

GUJARAT TECHNOLOGICAL UNIVERSITY
B. E. SEMESTER: VI
Mining Engineering

Subject Name: **Sub-Surface Environment**
Subject Code: **162203**

| Teaching Scheme | | | | Evaluation Scheme | | |
|------------------------|-----------------|------------------|--------------|---|--|--------------------------|
| Theory | Tutorial | Practical | Total | University Exam (Theory) (E) | Mid Sem Exam (Theory) (M) | Practical (I) |
| 3 | 0 | 2 | 5 | 70 | 30 | 50 |

| Sr. No | Course Content | Total Hrs. |
|---------------|---|-------------------|
| 1. | Mine Gases: Mine atmosphere its composition, Pollution of mine, air-mine gases, toxicity of gases. Origin, occurrence, physical, chemical and physiological properties of various gases and their detection. | 6 |
| 2. | Heat and Humidity in Mines : Rock temperature geothermic gradient auto-compression, Humidity, its determination and effects. Metabolism and respiration. Climate conditions, Kata thermometer assessment of comfort conditions. Control of temperature and humidity in deep mines. Airconditioning in mines. | 6 |
| 3. | Ventilation : Necessity and standard for ventilation, Flow of air in ducts and mine roadways, resistance of airways. | 4 |
| 4. | Law of ventilation : Chezy's and Atkinson's equation. Equivalent resistance of mines, equivalent orifice, mine characteristics. | 4 |
| 5. | Natural ventilation and its measurement, Thermodynamics of ventilation and determination of pressure volume diagram, Mine fans, principal types, their construction and working, characteristics and suitability; booster and auxiliary fans, venturi and air jets. | 6 |
| 6. | Installation of fans, air locking arrangement, design of evasee, parallel and series operations of mines fans. | 4 |

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| 7. | Coursing, distribution and regulation of air current and splitting in underground working; Ventilation of deal ends. System of Ventilation; Forcing and exhausting, ascensional and descensional, homotropical and antiropal ventilation. | 6 |
| 8. | Measurement of air flow and pressure ventilation survey, ventilation | 3 |
| 9. | Calculation concerning to fans and ventilation of mines, Network problems. | 3 |

Reference Books:

1. Elements of Mining Technology – Vol. II
2. Mine Ventilation – G.B.Mishra
3. U.M.S.