STATISTICS 890
STATISTICAL COMPUTING

Summer 2005
DAY COURSE

Instructor: Tim Swartz

Textbook:

There will be no textbook for this course although references will include:
- Robert and Casella - Monte Carlo Statistical Methods
- Fishman - Monte Carlo: Concepts, Algorithms and Applications
- Thisted - Elements of Statistical Computing
- Evans and Swartz - Approximating Integrals via Monte Carlo and Deterministic Methods

Course Description:

Topics will include:

1. Basic numerical considerations
   - computer arithmetic
   - error analysis

2. Random number generation
   - uniform generators
   - inversion
   - rejection sampling
   - aliasing
   - envelope methods

3. Optimization
   - Newton type methods
   - EM algorithm
   - simulated annealing

4. Integration
   - Laplace approximation
   - quadrature
   - importance sampling
   - Markov chain Monte Carlo
   - variance reduction

Other topics may include:
- bootstrapping
- data mining
- saddlepoint approximations
- Splus
- symbolic computation
- density estimation
- smoothing
- CART
- WinBUGS
- multivariate skew distributions

Grading Scheme:

Assignments (weighting TBA)
Final exam (weighting TBA)

Students should be aware that they have certain rights to confidentiality concerning the return of course papers and the posting of marks. Please pay careful attention to the options discussed in class at the beginning of the semester.

Revised March 2005