

Course Information for STAT:7400 (22S:248) Computer Intensive Statistics

Semester: Spring 2015

Lectures: MWF 11:30PM – 12:20PM

Room: Schaeffer 14

Instructor: Luke Tierney, Schaeffer 209, *luke-tierney@uiowa.edu*.

Office Hours MWF 10:30PM – 11:20PM or by appointment.

Web Page: <http://www.stat.uiowa.edu/~luke/classes/248>

DEO: Joseph Lang, 241 SH, 335-0712

Outline

The goal of this course is to develop skills, knowledge, and tools useful in applying modern computationally intensive statistical methods to research in any field. Topics will be selected from random variate generation, design and analysis of simulation experiments, optimization algorithms for model fitting, bootstrap, Markov chain Monte Carlo, smoothing, machine learning and data mining, parallel computing, data technologies, and graphical methods. Most topics will be presented in the context of the R statistical computing language.

Prerequisites

The prerequisites for this course are STAT:5200 (22S:164) or BIOS:5610 (171:201) and proficiency in Fortran or C or C++ or Java. These prerequisites imply a basic familiarity with mathematical statistics and with R.

Reading and Homework

Homework assignments consisting of a mix of computational and theoretical problems will be given roughly every week. Some problems will cover material not addressed in class and may require additional reading. Assignments will be posted on the class web site. Suggested reading will also be posted on the class web site when appropriate, but you should also seek out and explore relevant references on your own. Assignments will need to be submitted electronically. Many students find that these assignments take a long time to complete, so plan your time accordingly.

Class Project

Students registered for this class are expected to complete a class project. You can work on this project on your own or in a group of up to three students. Your project should represent about 20 hours of work on a topic of your choice that involves computation. You should start to think about the topic as soon as possible. You might investigate properties of a methodology you find interesting, you might compare several methods on a variety of problems, or you might analyze an interesting data set using methodology related to ideas introduced in the class. There are many possible choices for the topic of your project, and identifying a suitable topic is an important

part of your task. The project should represent new work, not something you have done for another course or as part of your thesis.

A proposal for your project is due on Friday, March 27. The proposal should be at most two pages long. A final report on your project is due on Friday, May 8. The report should be three to five pages in length, excluding any appendices you wish to attach, and must be submitted electronically. Your project will be shared with the class through the class web page.

Grading

The course grade will be based on assignments and the class project. You may discuss general issues and approaches with your fellow students, but your work must be your own. If you use any references, including solutions to similar problems prepared by other students, you *must* cite and credit your sources.

EMail and World Wide Web

Announcements on changes or clarifications of assignments or other matters may be sent by email to your university email account or posted on the class web page. You should check the class home page and your email regularly.

College of Liberal Arts and Sciences: Policies and Procedures

Administrative Home of the Course

The College of Liberal Arts and Sciences is the administrative home of this course and governs matters such as the add/drop deadlines, the second-grade-only option, and other related issues. Different colleges may have different policies. Questions may be addressed to 120 Schaeffer Hall, or see the CLAS *Student Academic Handbook*: <http://www.clas.uiowa.edu/students/handbook/>.

Electronic Communication

University policy specifies that students are responsible for all official correspondences sent to their University of Iowa e-mail address (@uiowa.edu). Faculty and students should use this account for correspondences. (*Operations Manual*, III.15.2. Scroll down to k.11.)

Accommodations for Disabilities

A student seeking academic accommodations should first register with Student Disability Services and then meet privately with the course instructor to make particular arrangements. See www.uiowa.edu/~sds/ for more information.

Academic Honesty

The College of Liberal Arts and Sciences expects all students to do their own work, as stated in the CLAS Code of Academic Honesty. Instructors fail any assignment that shows evidence of plagiarism or other forms of cheating, also reporting the student's name to the College. A student reported to the College for cheating is placed on disciplinary probation; a student reported twice is suspended or expelled.

CLAS Final Examination Policies

Final exams may be offered only during finals week. No exams of any kind are allowed during the last week of classes. Students should not ask their instructor to reschedule a final exam since the College does not permit rescheduling of a final exam once the semester has begun. Questions should be addressed to the Associate Dean for Undergraduate Programs and Curriculum.

Making a Suggestion or a Complaint

Students with a suggestion or complaint should first visit the instructor, then the course supervisor, and then the departmental DEO. Complaints must be made within six months of the incident. See the CLAS Student Academic Handbook.

Understanding Sexual Harassment

Sexual harassment subverts the mission of the University and threatens the well-being of students, faculty, and staff. All members of the UI community have a responsibility to uphold this mission and to contribute to a safe environment that enhances learning. Incidents of sexual harassment should be reported immediately. See the UI Comprehensive Guide on Sexual Harassment for assistance, definitions, and the full University policy.

Reacting Safely to Severe Weather

In severe weather, class members should seek appropriate shelter immediately, leaving the classroom if necessary. The class will continue if possible when the event is over. For more information on Hawk Alert and the siren warning system, visit the Public Safety web site.