CE679 is an introduction to the practical statistical methods for students majoring in sciences and engineering using R and OpenBugs. 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 statistical methods on particular real-life examples (taken mostly from environmental sciences) using R and OpenBugs. 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.

Students will need to install two free programs R (http://www.r-project.org/) and OpenBugs (http://mathstat.helsinki.fi/openbugs/). It is also convenient to operate R using code editors, such as Tinn-R for Windows (http://sourceforge.net/projects/tinn-r) and RKWard for Linux (http://rkward.sourceforge.net/).

Textbooks: