Computing in Statistics

Fall 2019

Lectures  MWF 9:30 AM – 10:20 AM
           150 SH

Instructor  Boxiang Wang, 261 SH, boxiang-wang@uiowa.edu
Office Hours MW 8:15 AM – 9:30 AM, or by appointment.
Teaching Assistant  Xun Li, xun-li@uiowa.edu
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            http://www.stat.uiowa.edu
DEO  Professor Kung-Sik Chen, DEO, 319-335-0712,
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Course Website. I will post announcements, homework problems, lecture notes, and other course information in ICON http://icon.uiowa.edu.

Course Description and Objectives.
This is a required course for master students in statistics. Through hands-on experience with real problems, we will learn computing skills essential in applied statistics and in research in methodological and theoretical statistics. Topics include the Linux operating system; R and SAS (statistical computing environments); LATEX (mathematical document preparation language); reproducible research; database management; simulation methods (Monte Carlo studies, bootstrap, MCMC); statistical computing algorithms (Newton’s method, for example); interfacing to cyberinfrastructure resources.

Grading. Your semester grade will consist of the following components:

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<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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<tr>
<td>Homework</td>
<td>15%</td>
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<tr>
<td>Midterm Exam 1</td>
<td>15% Sep 27</td>
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<tr>
<td>Midterm Exam 2</td>
<td>15% Nov 1</td>
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<tr>
<td>Project</td>
<td>25%</td>
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<tr>
<td>Final Exam</td>
<td>30% TBD</td>
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<tr>
<td>Total</td>
<td>100%</td>
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Grading will be on a curve, with +/- grade used. A grade of A+ represents exceptional work and rarely is awarded.

Homework. In general, homework will be assigned each Friday and will be due in class the following Friday Exceptions to this schedule will be announced in class. Homework should be submitted electronically through the ICON submission tools for this course (icon.uiowa.edu). Show your work when solving written homework problems. Complete code and output must be submitted for computer problems.
You are encouraged to study with others. However, if you do work with others on homework assignments, please: a) write up your own assignment and make sure you completely understand all solutions that you submit, and b) write the names of the others in your study group on your assignment.

Late homework is accepted only as required by university policy, i.e. due to “illness, mandatory religious obligations, or other unavoidable circumstances or University activities.”

Exams. There will be two 50-minute computing midterm exams and one comprehensive two-hour hands-on final exam. The midterms will be scheduled in the computer lab during the regular class period. The final will be given in the computer lab during the scheduled final-exam period. The computing exams are open book and open notes. Students must take exams as scheduled except in cases of officially university-approved absence such as class conflict with official exam time, illness, religious observance, and NCAA athletic competition.

Makeup exams are not available for other reasons, including student org field trips, club competitions, job interviews, and personal events. In the case of university-approved absence, the final exam score substitutes for the missing midterm exam score.

A student who is absent for more than five days or miss an exam due to an emergency or an illness may request the UI Service Center, 17 Calvin Hall, registrar@uiowa.edu, to notify me of the reason for the absence.

More teaching policies and resources are seen in: https://clas.uiowa.edu/faculty/teaching-policies-resources-examination-policies.

Projects. Students will work in groups of three or four to carry out projects involving application of the statistical computing methods covered in the course to problems of their own choosing. Examples of possible types of projects are:

- Design and carry out a simulation study to compare the properties of two or more statistical procedures.
- Learn to use two or more R packages that we have not studied as a class. Apply them to perform useful analyses of a real dataset.
- Choose a research question and find data to address it. Use SAS to “clean” and prepare the data to carry out an analysis.

Projects will be carried out in two stages. Please meet with me while you are working on each stage.

- Project proposal (due Nov 11).
Each team should write a two-page summary. This is a detailed description of what you plan to do, including questions to be addressed, software to be used, methods to be applied.

- Project presentation.
  Each team will give a twenty-minute presentation during the week of Dec 9. A list of which tasks each team member has performed should be submitted.

“Incomplete” Grades A grade of “Incomplete” will only be given under extraordinarily extenuating circumstances that prevent the student from completing the course requirements. Having a failing grade in the course is not an extraordinarily extenuating circumstance.

CLAS: Polices and Procedures
Absences and Attendance
Students are responsible for attending class and for contributing to the learning environment of a course. Students are also responsible for knowing their course absence policies, which will vary by instructor. All absence policies, however, must uphold the UI policy related to student illness, mandatory religious obligations, including Holy Day obligations, unavoidable circumstances, or University authorized activities (https://clas.uiowa.edu/students/handbook/attendance-absences). Students may use this absence form to aid communication; the instructor will decide if the absence is excused or unexcused (https://clas.uiowa.edu/sites/default/files/ABSENCE%20EXPLANATION%20FORM2019.pdf).

Academic Integrity
All undergraduates enrolled in courses offered by CLAS have, in essence, agreed to the College’s Code of Academic Honesty. Misconduct is reported to the College, resulting in suspension or other sanctions, with sanctions communicated with the student through the UI email address (https://clas.uiowa.edu/students/handbook/academic-fraud-honor-code).

Accommodations for Disabilities
UI is committed to an educational experience that is accessible to all students. A student may request academic accommodations for a disability (such as mental health, attention, learning, vision, and physical or health-related condition) by registering with Student Disability Services (SDS). The student is then responsible for discussing specific accommodations with the instructor. More information is at https://sds.studentlife.uiowa.edu/

Administrative Home of the Course
The College of Liberal Arts and Sciences (CLAS) is the administrative home of this course and governs its add/drop deadlines, the second-grade-only option, and related policies. Other colleges may have different policies. CLAS policies may be found here: https://clas.uiowa.edu/students/handbook.

Communication and the Required Use of UI Email
Students are responsible for official correspondences sent to the UI email address (uiowa.edu) and must use this address for all communication within UI (Operations Manual, III.15.2).
Complaints
Students with a complaint about an academic issue should first visit with the instructor or course supervisor and then with the Chair of the department or program offering the course; students may next bring the issue to the College of Liberal Arts and Sciences. For more information, see https://clas.uiowa.edu/students/handbook/student-rights-responsibilities.

Final Examination Policies
The final exam schedule is announced around the fifth week of classes; students are responsible for knowing the date, time, and place of a final exam. Students should not make travel plans until knowing this information. No exams of any kind are allowed the week before finals. Visit https://registrar.uiowa.edu/final-examination-scheduling-policies.

Nondiscrimination in the Classroom
UI is committed to making the classroom a respectful and inclusive space for all people irrespective of their gender, sexual, racial, religious or other identities. Toward this goal, students are invited to optionally share their preferred names and pronouns with their instructors and classmates. The University of Iowa prohibits discrimination and harassment against individuals on the basis of race, class, gender, sexual orientation, national origin, and other identity categories set forth in the University’s Human Rights policy. For more information, contact the Office of Equal Opportunity and Diversity (diversity.uiowa.edu).

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 must uphold the UI mission and contribute to a safe environment that enhances learning. Incidents of sexual harassment must be reported immediately. For assistance, please see https://osmrc.uiowa.edu/