Statistics 964- Spring 2021
ONLINE course

Stochastic Analysis

Instructor: Shlomo Levental.
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Time and Place: M, W, 8:45am- 10:00am in Zoom. The lectures will be recorded and posted on D2L (***http://d2l.msu.edu***)

Meeting ID: 95122317555
Passcode: 606242

Office Hours: M, W, 3:00 pm - 4:00 pm and by appointment.
Use the same meeting ID and passcode as for the lectures.

Objective: The course will cover the basics of one of the most important topics of modern probability: Stochastic Analysis. This huge field has very strong mathematical foundations together with extremely useful applications. There are many textbooks on the topic from the very theoretical to those that go quickly over the theory and emphasize applications. The textbook that I selected is somewhere between the extreme approaches and is probably appropriate for a student who want to see beautiful applications relatively early. It is a very popular book worldwide.

Description of the course: Here are the main topics that will be covered.

1. Some preliminaries; Brownian motion.
2. Ito integrals; Ito formula; Martingale representation.
3. Stochastic Differential Equations; Diffusions.
4. Applications:
    a. Filtering Problem.
    b. Boundary value problems.
    c. Optimal Stopping.

d. Stochastic control.
e. Math Finance.

5. The following is a list of more advanced topics in stochastic analysis but due to time constraints those (most likely) won't be covered. Levy processes, predictable processes, decomposition of stopping times, local martingales, Doob-Meyer Decomposition, semimartingales.

Prerequisite: STT 882 or equivalent course

Text book: Stochastic Differential Equations by Brent Oksendal(I have the 5th edition.).

Homework: There will be a couple of homework assignments throughout the semester. This will be done via D2L (***http://d2l.msu.edu***)

Exams: There will not be any exams.

Presentations: From time to time students will be asked to have a short presentation usually of an example or a problem.

Grading: It will be based mainly on the presentations and the homework. There is no fixed scale for the course grade. It will be decided on a curve.

Remark: Some changes in the above are possible.

Important Dates (Look for MSU Calendar for more dates.)

Class Begins
Wednesday 1/20/2021
Break days
Tuesday, 3/2 - Wednesday, 3/3
Class Ends
Wednesday, 4/21

Let me know if you are unable to attend class for an extended period so we can come up with arrangements regarding:

Communication norms surrounding prolonged absences.

Assignments and homework surrounding prolonged absences.

Assessment accommodations surrounding prolonged absences.

Technical remark: This course will be delivered ***online*** through the D2L system and you will need your MSU NetID to login to the course from the ***D2L homepage*** **(*http://d2l.msu.edu*).**
In ***D2L***, you will access recorded lessons and submit your homework. You will also submit your exams there. You can also use the D2L email system.