

## **Data Analysis for Geoscientists GEOS 5306**

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Text: Davis, J. C., (2002), *Statistics and Data Analysis in Geology*, 3rd ed., Wiley, New York.

Recommended Text: Hanselman, D. and B. Littlefield, (2005), *Mastering MATLAB 7*, Prentice-Hall, Englewood Cliffs, NJ.

Goals: To introduce graduate students in geology and GIS to statistical and mathematical methods appropriate for the analysis and modeling of spatial and temporal data.

Assumed background knowledge:

Win95/98/2000/XP and/or linux/unix operating system

The UTD computer network

Programming ability in C, Fortran, MATLAB or an equivalent (and available) language

Basic statistics, at the level of an introductory course

These requirements are similar to the content of GEOS 5303, *Computing for Geoscientists*.

Topics to Cover (some of which are optional, depending on class interest and needs):

Review of elementary statistics, probability and linear algebra

Robust statistics

Exploratory data analysis

Contouring and surface estimation, including Kriging

Fractals and self-similar processes

Point, line and area patterns

Statistics of orientation (angular) data

Multivariate statistics - regression, principal components, factor analysis, cluster analysis

Time (and space) series analysis and spectral analysis

Semester Project: A project of the student's own device (with help from the faculty). A one page, written proposal will be due in late February. After review by the instructor, a final version of the project will be assigned. The project will be reviewed on the basis of both creativity and practicality (given available resources). All projects are due at the end of the semester.