

Course Syllabus



Course Logistics and Instructor Contact Information

Probability

MATH 4350

T/Th 9:30 - 10:50 in RBN 4021 (the MLC).

Instructor Name: Nathan Smith

Office Location: RBN 4007

Email: nsmith@uttyler.edu

Office Hours: TBA

Course Information

TEXT: There is no text to purchase, we'll be using an online text [intro-prob-grinstead-snell.pdf](https://uttyler.instructure.com/courses/54803/files/15043215?location=course_syllabus_54803&wrap=1) (https://uttyler.instructure.com/courses/54803/files/15043215?location=course_syllabus_54803&wrap=1)  (https://uttyler.instructure.com/courses/54803/files/15043215/download?location=course_syllabus_54803&download_frd=1). Hard copy versions are available at amazon, etc., if you like, but purchasing one is not necessary.

STUDENT LEARNING OUTCOMES: By the end of the course students should be able to:

1. Define and use the basic concepts from probability theory, including random variables, distribution and density functions, conditional probability, moments, expectations, generating functions, and the central limit theorem.
2. Identify, give density functions for, and apply the standard discrete random variables.
3. Identify, give density functions for, and apply the standard continuous random variables.

GRADING: There will be four tests, tentatively September 10, October 1, October 22, and November 12. Each of these will be worth 1/5 of your semester grade.

The final exam will be Thursday, December 10 and will count for the remaining 1/5 of your grade.

Earning an overall weighted average of 90% or greater on your tests/quizzes/exams as described above guarantees a semester grade of A, an overall weighted average of 80% or greater guarantees a B, etc.

HOMEWORK: I will be assigning homework and am happy to take questions about the assignments -- both in class and during office hours. I will post answers to help your learning and studying. With the

advent of AI that is capable of producing correct answers to typical homework questions, there is little point in my collecting homework for a grade.

ARTIFICIAL INTELLIGENCE: UT Tyler is committed to exploring and using artificial intelligence (AI) tools as appropriate for the discipline and task undertaken. We encourage discussing AI tools' ethical, societal, philosophical, and disciplinary implications. All uses of AI should be acknowledged as this aligns with our commitment to honor and integrity, as noted in UT Tyler's Honor Code. Faculty and students must not use protected information, data, or copyrighted materials when using any AI tool. Additionally, users should be aware that AI tools rely on predictive models to generate content that may appear correct but is sometimes shown to be incomplete, inaccurate, taken without attribution from other sources, and/or biased. Consequently, an AI tool should not be considered a substitute for traditional approaches to research. You are ultimately responsible for the quality and content of the information you submit. Misusing AI tools that violate the guidelines specified for this course (see below) is considered a breach of academic integrity. The student will be subject to disciplinary actions as outlined in UT Tyler's Academic Integrity Policy.

For this course, you may not use AI tools to produce anything turned in for a grade.

COURSE OUTLINE:

1. Discrete probability distributions, set theoretic issues, random variables, the f function.
2. Continuous probability distributions, continuous random variables, the f and F functions.
3. Counting techniques, factorials, permutations, combinations, sampling with/without replacement and when order does/does not matter.
4. Joint densities and random vectors, marginal densities, and conditional densities and conditional probability, Bayes' theorem and the law of total probability, independence
5. Common and important discrete and continuous random variable families. Distributions of functions of random variables.
6. Expectation, variance, covariance and correlation, moment generating functions, Chebychev's inequality and the weak law of large numbers.
7. Distributions of sums, means, and the Central Limit Theorem.

UNIVERSITY POLICIES

In this course we will follow

- [university policies](https://docs.google.com/document/d/e/2PACX-1vQXRIbySwSUh3-Ow_8tVR0BoV9Ck3bKN1yTVExKtxygUWZgQ1c1LGttITyN6DpgDVN_ucMP9O12M50G/pub)  (https://docs.google.com/document/d/e/2PACX-1vQXRIbySwSUh3-Ow_8tVR0BoV9Ck3bKN1yTVExKtxygUWZgQ1c1LGttITyN6DpgDVN_ucMP9O12M50G/pub).

Too, please be aware of UT Tyler

- [student resources](https://docs.google.com/document/d/e/2PACX-1vRaJGg-hPnk5QtIIwceH5NWY94GijJFgVdtXwE1kjs_UGwXlv-cMpfErK84xN9kZLT21Co_GcBYfg7/pub)  (https://docs.google.com/document/d/e/2PACX-1vRaJGg-hPnk5QtIIwceH5NWY94GijJFgVdtXwE1kjs_UGwXlv-cMpfErK84xN9kZLT21Co_GcBYfg7/pub).

