

Statistics 882- Spring 2021  
ONLINE course

## Theory of Probability II

**Instructor:** Shlomo Levental.

Email: levental@msu.edu

**Time and Place:** M, W, F, 10:20am- 11:10am in Zoom. The lectures will be recorded and posted on D2L (<http://d2l.msu.edu>)

Meeting ID: 98934264281

Passcode: 106725

**Office Hours:** M, W, 3:00 pm - 4:00 pm and by appointment.

Use the same meeting ID and passcode as for the lectures.

**Course outline:** The course deals with some basic concepts of modern Probability theory. Applications/examples will be emphasized. This material is the basis for the ever-expanding applications of Probability Theory in Engineering, Physical Sciences, Finance, Business and Economics.

**Text book:** Probability: Theory&Examples, 4<sup>th</sup>(or 3<sup>rd</sup>) edition, Richard Durrett.

**Description of the course:** The topics that we will try to cover are included in the following list (those chapters/sections relate to the 4<sup>th</sup> edition of the book). The actual selection **depends on time considerations**.

1. Extensions of the CLT (Chapter 3, sections 3.7, 3.8)
2. Random walks (Chapter 4, mainly section 1)
3. **Martingale theory (Chapter 5)**
4. Markov Chains (Chapter 6)
5. Basics of Ergodic Theory (Chapter 7, mainly section 7.2)
6. **Brownian motion (Chapter 8)**

The core material is made of items 3 and 6 above (Martingales and Brownian motion). From time to time there will be material covered in class that doesn't appear in the textbook. This material will be posted on the course site in D2L.

**Recommended background:** STT 881 or an equivalent course

**Homework:** There will be homework assignments throughout the semester. The students are expected to submit the assignments by the due date. This will be done by using D2L which is an educational software supported by MSU. (<http://d2l.msu.edu>)

**Exams:** There will be 2 midterms during the semester. The dates and the material for the exams will be announced in advance. The midterms will be online.

**Grading:** It will be based on the homework and the exams. 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

<https://reg.msu.edu/roinfo/calendar/academic.aspx> for more dates.)

Class Begins

Wednesday 1/20/2021

Break days

Tuesday, 3/2 - Wednesday, 3/3

Class Ends

Wednesday, 4/21

Final exam

Thursday, April 29, 7:45am - 9:45am

**Learning Continuity Statement:** 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.