MATH 418 Probability / MATH 544 Probability I   2019W Term 1, Sep-Dec, 2019

Credit value: 3

Instructor: Dr. G. Slade, MATX 1211, 604-822-3781, `slade@math.ubc.ca`

Course webpage: `http://www.math.ubc.ca/~slade/418-web-19.html`

Office hours: See course webpage.

Prerequisites: For MATH 418: A score of 68% or higher in MATH 321.
For MATH 544: A solid background in undergraduate analysis, equivalent to Chapters 1–8 of Rudin's *Principles of Mathematical Analysis*.

Text: J.S. Rosenthal, A First Look at Rigorous Probability Theory, 2nd ed., World Scientific (2006).
A solutions manual for the even-numbered exercises is available at: `http://www.probability.ca/jeff/grprobbook.html`.
Corrections to the text are available at: `http://www.probability.ca/jeff/ftpdir/errata2.pdf`.

Other useful references: P. Billingsley, Probability and Measure, 3rd ed., Wiley, (1995).
L. Breiman, Probability, SIAM, (1992).
K.L. Chung, A Course in Probability Theory, 2nd ed., Academic Press, (1974).
R. Durrett, Probability: Theory and Examples, 5th ed., Cambridge University Press, (2019). Available online at: `https://services.math.duke.edu/~rtd/PTE/PTE5_011119.pdf`.

Outline: The course provides a mathematically rigorous introduction to probability theory based on measure theory. Prior knowledge of measure theory (or taking MATH 420/507 concurrently) is useful but not essential; the necessary measure theory will be developed as part of the course. Topics will be selected primarily from the first 13 chapters of Rosenthal's text. Highlights include:

1. Probability spaces, random variables, expectation, modes of convergence, independence, laws of large numbers, Borel–Cantelli lemma, Kolmogorov 0-1 law.

2. Characteristic functions, weak convergence, Central Limit Theorem.

3. Random walks.

4. Conditional expectation.

Evaluation: The final mark will be computed as: Homework: 50%   Final exam: 50%

Homework: Nine assignments will be given and marked for credit, with the following schedule. Assignments are due at the *beginning* of class on the due date. No late assignments will be accepted.

Assignment given	Assignment due
September 13	September 20
September 20	September 27
September 27	October 4
October 4	October 11
October 11	October 25
October 25	November 1
November 1	November 8
November 8	November 15
November 15	November 22

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

Course policies: The final exam is closed book: no calculators, formula sheets, or other aids are permitted.

Missing an assignment without a valid reason results in a mark of zero. Missing an assignment for a valid reason normally results in the weight of that assignment being transferred to the final exam. Examples of valid reasons include illness and travel to play a scheduled game for a varsity team. Examples of reasons that are not valid include conflicts with personal travel schedules or conflicts with work schedules. Any student who misses an assignment is to present to their instructor the Department of Mathematics self-declaration form for reporting a missed assessment within 72 hours of the due date. The form is here: `http://www.math.ubc.ca/~slade/Academic_Concessions_Self_Declaration_2019.pdf`. This policy conforms with the UBC Vancouver Senate's Academic Concession Policy V-135 and students are advised to read this policy carefully: `http://www.calendar.ubc.ca/vancouver/index.cfm?tree=3,329,0,0`.

University policies: 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 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 on the UBC Senate website `https://senate.ubc.ca/policies-resources-support-student-success`.

Updated August 28, 2019.