Course Type	Course Code	Name of the Course	L	T	P	Credits
DP2	**NMNC505**	Computational Subsurface Ventilation and Environment Lab	0	0	3	1.5

Course Objective
The course objective is to impart practical knowledge on the state-of-the-art techniques for monitoring the various ventilation and environmental parameters in underground mines and tunnels.
Learning Outcomes
Upon successful completion of this course, students will: • Learn the method of measurement of various ventilation and environmental parameters in underground mines and tunnels. • Learn the computer simulation of the incompressible flow ventilation network.

Unit No.	Topics to be Covered	Contact Hours	Learning Outcome
1	Measurement of airflow in tunnel using Vane Anemometer and Pitot tube	3	Students will learn the constructional features of anemometer and pitot tube, and the methods of measurement of air velocity using them.
2	Plotting of fan characteristic curves	3	Students will learn the plotting of fan characteristic curves of single fan, and combination of fans in series and parallel.
3	Computation of psychrometric properties of underground air	3	Students will learn computation of the resultant thermodynamic properties of the air.
4	Determination of thermal properties of rocks	3	Students will learn the advanced method of determination of thermal conductivity, thermal diffusivity and specific heat of rock.
5	Study of gas evolution characteristics of coal using Gas Chromatograph.	3	Students will learn the functions of important components of Gas Chromatograph (GC) and also method for analysis of gas evolution characteristics of coal using GC.
6	Determination of desorbable gas content of coal.	3	Students will learn the methods of desorbed gas, lost gas, and residual gas of the coal.
7	Determination of spontaneous combustion susceptibility of coal by R-70 apparatus	3	Students will learn the constructional features of R-70 apparatus and the procedure of for prediction of spontaneous combustion susceptibility of coal using the advanced apparatus.
8	Determination of wet oxidation potential of coal samples.	3	Students will learn the constructional features of wet oxidation potential apparatus and the comparison of spontaneous combustion susceptibility of different coal samples.
9	Determination of dust concentration using dust samplers.	3	Students will learn the constructional features and operational procedure of advanced dust Samplers.
10	Determination of noise level using Noise Level Meter.	3	Students will learn the constructional features of Noise Level Meter and method of determination of noise level.

11	Determination of illumination level in underground using Lux meter.	3	Students will learn the constructional features of Lux meter and method of determination of illumination level using Lux meter.
12	Ventilation simulation of underground workings	3	The students will learn simulation of the incompressible flow ventilation network using Ventsim software.
13	Mini Project	3	
	Practice & Review	3	
	Total	42	

Text Books:

1. Subsurface Ventilation and Environmental Engineering by M. J. McPherson, 2012

Reference Books:

1. Mine Ventilation and Air Conditioning : H. L. Hartman, Jan Mutmansky and Y. J. Wang
2. Mine Environmental Engineering, Vol. 1 & Vol. 2 : Mritunjoy Sengupta
3. Environmental Engineering in Mines : V. S. Vutkuri and R. D. Lama
4. Mine Ventilation : S. P. Banerjee
5. Mine Environment and Ventilation : Prof. G. B. Mishra
6. Advanced mine ventilation: Pramod Thakur
7. Prevention and combating mine fires: S.C. Banerjee