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STAT 422.01: Mathematical Statistics

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STAT 422 Mathematical Statistics

Spring 2022, MWF 10:00-10:50, Math 211

Course Information

- **Instructor:** David Patterson, Math 208, 243-6748, david.patterson@umontana.edu
- **Textbook:** Introduction to Probability, 2nd ed., Blitzstein and Hwang and Devore and Berk, Modern Mathematical Statistics with Applications, 2nd ed (both books available via free legitimate download).
- **Prerequisites:** M 273 (Multivariable Calculus)
- **Software:** Some assignments will require the use of R. R is a free program which can be downloaded from <http://www.r-project.org/>. It is also available in the Math 206 computer lab.
- **Office Hours:** See Moodle page

Grading (+/- grading will be used):

- Homework: 30%
- Midterm exams 1,2 and final exam (all equal): 70%

STAT 422 is the second semester of a year-long course in probability and mathematical statistics. It will cover material from Chapters 9-10 and 12 of Blitzstein & Hwang and Chapters 7-10 of Devore & Berk, plus additional material from these books as time permits. Use of computer software (R) will be integrated into the course as needed.

Catalog description:

Offered spring. Prereq., STAT 421. Introduction to the theory of point estimation, interval estimation, and hypothesis testing. Level: Undergraduate-Graduate

Learning Goals:

1. To understand how to derive estimators and their properties, such as distribution, variance, bias, MSE, and consistency and other asymptotic properties.
2. To understand the theory behind confidence intervals and hypothesis tests.
3. To understand likelihood theory and apply it to estimation and hypothesis testing.
4. To gain an understanding of the theory behind normal-based inference procedures for the one and two-sample problems.
5. To be able to use software to obtain numerical solutions to problems where analytical solutions are not possible and to carry out simulations to compare inference procedures.

Homework

Homework will be assigned every week, to be handed in one week later. Up to two late homeworks will be accepted without penalty if they are handed in by the start of the next class. In addition, your lowest homework score will be dropped. Homework is vital to your success in this class. Working with other students on homework is allowed and even encouraged, so long as you hand in your own work, and do not simply copy someone else's work.

Midterm Exams

The exams will be partially closed book/closed notes, partially open book/open notes. The exact dates will be given later. If you cannot make it to an exam for a good reason, please let me know well ahead of time.

Final Exam

10:10-12:10, Thursday, May 12.

Important dates:

- **Monday, January 17:** Martin Luther King Jr. Day, no classes.
- **Monday, February 7, 5 pm:** last day to drop classes with refund and no entry on transcript. After this date through March 29, W will appear for dropped classes.
- **Monday, February 21:** Presidents' Day, no classes, offices closed.
- **Tuesday, March 29:** last day to drop without Dean's signature. After this date, WP or WF will appear on transcript rather than W.
- **Monday-Friday, March 21-25:** Spring break
- **Friday, May 6:** last day of classes. Last day to drop (requires Dean's signature). Last day to change to CR/NCR grading.
- **Thursday, May 12: 10:10-12:10 pm:** Final exam.

Incompletes

Incompletes are given at the discretion of the instructor and are only considered in cases where the student has been in attendance and doing passing work up to three weeks before the end of the semester, and for reasons beyond the student's control and which are acceptable to the instructor, the student has been unable to complete the requirements of the course on time. Negligence and indifference are not acceptable reasons.

Students with disabilities are welcome to discuss accommodations with me.

Academic Honesty

All students must practice academic honesty. Academic misconduct is subject to an academic penalty by the course instructor and/or a disciplinary action by the University. All students need to be familiar with the Student Conduct Code. You can find it in the A-Z index on the UM home page.