

5th Semester	RMN5D006	Ground Control Instrumentation	L-T-P 3-0-0	3 Credits
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Module-I: (10 Hours)

Deformation and Strain Measuring Instruments: Convergence meters, convergence recorders, tape extensometers, bore hole deformation, gauge, multipoint borehole extensometers and bore hole camera

Module-II: (14 Hours)

Load and Pressure Measuring Instruments: Load cells, pressure measuring instruments – stress capsules, stress meters, borehole pressure, cells and flat jacks. Strain gauges and transducers, readout units, sensors, transmitters and data acquisition systems

Module-III: (10 Hours)

Testing Equipment: UTM, MTS and acoustic emission equipment. Rock bolt pull tester, Monitoring and interpretation of the data

Module-IV: (12 Hours)

Applications: Mining Engineering applications: Instrumentation in underground mines and opencast mines; Civil Engineering applications; Instrumentation in Hydro electric projects and Tunnels, case studies

Books:

1. Comprehensive Rock Engineering, J. A. Hudson, Pergamon Press, UK, 2000
2. Strata Mechanics in coal mining, M. L. Jeremic, A A Balkema, Rotterdam, Taylor and Francis, 1985
3. Strata Control in Mineral Engineering, Z. T. Bieniawski, New York: John Wiley & Sons, 1987
4. Rock Mechanics for Underground Mining, B. H. G. Brady and E. T. Brown, George Allen and Unwin Ltd., 1992
5. Engineering Rock Mass Classifications, Z. T. Bieniawski, Wiley, New York, 1989