

MATH 4342 – MATHEMATICAL STATISTICS I

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Course Pages: <https://www.math.ttu.edu/hongwei/MATH4342.html>

Time&Place: TR 11:00 AM-12:20 PM @MAT010

Office Hours: TR 9:00 AM-9:30 PM and 12:30-13:30 or by appointment

TextBook: *Mathematical Statistics with Applications*, 7th ed., by Wackerly, Mendenhall, and Scheaffer, Duxbury Press, 2008. (6th ed. is ok.)

Objectives: The sequence MATH 4342-4343 develops the basic mathematical theory of statistical inference at an undergraduate level. Three semesters of calculus are prerequisite for this course (MATH 2450). MATH 4342 introduces the concepts and methods of probability and distribution theory. In MATH 4343, these tools are used to develop the theory of statistical estimation and hypothesis testing. MATH 4342 is a required course for minoring in Actuarial Science at TTU, and forms the basis for the CAS/SOA Exam 1/P (Probability).

Topics to be Covered: Chapters 1-6 of the book: basics of discrete probability; discrete and continuous random variables and their distributions; calculation of means, variances, and other expectations; moment generating functions; multivariate probability distributions; variances and covariances of linear combinations of random variables; and finally methods for finding the distributions of functions of random variables.

Expected Learning Outcomes: After completing this course the student should be able to: Calculate probabilities of events using counting rules; calculate conditional probabilities; determine independence of events; apply the Law of Total Probability and Bayes' Rule.

- Calculate probabilities, moments, and moment-generating functions for discrete random variables; recognize the following standard discrete distributions: binomial, geometric, hypergeometric, poisson.
- Calculate probabilities, moments, and moment-generating functions for continuous random variables; recognize the following standard continuous distributions: uniform, normal, gamma, beta.
- Calculate probabilities and moments for multivariate distributions; obtain marginal and conditional distributions; calculate covariance and correlation and determine independence of random variables; obtain expectations and variances for linear combinations of random variables.
- Find the distribution of a function of random variables using the methods of: distribution functions, transformations, and moment-generating functions; perform bivariate transformations using jacobians; calculate joint distributions and moments of order statistics.

Attendance(5%): Attendance is mandatory and will be taken every meeting. It is worth the bonus 5% of the final grade. For example, if your attendance is 25 out of the total 38 meetings, your attendance grade will be

$$\frac{25}{38} \times 5\%.$$

Homework(30%): Cengage-Webassign is required for this class. Please enroll using the following link

<https://www.getenrolled.com/?courseKey=ttu66949667>

Homework will be posted after a section is complete. The due date for every homework is always Monday 11:59PM. It is the student's responsibility to check the assignments regularly. Homework will not be reopened except for exceptional circumstances.

Test(40%): There will be 3 tests in total, of which the lowest grade will be dropped. The dates are listed below.

Test 1 Thursday Feb 12
Test 2 Thursday March 12
Test 3 Thursday April 16

Make-up Tests: These may be granted in exceptional circumstances if you provide me with a valid excuse (such as a note from a physician, an obituary, etc.).

Final Exam(30%): Final exam is required for this class. You will receive "F" if you miss the final. The time is:

Final Exam Thursday, May 7 1:30 PM to 4:00 PM

Grading Scale:

A: $\geq 90\%$
B: $\geq 80\%$ & $< 90\%$
C: $\geq 70\%$ & $< 80\%$
D: $\geq 60\%$ & $< 70\%$
F: $< 60\%$ or Missing the Final Exam.

Calculators: Scientific calculators are allowed.

ADA accommodations (TTU Operating Policy 34.22). Any student who, because of a disability, may require some special arrangements in order to meet course requirements should contact the instructor as soon as possible to make any necessary arrangements. Students should present appropriate verification from Student Disability Services, during the instructor's office hours. Please note instructors are not allowed to provide classroom accommodations to student until appropriate verification from Student Disability Services has been provided. For additional information, you may contact the Student Disability Services office at 335 West Hall or 806-742-2405.