This syllabus is subject to change; the final version will be made available for enrolled students at the start of the semester.

Course Information for STAT:7400 Computer Intensive Statistics
Semester: Spring 2019
Lectures: MWF 11:30PM – 12:20PM
Room: Schaeffer 74

Instructor:	Luke Tierney, Schaeffer 209, *luke-tierney@uiowa.edu*.
Office Hours:	10:30 – 11:20 or by appointment.
Web Page:	`http://www.stat.uiowa.edu/~luke/classes/STAT7400`
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 or BIOS:5610 and proficiency in Fortran or C or C++ or Java. These prerequisites imply a basic familiarity with mathematical statistics and with R.

Recommended Textbooks

Geof H. Givens, Jennifer A. Hoeting (2005). *Computational Statistics*, Wiley-Interscience.

Norman Matloff (2011). *The Art of R Programming: A Tour of Statistical Software Design*, No Starch Press.

John Monahan (2011). *Numerical Methods of Statistics*, 2nd Edition, Cambridge University Press.

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 interestign 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 Monday, March 25. The proposal should be at most two pages long. A final report on your project is due on Friday, May 3. The report should be three to five pages in length, excluding any appendices you wish to attach, and must be submitted electronically. Your project may 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 Academic Policies Handbook at `https://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, k.11).

Accommodations for Disabilities

The University of Iowa is committed to providing an educational experience that is accessible to all students. A student may request academic accommodations for a disability (which includes but is not limited to mental health, attention, learning, vision, and physical or health-related conditions). A student seeking academic accommodations should first register with Student Disability Services and then meet with the course instructor privately in the instructor's office to make particular arrangements. Reasonable accommodations are established through an interactive process between the student, instructor, and SDS. See `https://sds.studentlife.uiowa.edu/` for information.

Academic Honesty

All CLAS students or students taking classes offered by CLAS have, in essence, agreed to the College's Code of Academic Honesty: "I pledge to do my own academic work and to excel to the best of my abilities, upholding the IOWA Challenge. I promise not to lie about my academic work, to cheat, or to steal the words or ideas of others; nor will I help fellow students to violate the Code of Academic Honesty." Any student committing academic misconduct is reported to the College and placed on disciplinary probation or may be suspended or expelled (CLAS Academic Policies Handbook).

CLAS Final Examination Policies

The final examination schedule for each class is announced by the Registrar generally by the fifth week of classes. Final exams are offered only during the official final examination period. **No exams of any kind are allowed during the last week of classes.** All students should plan on being at the UI through the final examination period. Once the Registrar has announced the date, time, and location of each final exam, the complete schedule will be published on the Registrar's web site and will be shared with instructors and students. It is the student's responsibility to know the date, time, and place of a final exam.

Making a Suggestion or a Complaint

Students with a suggestion or complaint should first visit with the instructor (and the course supervisor), and then with the departmental DEO. Complaints must be made within six months of the incident (CLAS Academic Policies 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 Office of the Sexual Misconduct Response Coordinator 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 Department of Public Safety website.