

# MATH 318 201 2023W2 Probability with Physical Applications

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## Math 318: Probability with Physical Applications Jan-Apr, 2024

**Instructor:** Geoffrey Schiebinger

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Math 118

**Office Hours:** (Math 118)

Fri: 1pm

Mon: 1pm

**TAs:** Shashank Sharma, Vince Guan

**TA Office Hours:**

**Shashank Sharma: Tuesdays 11:00 AM to 12:00 PM**

<https://ubc.zoom.us/j/6869149913?pwd=TWtxbHczeXZNOVNRFDFXN3VjMTZidz09&omn=61504590045>

**Vince Guan: Thursdays 9:30AM to 10:30AM**

[https://ubc.zoom.us/j/68006096144?pwd=NnhnVmw3b1FkSE1aSkw3MVM0T0xsZz09Links to an external site.](https://ubc.zoom.us/j/68006096144?pwd=NnhnVmw3b1FkSE1aSkw3MVM0T0xsZz09Links%20to%20an%20external%20site.)

**Communication:** Please post all questions related to course material on Piazza. Email correspondence should be reserved for emergencies and private matters.

**Text:** The course text is S.M. Ross, "Introduction to Probability Models," 12th edition, Academic Press, (2010). The 10th and 11th editions are indistinguishable for our purposes, apart from changes to page numbers, and you should feel free to use them. Problems assigned from the text will be identical to those in the 11th and 10th editions. If you are using an older version, please consult with the 12th edition to be sure to do the correct homework problems.

An optional more advanced reference is G.R. Grimmett and D.R. Stirzaker, "Probability and Random Processes," 3rd edition, Oxford, (2001).

**Outline:** The course was originally designed for physics and engineering physics students, but students in mathematics, electrical and computer engineering, and other disciplines may also find it useful. The course will be based primarily on topics from the first five chapters of Ross. Highlights include:

1. Probability spaces
2. Independence and conditional probability
3. Discrete and continuous random variables
4. Expectation
5. Generating functions and characteristic functions
6. Convergence of random variables
7. Law of large numbers and central limit theorem
8. Confidence intervals
9. Discrete Markov chains
10. Random walk
11. Poisson process

**Evaluation:** There will be homework assignments, two midterms and one final.

**Homework:** Nine assignments will be given and marked for credit. Assignments are due at the beginning of class on the due date. No late assignments will be accepted. The assignment schedule is as follows:

|     |            |            |
|-----|------------|------------|
| HW1 | Out Jan 12 | Due Jan 19 |
| HW2 | Out Jan 19 | Due Jan 26 |
| HW3 | Out Jan 26 | Due Feb 2  |
| HW4 | Out Feb 2  | Due Feb 9  |
| HW5 | Out Feb 16 | Due Mar 1  |
| HW6 | Out Mar 1  | Due Mar 8  |
| HW7 | Out Mar 8  | Due Mar 15 |
| HW8 | Out Mar 15 | Due Mar 22 |
| HW9 | Out Mar 27 | Due Apr 5  |

**Tests:** There will be two 50-minute tests held during the regularly scheduled class hours on the following dates:

February 16, March 27.

Missing a test normally results in a mark of zero. Exceptions may be granted in two cases: prior consent of the instructor or a medical emergency. In the latter case, the instructor must be notified within two working days of the missed test, and presented with a doctor's note immediately upon the student's return to UBC. When an exception is granted for a missed test, there is no make-up test, and the final exam mark will be used.

**Final exam:** There will be a final examination during the April examination period.

**Final mark:** The final mark will be calculated as follows:

Homework: 10%

Tests: 20% each

Final exam: 50%