COURSE FOLDER

MN241: Underground Mine Environment

1. Overview

MN241: Underground Mine Environment, L-T-P: 3-1-2 (13-Credit)

Teachers (Theory):

1. Dr. S. K. Palei

Teaching Assistants:

Tutors:

2. Plan

- Week 1-2: Composition of atmospheric air (Mine gases - occurrences, properties, physiological effects, detection; sampling, analysis, monitoring. Methane layering, methane drainage)
- Week 3-4: Heat and Humidity (Sources and effects of heat and humidity in mines. Cooling power of mine air – psychrometry, Kata thermometer, effective temperature. Basics of air conditioning.)
- Week 5-6: Airflow in Mine Workings (State of airflow. Square law of mine ventilation. Mine characteristic. Frictional and shock losses. Equivalent orifice. Combination of resistances. Ventilation control devices. Splitting of air current.)
- Week 7: Natural Ventilation: Causes. Effects of seasonal variation. Calculation of NVP.
- Week-8-9: Main Mechanical Ventilation (Centrifugal and axial flow fans – construction, pressure development, characteristic curves, series and parallel operations. Forcing versus exhaust ventilation. Fan drift, evasee, diffuser. Reversal of airflow.)
- Week 10: Auxiliary and Booster Ventilation (Auxiliary ventilation by brattice. Auxiliary fans and installation. Booster fans, installation, Pressure gradient diagram, positioning.)
- Week 11: Ventilation Planning (Classification of ventilation systems – central & boundary, homotropal & antitropal, ascensional & descensional. Desirable features of ventilation planning. Ventilation layout for mining coal and ore deposits. Principles for calculation of air quantity and pressure requirements.)
- Week 12: Ventilation Survey (purpose, instrumentation, procedure and data tabulation. Ventilation Plans.)

- Week 13: Mine Illumination (Cap lamps. Lamp room layout and organization. Underground lighting from mains. Illumination standards. Illumination survey.)

3. Books:

Text Books

i). Mishra, G.B., Mine Ventilation and Environment, Oxford University Press, India, 2002.

ii). Banerjee, S.P. Mine Ventilation, Lovely Prakashan, Dhanbad, 2003.

iii). Vutukuri V.S. and Lama, R. D., Environmental Engineering in Mines, Cambridge University Press

iv). Hartman, H. L., Mutmansky, J.M., Ramani, R. V., Wang, Y. J.: Mine Ventilation and Air Conditioning, John-Wiley & Sons, 1997.

v). Karmakar, N. C., Handbook of Gas Testing, Lovely Prakashan, Dhanbad, 2012.

Reference Books

i). Roberts, A. Mine Ventilation, Cleaver-Hume; 1st Edition

ii). Skochinsky, A. and Komarov, V., Mine Ventilation, MIR Publisher

iii). Sengupta, M. Mine Environment Engineering, Vol.- II, CRC Press