Instructor: Kerem Ugurlu, Office: Lewis Hall 304,
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Office Hours for in-class Students: Thursday 2:30-3:30 pm and by appointment.
Office Hours for online Students: Thursday 12:00-1:00 pm and by appointment.

Textbook: There will be no required textbook for the class. The followings are reference books for the class. They are reserved in the Mathematics Research Library.


Course Objectives: This is an introductory course on stochastic calculus for quantitative finance. We will cover basic mathematical concepts and theories used in finance. At the end of the course, the students are expected to master in stochastic calculus and its various applications in finance.

Course Outline:

- Probability and Measure [S-Chp.1]
- Conditional Expectation [S-Chp.2]
- Martingales and Stopping Times[S-Chp.3]
- Brownian Motion and Brownian Bridge [S-Chp.3]
- Stochastic Differential Equations (SDE’s) and Ito’s Formula [S-Chp.4, G-Chp.5]
- Linear SDE’s, Generalized Brownian Motion (GBM), OU Processes [S-Chp.4, G-Chp.5]
- Exponential OU and CIR Processes [S-Chp.4, G-Chp.5]
- Affine SDE’s and its use in Bond Pricing [S-Chp.10, G-Chp.10]
- Black-Scholes (BS) Model and BS Partial Differential Equation [S-Chp.5, G-Chp.7]
- Feynman-Kac Formula and Its Applications in Finance [S-Chp.6]
- Multidimensional Ito Formula and an Application: Heston Volatility Model [S-Chp.6]
Grading:
Homework: 50 %
Midterm: 20 %
Final: 30 %

Academic Honesty Academic integrity is vitally important in the Computational Finance & Risk Management Program; hence our CFRM Honor Code: “Cheating, attempted cheating, plagiarism, lying, and stealing in relation to academic work is prohibited.” Specifically, there is a zero-tolerance policy for academic misconduct in the class. Graduate students at the University of Washington are expected to practice high standards of professional honesty and integrity as described in the Student Academic Responsibility statement: [http://depts.washington.edu/grading/pdf/AcademicResponsibility.pdf](http://depts.washington.edu/grading/pdf/AcademicResponsibility.pdf)

In regards to software development, the UW CSE Academic Misconduct Policy will also be applied: [http://www.cs.washington.edu/education/AcademicMisconduct](http://www.cs.washington.edu/education/AcademicMisconduct)

This policy states 5 specific rules with the following 2 being critically important: You must not share actual program code with other students. In particular, you should not ask anyone to give you a copy of their code or, conversely, give your code to another student who asks you for it; nor should you post your solutions on the web, in public repositories, or any other publicly accessible place. Similarly, you should not discuss your algorithmic strategies to such an extent that you and your collaborators end up turning in exactly the same code. Discuss ideas together, but do the coding on your own. You must not look at solution sets or program code from other years, nor should you make your own solutions publicly available even after the due date. Beyond being a clear violation of academic integrity, making use of old solution sets is a dangerous practice. Most assignments change in a variety of ways from year to year as we seek to make them better. Each year, however, some student turns in a solution to an assignment from some prior year, even though that assignment has since changed so that the old solution no longer makes sense. Submitting something that solves a previous years assignment perfectly while failing to solve the current one is particularly damaging evidence of Academic Misconduct. Students violating this policy will receive a failing grade for the course and be referred to the Dean of the College of Arts and Sciences per the colleges disciplinary review process: [http://depts.washington.edu/grading/conduct/reporting.html](http://depts.washington.edu/grading/conduct/reporting.html)

Students should take the time to review each of the above policies and be conscientious to follow them throughout the course.

Disability Accommodations Students requiring academic accommodations due to a physical, psychological, or sensory disability should request services through Disability Resources for Students: [http://www.washington.edu/students/drs](http://www.washington.edu/students/drs). If you are approved for an academic accommodation, please advise the instructor during the first week of the class.
Extra Help All students are strongly encouraged to come to my office hours to discuss homework problems or any aspect of the course. I am also available by appointments, if the office hours do not fit into your schedule. Sending me emails regarding your questions is also an excellent way to get a prompt response.

Changes to the Course This syllabus is the working plan as the course begins. However, the instructor reserves the right to adjust the course schedule, content, assignments, and grading policy as the course proceeds. Each course offering is unique and new materials, technology resources, the availability of guest lecturers, and even the weather can and do affect the course as it progresses. Students should expect minor changes and be flexible and adaptable when changes need to be made.