

Course Type	Course Code	Name of Course	L	T	P	Credit
DC (Hons)	NGLH405	Geostatistics & Mining Geology Practical	0	0	3	1.5

Course Objective			
Students learn to solve practical exercises in classical statistics, geostatistics, and core drilling.			
Learning Outcomes			
Upon completion of the course, students will be able to:			
<ul style="list-style-type: none"> <li>• Apply traditional statistical tools and tests.</li> <li>• Use geostatistical concepts and principles to characterise mineral deposits.</li> <li>• Perform semi-variogram, kriging, and conditional simulation.</li> <li>• Estimate core recovery and bulk density of wet and dry core.</li> </ul>			
Unit No.	Topics to be Covered	Practical Hours	Learning Outcome
1.	Analysis of frequency distributions with equal and unequal sample supports	3	Understand frequency distribution analysis and compute its descriptive measures
2.	Frequency distribution analysis with unequal support.	3	Understand frequency distribution analysis and calculate average grade
3.	Drill hole statistics and reserve estimation	3	Learn compositing of sample values from drill holes and compute reserves.
4.	Fitting a normal distribution (graphical and numerical methods)	3	Fit a normal probability distribution to a sample frequency distribution and estimate population parameters
5.	Fitting a lognormal distribution (graphical and numerical methods)	3	Fit a lognormal probability distribution to a sample frequency distribution and estimate population parameters.
6.	Chi-squared goodness-of-fit test	3	Numerically fit a probability distribution
7.	One-dimensional semi-variography	3	Compute experimental semi-variograms in one dimension
8.	Two-dimensional semi-variography	3	Compute experimental semi-variograms in two dimensions
9.	Calculation of estimation variance	3	Calculate estimation variance
10.	Stope block evaluation one estimation problem	3	Geostatistically evaluate a stope block
11.	Core recovery and dry bulk density estimation	6	Evaluate core recovered and estimate bulk density for dry and wet cores
12.	Difference in surveyed and DTM bore hole	3	Validate surveyed point coordinates with Digital Terrain Model (DTM)
13.	Practical examination	3	Assess practical understanding
	<b>Total Hours</b>	42	

#### Reference Books:

14. Isaaks Edward (1989). An Introduction to Applied Geostatistics. Oxford university press.
15. Marat Abzalov (2016). Applied Mining Geology.

#### Other Reference Books:

16. Sinclair, A.J. and Blackwell, G.H. (2002) *Applied Mineral Inventory Estimation*, Cambridge University Press.
17. David, M. (1977) *Geostatistical Ore Reserve Estimation*, Elsevier Scientific Publ. Co., Amsterdam.

18. Chiles, J.P. and Delfiner, P. (1999) *Geostatistics – Modelling Spatial Uncertainty*, John Wiley and Sons, New York.
19. Clark, I. (1979) *Practical Geostatistics*, Elsevier Applied Science Publ., London.
20. David, M. (1988) *Handbook of Applied Advanced Geostatistical Ore Reserve Estimation*, Elsevier, Amsterdam.
21. Davis, J.C. (1986) *Statistics and Data Analysis in Geology*, 2nd Edition, John Wiley & Sons, New York.
22. Gandhi, S.M. and Sarkar, B.C. (2016) *Essentials of Mineral Exploration and Evaluation*, Elsevier, USA.
23. Goovaerts, P. (1997) *Geostatistics for Natural Resources Evaluation*, Oxford University Press, Oxford.
24. Isaaks, E.H. and Srivastava, R.M. (1989) *An Introduction to Applied Geostatistics*, Oxford University Press.
25. Journel, A.G. and Huijbregts, C.J. (1978) *Mining Geostatistics*, Academic Press, London.
26. Wellmer, F.W. (1998) *Statistical Evaluation in Exploration for Mineral Deposits*, Springer, Hannover.