

# STAT 302- Introduction to Probability

University of British Columbia - Winter 2021/2022 - Term 1

## Course Description

Basic notions of probability, random variables, expectation and conditional expectation, discrete and continuous probability distributions, limit theorems.

**Note:** **STAT 302** is equivalent to **MATH 302**. Proofs are an important component of the course.

## Prerequisites

One of MATH 200, 217, 226, 253 or 254.

## Audience

Undergraduates majoring in Mathematics or Statistics, and students from other disciplines seeking an exposition of the basic elements of probability theory and an introduction to probabilistic modelling.

## Textbook

A First Course in Probability (9th ed.) by Sheldon Ross, Prentice Hall, 2014. The 10th edition of the book is also acceptable.

## Instructor

Matias Salibian Barrera. Contact information will be available on Canvas.

## Course Evaluation

**All course evaluations (marks) will be conducted on-line (mostly likely on WebWork).**

- Quizzes (3%): There will be a minimum of 9 quizzes (administered on WebWork). Only the best 7 grades will be counted. The schedule and topics for the quizzes will be available on Canvas. All quizzes will be equally weighted, regardless of the number of questions or items in each of them. These are formative assessments (<https://www.cmu.edu/teaching/assessment/basics/formative-summative.html>).
- WebWork assignments (2%): There will be 6 WebWork assignments. They will all be counted. The schedule will be available on Canvas. You will have several attempts to complete each of them before their individual deadlines. All assignments will be equally weighted, regardless of the number of questions or items in each of them. These are formative assessments (<https://www.cmu.edu/teaching/assessment/basics/formative-summative.html>).
- Midterm Exams (45%): There will be two Midterm Exams administered on WebWork. The schedule will be available on Canvas. These are summative assessments (<https://www.cmu.edu/teaching/assessment/basics/formative-summative.html>).
- Final Exam (50%): The Final Exam will be administered on WebWork and include all the

material covered in all the components of the course. This is a summative assessment (<https://www.cmu.edu/teaching/assessment/basics/formative-summative.html>).

## Policy regarding missed exams, quizzes and assignments

There will be **no make-up Midterm Exams, Quizzes or WebWork assignments. No exceptions** will be considered. Missed Quizzes and WebWork assignments will receive a grade of zero. If you have **valid grounds** for an **academic concession** regarding a **Midterm** or **Final Exam**, one may be granted if you **apply** for it. Otherwise you will receive a grade of zero. Please follow the **instructions below** to **apply** for an **academic concession** if you miss a **Midterm** or **Final Exam**. You can find more information about **what constitutes valid grounds for an academic concession** at <https://science.ubc.ca/students/advising/concession>

Students who miss a **Midterm Exam**:

1. Should notify the instructor prior to (if possible) or immediately after the midterm; and
2. **Must, within 48 hours of the missed Midterm Exam**, fill out and **submit** to the course instructor a “**Student Declaration of Academic Concession**” form (available on the Canvas page of the course). Failure to do this will result in a grade of zero in the Midterm Exam.

Students who miss the **Final Exam**:

1. Must report to their Faculty Advising Office within 48 hours of the missed Final Exam and must supply supporting documentation;
2. Faculty of Science students please refer to <https://science.ubc.ca/students/advising/concession/deferredstanding>;
3. Must notify your instructor prior to (if possible) or immediately after the Final Exam;
4. Deferred exams will ONLY be provided to students who have applied for and received Deferred Standing from their Faculty Advising Office;
5. If you are granted Deferred Standing you will be expected to write your Deferred Exam with the next offering of STAT 302. Note that you may not have access to the Canvas website after the Term in which you were registered in this course ends.

## Syllabus

The syllabus below is a tentative schedule. The topics covered and the order in which they will be presented in this course may change.

1. Definition and rules of probability (Chapter 2).
2. Combinatorial Analysis: permutation and combination (Chapter 1).
3. Conditional probability, conditional independence (Chapter 3).
4. Discrete and continuous probability distributions: random variables and their expected values, discrete distributions, continuous distributions, functions of random variables (Chapters 4 & 5).

5. Bivariate and multivariate probability distribution: Joint, marginal and conditional distributions, conditional expectations, multinomial distribution, moment generating functions (Chapters 6 & 7).
6. Limit theorems: Convergence in probability, convergence in distribution, the Central Limit Theorem (Chapter 8).

## Communication

**All communication** to and from the instruction team will be done **via Canvas**. Canvas is also the preferred method for you to communicate with us.

Please adjust your Canvas settings in order to receive all Announcements and Conversation messages promptly. It is **your responsibility** to remain **informed** about **all course-related issues and news** (e.g. updates to the course schedule, changes to assignments or quizzes, deadline changes, etc.) as **posted on** the course's **Canvas** page. You are assumed to have read all course Canvas announcements and to be 100% familiar with the content of this syllabus.

## Piazza & Office Hours

Students are encouraged to attend **on-line Office Hours** for help with questions about the course material. Their schedule will be announced on Canvas. There is also a **Piazza forum** for the course (access instructions will be available on Canvas), which is primarily meant **for students to help each other** by sharing and discussing questions about course material. Although the **Piazza forum will be monitored**, our interventions will mostly be limited to enforcing **rules** about **appropriate use** of the discussion board (please refer to the pinned posts at the top of the forum).

## Covid accommodations to course delivery and marks

- To accommodate students who may not be available to come to campus, or be onsite during our scheduled class meetings, note that **all classes will be broadcast live (synchronously)**. Details on accessing these live broadcasts will be available on Canvas.
- In addition, **all course evaluations will be conducted on-line (mostly likely on WebWork)**.

## Covid Safety in the Classroom

- **Masks:** Masks are required for all indoor classes, as per the BC Public Health Officer orders. It is important that all of us feel as comfortable as possible while sharing an indoor space. For the purposes of this order, the term “masks” refers to medical and non-medical masks that cover our noses and mouths. Masks are a primary tool to make it harder for Covid-19 to find a new host. You will need to wear a medical or non-medical mask for the duration of our class meetings, for your own protection, and the safety and comfort of everyone else in the class. Your mask should cover your nose and mouth. Please do not eat in class. If you need to drink water, please keep your mask on between sips.

- **Vaccination:** If you have not yet had a chance to get vaccinated against Covid-19, vaccines are available to you, free, and on campus (<http://www.vch.ca/covid-19/covid-19-vaccine>). The higher the rate of vaccination in our community overall, the lower the chance of spreading this virus. Please arrange to get vaccinated if you have not already done so.
- **Seating in class:** To reduce the risk of Covid transmission, please sit in a consistent area of the classroom each day. This will minimize your contacts.

## Your personal health

- If you're sick, it's important that you stay home – regardless of what you think you may be sick (e.g., cold, flu, other).
- **A daily self-health assessment is required** before attending campus. **Every day, before** coming to **class**, complete the self-assessment for Covid symptoms using this tool: <https://bc.thrive.health/covid19/en>.
- Do not come to class if you have Covid symptoms, have recently tested positive for Covid, or are required to quarantine. You can check this website to find out if you should self-isolate or self-monitor: <http://www.bccdc.ca/health-info/diseases-conditions/covid-19/self-isolation>.
- Your precautions will help reduce risk and keep everyone safer. In this class all marks are collected with online assessments and exams. The marking scheme is intended to provide flexibility so that you can prioritize your health and still be able to succeed.
- If you do miss class because of illness:
  - Make a connection early in the term to another student or a group of students in the class. You can help each other by sharing notes. If you don't yet know anyone in the class, post on the discussion forum to connect with other students.
  - Consult the class resources on Canvas (slides, readings, etc.)
  - Use the online discussion forum for help.
  - Come to virtual office hours.
  - If you are sick on a Midterm Exam day, please see the "Policy regarding exams" section above.
  - If you are sick on the Final Exam day you must apply for deferred standing (an academic concession) through Science Advising no later than 48 hours after the missed final exam/assignment. Students who are granted deferred standing write the final exam/assignment at a later date. Learn more and find the application online: <https://science.ubc.ca/students/advising/concession>. For additional information about academic concessions, see the UBC policy here: <http://www.calendar.ubc.ca/vancouver/index.cfm?tree=3,329,0,0> Please also refer to the "Policy regarding exams" section above.

## Instructor health

If the instructor is sick they will be substituted by a colleague.

## Statement of Academic Integrity

The academic enterprise is founded on honesty, civility, and integrity. As members of this enterprise, all students are expected to know, understand, and follow the codes of conduct regarding academic integrity. At the most basic level, this means submitting only original work done by you and acknowledging all sources of information or ideas and attributing them to others as required. This also means you should not cheat, copy, or mislead others about what is your work. Violations of academic integrity (i.e., misconduct) lead to the breakdown of the academic enterprise, and therefore serious consequences arise and harsh sanctions are imposed. For example, incidences of plagiarism or cheating may result in a mark of zero on the assignment or exam and more serious consequences may apply if the matter is referred to the President's Advisory Committee on Student Discipline. Careful records are kept in order to monitor and prevent recurrences.

### Discipline for Academic Misconduct

<http://www.calendar.ubc.ca/vancouver/index.cfm?tree=3,54,111,0>

### Academic Misconduct

<http://www.calendar.ubc.ca/vancouver/index.cfm?tree=3,54,111,959>

### Faculty of Science - A Letter to Students Regarding Academic Integrity

<https://science.ubc.ca/students/blog/letter-students-academic-integrity-oct2020>

## UBC policies and resources to support student success

UBC provides resources to support student learning and to maintain healthy lifestyles but recognizes that sometimes crises arise and so there are additional resources to access including those for survivors of sexual violence. UBC values respect for the person and ideas of all members of the academic community. Harassment and discrimination are not tolerated nor is suppression of academic freedom. UBC provides appropriate accommodation for students with disabilities and for religious and cultural observances. UBC values academic honesty and students are expected to acknowledge the ideas generated by others and to uphold the highest academic standards in all of their actions. Details of the policies and how to access support are available here:

<https://senate.ubc.ca/policies-resources-support-student-success>

## More UBC resources for student success

### Academic and learning resources

<https://students.ubc.ca/enrolment/academic-learning-resources>

### Academic Concessions

<https://students.ubc.ca/enrolment/academic-learning-resources/academic-concessions>

<http://www.calendar.ubc.ca/vancouver/index.cfm?tree=3,329,0,0>

Academic Honesty and Standards

<http://www.calendar.ubc.ca/vancouver/index.cfm?tree=3,286,0,0>

Attendance

<http://www.calendar.ubc.ca/vancouver/index.cfm?tree=3,36,0,0>

Grading Practices

<http://www.calendar.ubc.ca/vancouver/index.cfm?tree=3,42,0,0>

Student Conduct and Discipline

<http://www.calendar.ubc.ca/vancouver/index.cfm?tree=3,54,0,0>

Viewing Marked Work

<http://www.calendar.ubc.ca/vancouver/index.cfm?tree=3,41,93,0>