Students requiring accommodations as a result of disability, must contact the Centre for Students with Disabilities 778-782-3112 or csdo@sfu.ca

Instructor: Dr. Brad McNeney

Prerequisite:

Statistics 830 or permission of the instructor

Textbook:

Required:
Numerical Analysis for Statisticians (2nd ed.), by K. Lange, published by Springer, 2010;

Supplementary:
Numerical Optimization (2nd ed.), by J. Nocedal and S.J. Wright, published by Springer-Verlag, 2006;
Introducing Monte Carlo Methods with R. By C. Robert and G. Casella, published by Springer, 2010

Calendar Description:

An introduction to computational methods in applied statistics. Topics can include: the bootstrap, Markov Chain Monte Carlo, EM algorithm, as well as optimization and matrix decompositions. Statistical applications will include frequentist and Bayesian model estimation, as well as inference for complex models. The theoretical motivation and application of computational methods will be addressed.

Outline:

1. Review of likelihood and Bayesian inference
2. Foundations of statistical computing: finite precision arithmetic, pseudorandom number generation, approximations
3. Matrix computations
4. Optimization and root-finding
5. Approximating derivatives and integrals
6. Monte Carlo
7. Markov chain Monte Carlo

Grading Scheme:

Assignments 25%
Projects 75%
Grading is subject to change.

Revised October 26, 2011