

**Fall 2008**  
**CE679 Regression and Stochastic Methods**

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Lectures: Monday, 06:45-08:45PM

CE679 is an introduction to the practical statistical methods for students majoring in sciences and engineering. Statistical reasoning plays a critical role in the modern sciences, as much of real-life problems naturally involve a large amount of uncertainty and randomness. This course will teach students to use regression models as a research tool in experimental studies on particular real-life examples (taken mostly from environmental sciences). This course will introduce stochastic methods using commonly used regression models, such as linear models, polynomial and exponential models, the Monod model (a non-linear regression model widely used in environmental and biomedical research), sigmodal models, and simple hierarchical models. Bayesian approach will be considered in substantial depth. Commercial and free statistical

software for both Windows and Linux will be reviewed, and some programs, such as Origin, WinBugs, Statistica and Mathematica will be introduced in greater detail and then widely used throughout the course. Optimal experimental design theory will be introduced and illustrated with on-line based programs presented at [www.optimal-design.org](http://www.optimal-design.org).

Graduate and advanced undergraduate students from any science and engineering department who are interested in contemporary applied statistics are welcome to register. Particular topics include: Bayesian approach, causal inference, linear and multiple linear regression, non-linear regression models, dose-response models, analysis of variances, optimal experimental design.

