

# GUJARAT TECHNOLOGICAL UNIVERSITY

## DIPLOMA IN MINING ENGINEERING

### SEMESTER: V

Subject Name: **Mine Ventilation**

Sr. No.	Course Content
1.	<p><b>Mine Atmosphere:</b>  Mine atmosphere V/s surface atmosphere, Composition of the two, In brief, fresh surface air sent down the mine gets polluted, On account of various mining activities, Properties &amp; Effects on human being, various mine gases Methane CO<sub>2</sub>, CO, H<sub>2</sub>S, SO<sub>2</sub> Nitrous oxides, etc., Humidity &amp; temperature.</p> <p>1.1 Fire Damp  FIRE DAMP (Methane chiefly).Emission in U/G workings, Gradual oxidation, out bursts, blowers. How firedamp is locked up in coal mass, e.g. particle surface occlusion intermolecular spaces, cavities, pockets, etc. Methane layering in mine workings. Methane drainage from coal deposits and advance safety measures.</p> <p>1.2 Detection of fire damp &amp; other mine gases during inspections &amp; precautions when detected beyond safe levels.</p>
2.	<p><b>Mine Ventilation:</b>  2.1 Brief information about Natural ventilation of Mines.  2.2 Mechanical ventilation of mines. Main &amp; auxilliary fan.  Mine Ventilation By Fans Installed On Surface At Mine Heads:  Types of fans, Exhaust &amp; forcing systems of mine ventilations, Fan installation, fan drives, Evasee Chimney &amp; fan houses air Lock at mine top, Instruments permanently installed in fan house for continuous monitoring of operation, Auxilliary underground, Ventilation for districts by booster fans &amp; forlong heading drivages by portable/shiftable fans, Steel tubes, Canvass tubes, etc., advantages &amp; disadvantages of auxilliary systems of ventilation, Neutral-line.</p> <p>2.3 Fan characteristic curves, laws of fan ventilation, quantity pressure &amp; H.P. relations, mine circuit resistance.</p> <p>2.4 ventilation surveys in mines: Quantity surveys pressure surveys, Instruments &amp; Method used.</p> <p>2.5 Simple numerical problems on mechanical/ fan ventilation Laws: Safety and statutory aspects of mine ventilation.</p>
3.	<p><b>Mine Lighting:</b>  Problems of mine lighting by cap lamps, etc., Individual portable personnel lighting, General road way lighting, work stations lighting pit bottom loading points, etc., Flame proof lighting, Caplamp room, Layout, Organisation &amp; operation, Maintenance, etc.</p>

## **Laboratory Experiences:**

1. Determination of relative humidity by whirling hygrometer.
2. Study of self contained breathing apparatus Proto-Mark IV.
3. Study & layout of Cap Lamp room.
4. Determination of cooling power of the mine air by using kata thermometer.
5. Measurement of air velocity, quantity and pressure in a duct by using a pitot tube.
6. Study and sketch of air crossing, regulator, Ventilating door, air lock at pit top etc.
7. Study of different types of flame safety lamps and their use for determining CH<sub>4</sub>% in a gassy mine.
8. Mine Gas analysis by (a) Haldan's app. (b) orsat's app.
9. Determination of CO gas in mine working.

## **Reference Books:**

1. Elements of Mining Technology Vol-2, D. J. Deshmukh
2. Mine Ventilation, G.B. Mishra
3. U.M.S.