

MATH 3170 - Elementary Stochastic Processes - Spring 2024

<https://alexander-teplyaev.uconn.edu/math-3170-spring-2024/>

- **Instructor:** Alexander (Sasha) Teplyaev,
<https://alexander-teplyaev.uconn.edu/>
- **Office hours:**

Wednesday at noon and by appointment
(please send me an email if the meeting is important).

Office: MONT 429, email: teplyaev@uconn.edu
- **Textbook:** [Essentials of Stochastic Processes](#) by Richard Durrett
- **Quizzes, Tests and Exams:**
 - * **There will be in class quizzes and/or take-home about every other week, usually on Tuesdays.**
 - * **There will be a mid-term test right after the Spring Break.**
 - * **Final Exam during the final exam week: tba**
 - * **Extra credit problems will be provided.**
- **Grades:** The grading curve will be flexible (to be explained in class)

No make-up quizzes or tests will be offered.

If you can not come to class for a test or a quiz, please provide an explanation by email, preferably in advance.

- **Homework:** Assignments will be posted in HuskyCT and/or on the webpage <https://alexander-teplyaev.uconn.edu/math-3170-spring-2024/>
Assigned problems, possibly in modified form, are subject to appear in the quizzes and/or the exams.
The HW will not be collected and graded.
- **Look at the [Academic Calendar](#)** for all the important dates in the semester.
- **Prerequisites:** Calculus, up to and including series, limits, partial differentiation, and multiple integration. Recall that MATH 2110Q, 2130Q or 2143Q, and especially MATH 3160, are strictly enforced as a prerequisite for MATH 3170.

The **final exam date** will be announced by the registrar a few weeks into the semester. You **MUST** contact the [Dean of Students Office \(DSO\)](#) regarding any conflict with the scheduled final exam times by the end of the third-from-last week of the semester.

- **Course preparation:** To keep up with the course, you will need to spend 2+ hours studying on your own for each class meeting. Work on the corresponding homework problems: this is especially important in the last 2/3 of the course, where the *new material builds upon the previous material*.
- **The Student Code:** Everyone is expected to read and abide by the [UConn Student Code](#), especially [Appendix A: Academic Integrity in Undergraduate Education and Research](#). Any academic misconduct will be dealt with under this policy.

Standard syllabus for Math 3160 Probability:

Other sources of the material are open source textbooks, such as <http://probability.oer.math.uconn.edu/3160-oer/> and [Introduction to Probability](#) by Charles M. Grinstead and J. Laurie Snell. There are many published textbooks, such as *A First Course in Probability*, 7th/8th/9th Ed., by Sheldon Ross.

- **Combinatorics:** product rule and permutations; combinations. Axioms of Probability: sample spaces, events and set operations; probability axioms. Conditional Probability and Independence: conditional probability and Bayes rule; probability trees; independent events.
- **Discrete Random Variables:** probability mass function (PMF), cumulative distribution function (CDF); expectation; variance, moments, moment generating function (MGF). Uniform, Bernoulli, Binomial, Poisson, Geometric, Hypergeometric distributions; expectation, variance, MGF of these RVs.
- **Continuous Univariate Random Variables:** probability density function (PDF), CDF, expectation, variance, moments, MGF. Uniform, Exponential, Gamma, Normal distributions; expectation, variance, MGF of these RVs. Transformations (functions) of continuous RVs.
- **Jointly Distributed Random Variables:** joint PMF/PDF, and CDF; marginal distributions; conditional PMF/PDF; conditional expectation and variance; covariance and correlation coefficients.
- **Limit Theorems:** Weak Law of Large Numbers, Central Limit Theorem, Normal approximations.