Prof. Dr. D. Becherer
Humboldt Univerität zu Berlin
Institut für Mathematik
Bereich Stochastik

In the summer term 2023 I will teach the course (**module M24**):

Stochastic Analysis (Stochastic Processes II)

The course will be given in English to facilitate participation by international students.

Content:
Gaussian processes; Brownian motion, construction and properties; filtrations and stopping times; continuous time martingales; continuous semimartingales; quadratic variation; stochastic integration; Itô's formula; stochastic differential equations and diffusion processes, probabilistic representations for partial differential equations. Girsanov's theorem and change of measure; Itô's martingale representation property.

Prerequisites:
Analysis I-III (incl. measure theory), Stochastics II (BMS title: Stochastic Processes I).
Helpful and beneficial will be interest and/or knowledge in Functional Analysis and PDE theory.

References:

- Le Gall, J.-F.: Brownian Motion, Martingales, and Stochastic Calculus (Graduate Texts in Mathematics, 1st ed. 2016 Edition, Springer.
- Karatzas, I., Shreve S.: Brownian motion and stochastic calculus. Vol. 113. Springer, 2012.
- Klenke, A.: Wahrscheinlichkeitstheorie, Springer, 2008., English version: Probability theory: a comprehensive course. In particulary chapters 21, 25, 26. Springer, 2014.
- Revuz, D., and Yor, M.: Continuous martingales and brownian motion. 3rd ed. Springer, 1999.
- Rogers, L.C.G., Williams, D.: Diffusions, Markov processes and martingales, Vol. 1 & 2, Cambridge University Press, 2000.
- Jacod, J., and Shiryaev, A.N.: Limit theorems for stochastic processes,.Springer, 2003.
- Jacod, J.: Calcul stochastique et problems de martingales. LNM No. 714, Springer, 1979
- Jacod's, J. lecture notes (in French).
- Kallenberg, O.: Foundations of modern probability. Springer, 1997.
- Mörters, P., and Peres, Y.: Brownian motion, 1st ed. Cambridge University Press, 2010, see http://yuvalperes.com/

Lectures (**first lecture: Tue 18.4.23**)
Mon., 09 – 11, RUD25 room 1.115
Tue., 13 – 15, RUD25 room 1.115

Classes (**first class Tue 25.4.23**)
Tue., 15 – 17, RUD25 room 1.115
Current information about current times for lectures and classes will be posted on Moodle: please check AGNES and http://www.math.hu-berlin.de/~becherer/ for further information.

Teaching assistant: Mr. Sun Yuchen (sunyuche+at+math.hu-berlin.de)
Office hours by appointment.