

5th Semester	RMN5C003	Mine Environment and Ventilation	L-T-P 3-0-0	3 Credits
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Module-I:**(10 Hours)**

Mine Gases: Properties, physiological effects, occurrence, detection and monitoring, sampling and analysis of mine air; Methane: Methane content of coal seams, methane emission, methane layering, methane drainage, radon gas and its daughter products

Module-II:**(6 Hours)**

Heat and Humidity: Sources of heat and humidity in mines, physiological effects of heat and humidity, heat stresses, Psychrometry, air cooling power, air cooling systems

Module-III:**(10 Hours)**

Distribution and control of air flow through mine openings: Laws of fluid flow, resistance of mine airways, equivalent orifice, losses in airways, distribution of air, economic design of airways, flow control devices, standards of ventilation, regulation regarding air velocities in underground mines

Module-IV:**(16 Hour)**

Natural Ventilation: Causes of natural ventilation, methods of calculation of NVP

Mechanical Ventilation: Mine fans, types of fans, theory, characteristics and selection of fans, reversal of flows, fan laws, installation of fans, series and parallel combination of fans, fan drift, diffuser and evasee, booster fan, auxiliary ventilation

Module-V:**(8 Hours)**

Ventilation Surveys and Ventilation Planning: Pressure and quality surveys, survey instruments, planning of ventilation systems, estimation of air quality requirement for mines, principle of ventilation network analysis

Books:

- [1] Mine Environment and Ventilation, G. B. Mishra, Oxford University Press, 5th Impression, 1993.
- [2] Mine Ventilation, S. P. Banerjee, Lovely Prakashan, 1st Edition, 2003
- [3] Mine ventilation and Air Conditioning, H. L. Hartman, John Wiley, 1989
- [4] Subsurface Ventilation and Environmental Engineering, M. J. McPherson, Chapman & Hall, 1993

Digital Learning Resources:

Course Name: An Introduction to Mine Underground Environment and Ventilation

Course Link: <https://nptel.ac.in/courses/123/106/123106002/>

Course Instructor: Dr. Harsha Vardhan, IIT Madras