. • **Water gas explosion -** causes and safety measures.	**10**	**20 %**
5	Problems of radiation in atomic mineral mines.	**2**	**1 %**
6	**Mine rescue and recovery work:** Different type of rescue equipment; test on rescue apparatus. Rescue station, recovery and first aid appliances. Training of personnel and organization of rescue station; rescue and recovery work in connection with mine fire, explosion and other conditions.	**10**	**20 %**
7	**Mine inundations:** Causes; precautionary measures; precautions to be taken while approaching old workings. Burnside boring apparatus. Dewatering of old working. Design and construction of water dams; recovery of flooded mines. Water blast dangers and precautions.	**8**	**12 %**

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
64 %	**20 %**	**12 %**	**2 %**	**1 %**	**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:

Sr. No.	Title of Books	Author	Publication
1	Elements of Mining Technology-II	D. J. Deshmukh	Central techno publication
2	U.M.S.	-	Lovely Prakashan
3	Mine Ventilation	G.B.Mishra	Lovely Prakashan
4	Mine Hazards & safety	M.A Ramlu	Lovely Prakashan

Course Outcome:

After learning the course the students should be able to:

i. Identify and declare a condition safe or unsafe depending upon conditions and criterion presented about the mines.
ii. Deal safely with spontaneous heating of coal.
iii. Design safety inspection plan to mitigate problems related to ventilation and fire. iv. Deal with coal dust and inundation situations.

List of Experiments:

S. No.	**Practical / Exercise** (outcomes in psychomotor domain)	Approx. Hrs. Required
1	Detect Spontaneous Heating of coals and its various stages and preventive measures.	4
2	Select and design a method of sealing of a fire area.	4
3	Inspect and maintain different types of fire extinguishers.	4
4	Collect air sample from a sealed off area by using various methods.	4
5	Design various types of stone dust barriers.	4
6	Explain operation of Burn Side Safety Boring machine.	4
7	Operate and maintain various Rescue apparatus.	4
	Total	**28**

Major Equipment:

i. Models.

ii. Apparatus.

List of Open Source Software/learning website:

i. Wikipedia.

ii. www.youtube.com

ACTIVE LEARNING ASSIGNMENTS: Preparation of power-point slides, which include videos, animations, pictures, graphics for better understanding theory and practical work – The faculty will allocate chapters/ parts of chapters to groups of students so that the entire syllabus to be covered. The power-point slides should be put up on the web-site of the College/ Institute, along with the names of the students of the group, the name of the faculty, Department and College on the first slide. The best three works should submit to GTU.