Stochastic Calculus and Applications (L24)
M. Tehranchi

This course is an introduction to the theory of continuous-time stochastic processes, with an emphasis on the central role played by Brownian motion. It complements the material in Advanced Probability, Advanced Financial Models, and Schramm–Loewner Evolutions.

- **Review of Brownian motion.** Isonormal process. Wiener’s existence theorem. Sample path properties.

- **Continuous stochastic calculus.** Martingales, local martingales and semi-martingales. Quadratic variation and co-variation. Itô’s isometry and definition of stochastic integral. Kunita–Watanabe’s theorem. Itô’s formula.


**Pre-requisites**

Knowledge of measure theoretic probability at the level of Part III Advanced Probability will be assumed, especially familiarity with discrete-time martingales and basic properties of Brownian motion.

**Literature**

2. D. Revuz and M. Yor. *Continuous martingales and Brownian motion.* Springer. 2001

**Additional support**

Four sheets will be provided and four associated examples classes will be given. There will be a one-hour revision class in the Easter Term.