Course Type	Course Code	Name of Course	L	T	P	Credit
DP10	**MNC 307**	**Numerical Modelling / Remote Sensing & GIS Lab. (Modular)**	0	0	2	2

Course Objective
To provide skills in operating latest software in numerical modelling, remote sensing and GIS applications
Learning Outcomes
• will be able to design various structures in rock • will be able to process various remote sensing data • apply GIS and SAR to predict mine subsidence

Sl. No.	Major Topics	No. of Practicals	Learning outcomes
Numerical Modelling			
1	To perform finite element analysis of stress around a circular tunnel	1	basics of applying 2D numerical modelling
2	Study effect of mesh size on stress distribution around the circular tunnel and comparing the numerical solution with closed form solution	1	influence of mesh size on results of numerical modelling
3	Modelling of underground excavations in massive rockmass	1	understanding of 3D numerical modelling
4	To perform finite element analysis of a rib pillars and Modelling of sequence of excavation and design of stopes/cavern	1	solving metal mining geotechnical problems
5	Modelling of mechanical behaviour of pillars under different geo-mining conditions	1	modelling of coal mine pillars and understanding its strength behaviour
6	Modelling of a hydroelectric cavern and gas oil storage cavern	1	solving problems w.r.t. large civil underground structure
Remote Sensing & GIS Lab.			
7	Introduction to different types of remote sensing data products	1	Remote sensing data products and their uses in various applications
8	Visual interpretation of various features and Analysis on a satellite data.	1	data processing of satellite data and interpretation of results
9	Demonstration on various GIS software's and their salient features	1	An overview of the capabilities of GIS platform for a series of mining applications
10	Georeferencing of various maps and Satellite image & Digitisation for documentation of Mine Lease Boundaries	1	Geo-referencing and digitisation of cadastral map with lease boundary of mining areas
11	Preparation of Land Use/ Land Cover Map from the satellite data	1	Land pattern usages and change detection within lease area of mine
12	Mine subsidence modeling using Spaceborne SAR interferometry technique	1	Radar image processing to estimate subsidence.