

STAT 422 Mathematical Statistics Spring, 2018

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| <u>Instructor:</u> | Ekaterina Smirnova, Math 301, ekaterina.smirnova@mso.umt.edu |
| <u>Time/Room:</u> | Tu, Th, 4:00-5:20pm, in Math 108 |
| <u>Textbook:</u> | Probability and Statistics, by DeGroot & Schervish, 4th ed. |
| <u>Office Hours:</u> | MW 12:00 - 1:00 pm, By appointment |
| <u>Grading:</u> | Homework/Quiz: 30% Exams 1,2: 40% Final: 30% |
| <u>Prerequisites:</u> | Stat 421 (Probability Theory), or consent of instructor |

Homework will be assigned every Thursday, to be handed in at the beginning of class the following Thursday. All problems must be solved, but only **2 randomly selected problems** will be graded. **NO LATE HOMEWORK WILL BE ACCEPTED FOR ANY REASON**, and the lowest homework grade will be dropped. Homework is not only a fairly substantial portion of your grade, but is vital to your success in this class. Working with other students on homework is allowed and even encouraged, as long as you hand in your own work, and do not simply copy someone else's work. Solutions to all problems will be provided.

Quiz will be given every Tuesday. Problems on the quiz will come either directly from the homework set assigned a week before, or very closely related to those homework problems. One lowest quiz grade will be dropped. If you cannot make it to a quiz, you must let me know **BEFORE** the quiz is given. No make-up quizzes will be given without a valid reason for missing the quiz.

Exams 1 & 2 will be cumulative and closed book. More about the exams, including the exact dates of the exams will be given later. If you cannot make it to an exam, you must let me know **BEFORE** the exam is given. No make-up exams will be given without a documentable reason for missing the exam.

Final exam. The in class portion of final will be held on the last day of classes (Thursday, May 3rd) and will be cumulative and closed book. The take home portion of the final exam will be due the end of the day, Thursday, May 10. **Course Material and Objectives:**

This course builds upon the topics of probability theory, random variables and their probability distributions, studied in STAT 421. Here, we examine basic statistical theory, methods of estimation, and hypothesis testing. Some goals of this course are to provide a foundation for more advanced studies in probability and statistics, to understand how to approach and think about a problem involving data, and to demonstrate the numerous applications of probability and statistics. Throughout the course, the R computer package will be used both in class and in homeworks to illustrate concepts.

Learning Outcomes:

1. To be able to understand how to derive estimators and their properties, such as distribution, variance, bias, MSE, consistency and other asymptotic properties.
2. To be able to understand the theory behind confidence intervals and hypothesis tests.
3. To be able to understand likelihood theory and apply it to estimation and hypothesis testing.
4. To have an understanding of the theory behind normal-based inference procedures for 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.

Additional Course Information: The last day to add this course through Cyberbear is January 30. The last day to drop this course or change the grading option through Cyberbear is February 9. February 19 – President's Day, no classes. March 26-30 Spring Break, no classes. May 4 - last day of classes. May 7 - 11

Final exams week. See <http://www.umt.edu/registrar/default.php> for other important dates.

Academic Misconduct: All students must practice academic honesty. Academic misconduct is subject to an academic penalty by the course instructor and/or a disciplinary sanction by the University. All students need to be familiar with the Student Conduct Code. The Code is available for review online at http://life.umt.edu/vpsa/student_conduct.php.

Disability Services: The University of Montana assures equal access to instruction through collaboration between students with disabilities, instructors, and Disability Services for Students (DSS). If you think you may have a disability adversely affecting your academic performance, and you have not already registered with DSS, please contact DSS in Lommasson 154. I will work with you and DSS to provide an appropriate accommodation.

Questions are strongly encouraged, both during class and at office hours. If you are lost or confused, please let me know.