Semester course: STAT 7730 -- 3 CREDIT HOURS

1. Transcript Abbreviation: (maximum 18 characters)

Adv Comp Stats

2. Long course title

Advanced Computational Statistics

3. Course description: (maximum of 250 characters)

Covers commonly used statistical computing methods, with emphasis on how and why they work in a variety of important statistical models. As a prerequisite, students should be able to program basic functions in a statistical computing environment. Intended primarily for students in the PhD program in Statistics or Biostatistics.

4. Prerequisites / Co-requisites (use quarter and semester codes):

Stat 6802 (Stat 622 under quarters) and Stat 6950 (Stat 645 under quarters), or written permission of the instructor

5. Exclusions (use quarter and semester codes):

Not open to students with credit for Stat 773.

6. A list of topics that make up the course: (One per line, max of 15 topics -- if you course description is a list of topics, I can just use that list)

1. Matrix decompositions
2. Univariate optimization
3. Numerical methods of maximum likelihood estimation
4. EM algorithm and extensions
5. Probability density function estimation
6. Numerical integration
7. Random number and variate generation
8. Rejection sampling
9. Monte Carlo integration
10. Importance sampling methods
11. Bootstrap and resampling methods
12. Markov chain Monte Carlo (MCMC) methods
13. Gibbs sampler
14. Metropolis-Hastings algorithm

7. Does you class have a component that is not just a lecture (YES/NO):

NO

8. If your course is not a straight conversion and adds or removes material, write a brief rationale for the change (one sentence - max 250 characters).
Whereas STAT 773 is not currently a required course for any degree program, the revised Ph.D. program in Statistics will include STAT 7xxx as a required course. Because statistical computing methods have become an integral component to both data analysis and methodological research in the statistical sciences, a 3 credit hour semester course will be required to cover the methods of modern statistical computing at a level that will enable our Ph.D. students to use and develop these methods as a part of their research.

Conversion of Stat 773