Course Type	Course Code	Name of the Course	L	T	P	Credits
DP	NMNC519	Computer Aided Mine Planning and Design Lab	0	0	3	1.5

Course Objectives

Upon successful completion of this course; the students will

- have an in-depth and comprehensive understanding of mine planning and design process across the mining value chain, and application of various mine planning, scheduling and simulation software.
- be able to evaluate drillhole data from geological exploration, convert the drillhole data into geological database to perform various types of analysis such as statistical and geostatistical analysis, development of 3-D geological model and estimation of geological resources
- be able to perform open pit design, reserve estimation, estimation of waste quantity, design of waste dump, design of surface haul roads and development of an integrated pit.
- be able to perform production scheduling from the estimated open pit reserve.
- be able to perform design of underground stopes.

Learning outcomes

- The objective of the course is to provide an in-depth and comprehensive understanding of mine planning and design process, and knowledge about the application of mine planning, scheduling and simulation software.

Unit No.	Topics to be Covered	Practical Hours	Learning Outcome
1	Introduction to Mine Planning Process and Application of Computer Technology in Mine Planning	3	The students will be introduced to the mine planning process and application of computer technology in the mine planning
2	Computer Aided Mine Planning and Design Process with SURPAC	3	The students will be introduced to SURPAC Mine Planning Software in terms of its various functions and Applications.
3	String and DTM concept in Surpac	3	The students will learn the concept of String and DTM files in SURPAC including practicing the manipulation of String and DTM files.
4	Geological database and Geological Modeling Concepts	6	The students will learn the concept of geological database and Geological Modelling.
5	Creation of Geological Database in Surpac and Import of Geological Data	3	The students will learn how to create a geological database in Surpac mine planning software.
6	Drill Hole Visualization and Data Presentation	3	The students will learn how to visualize and present the drill-hole data for analysis.
7	Compositing and Statistical Analysis of Geological Data	3	The students will learn to create ore composites from drill-hole data and undertake statistical analysis of geological database to enhance the understanding to distribution of grades etc.
8	Sectioning & Digitization of drill hole data to identify ore-body.	3	The students will learn how to cut a section plane across ore bearing area, demarcate and digitize the ore-body.

Unit No.	Topics to be Covered	Practical Hours	Learning Outcome
9	Geo-Statistic Analysis & Variogram Modeling	3	The students will learn how to undertake geo-statistical analysis of mineral data to establish spatial relationship between the data (co-relation) through variogram modelling.
10	Block Modeling & Resource Estimation	3	The students will learn and practice block modelling concepts and mineral resource estimation process in SURPAC software.
11	Pit Design and pit lay layout	3	The students will learn and practice pit design process and create pit layout in SURPAC software.
12	Design of haul road	3	The students will learn and practice the haul-road design process in Surpac software.
12	Production Scheduling	3	The students will learn how to create a geological database in Minex mine planning software for stratified deposit.
13	Overview of planning and design of stratified deposit.	3	The students will be introduced to the planning and design of stratified deposits such as coal, Phosphate etc. using Minex software.
	TOTAL	42	

Textbooks

1) Tutorials on mine planning software SURPAC, Minex, Datamine.