האוניברסיטה העברית בירושלים
THE HEBREW UNIVERSITY OF JERUSALEM

Syllabus

Brownian Motion - 80766

Last update 29-04-2015

HU Credits: 3

Degree/Cycle: 2nd degree (Master)

Responsible Department: Mathematics

Academic year: 0

Semester: 2nd Semester

Teaching Languages: Hebrew

Campus: E. Safra

Course/Module Coordinator: Dr. Ori Gurel-Gurevich

Coordinator Email:

Coordinator Office Hours:

Teaching Staff:
Prof Ori Gurel-Gurevich,
Dr. Feldheim Ohad

Course/Module description:

1) Brownian motion definition and the basic properties of its sample paths.
2) Brownian motion as a Markov process and martingale.
3) Brownian motion and potential theory - Recurrence/transience, Green functions and harmonic measure.
4) Hausdorff dimension and its uses for Brownian motion.
5) Brownian motion as a scaling limit of random walks.
6) The local time of Brownian motion.
7) Stochastic integrals with respect to Brownian motion, conformal invariance and related theorems.
8) Relations between Brownian motion and differential equations.

Course/Module aims:

Learning outcomes - On successful completion of this module, students should be able to:

Ability to prove and apply the theorems presented in the course.

Ability to apply correctly the mathematical methodology in the context of the course.

Acquiring the fundamentals as well as basic familiarity with the field which will assist in the understanding of advanced subjects.

Ability to understanding and explain the subjects taught in the course.

Attendance requirements(%):

Teaching arrangement and method of instruction:

Course/Module Content:

1) Brownian motion definition and the basic properties of its sample paths.
2) Brownian motion as a Markov process and martingale.
3) Brownian motion and potential theory - Recurrence/transience, Green functions and harmonic measure.
4) Hausdorff dimension and its uses for Brownian motion.
5) Brownian motion as a scaling limit of random walks.

6) The local time of Brownian motion.
7) Stochastic integrals with respect to Brownian motion, conformal invariance and related theorems.
8) Relations between Brownian motion and differential equations.

Required Reading:

Additional Reading Material:

Course/Module evaluation:
End of year written/oral examination 0 %
Presentation 0 %
Participation in Tutorials 0 %
Project work 0 %
Assignments 0 %
Reports 0 %
Research project 0 %
Quizzes 0 %
Other 100 %

Additional information: