

## **GIS – 876 Geo-Statistics (3+0=3)**

### **1. Course Objectives:**

a. Geostatistics is the name commonly associated with both the techniques utilized and the problems/objectives arising out of applications in the earth sciences where earth sciences is interpreted in a broad sense (including but not limited to geosciences, hydrology, soil sciences, mining engineering, environmental monitoring and assessment, atmospheric sciences). In general the topics are oriented to the analysis of spatially located data and in particular the estimation of values of the variable or variables of interest (for example ore grades, pollutant concentrations, hydrologic parameters) at an unsampled point or the average over an area or volume using data at a discrete number of (possibly) irregularly spaced points.

### **2. Course Outcomes:**

a. The course will emphasize applying the methods and software for the analysis of a specific data set as well as becoming familiar with the literature.

### **3. Course Code:**

a. GIS – 876

### **4. Credit Hours:**

a. Theory = 03  
b. Practical = 00  
c. Total = 03

### **5. Detailed Contents:**

a. Introduction  
b. Sampling  
c. Exploratory Data Analysis  
d. Spatial Statistics  
e. Puntual Kriging  
f. Variograms  
g. Block Kriging  
h. Universal Kriging  
i. Space-time Modeling  
j. Intrinsic Random Functions  
k. Non-linear Transformations  
l. Comparison with other Techniques  
m. Multivariate Methods  
n. Geostatistical Simulation and Risk Assessment  
o. Geostatistcs Application Areas

### **6. Textbooks/Reference Books:**

a. P. K. Kitanidis (1997) Introduction to Geostatistics : Applications in Hydrogeology Cambridge University Press ISBN: 0521587476 Ralphs, M. P., & Wyatt, P. (2003). GIS in land and property management. Taylor & Francis. 416 pages, ISBN: 0415240654.  
b. Noel A. C. Cressie (1993) Statistics for Spatial Data (Wiley Series in Probability and Statistics) Wiley-Interscience; 1st edition ISBN: 0471002550

- c. A . Stewart Fotheringham, Chris Brunsdon, (2000) Quantitative Geography: Perspectives on Spatial Data Analysis SAGE Publications  
ISBN: 0761959483