

Course Title. *STOCHASTIC DIFFERENTIAL EQUATIONS*

Teacher(s). Zdzislaw Brzezniak

Overview. The course is also devoted to PhD students in Mathematics and Physics. The pre-requisites are probability and measure theory, basic stochastic processes including Wiener and Poisson processes.

When. 9 June 2025 - 4 July 2025

Where. Collegio Nuovo

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Abstract. Rigorous definition of the Itô integral. Study of martingale, Markov and strong Markov properties, Doob and Burkholder inequalities. Stochastic differential equations: local and global solutions under locally Lipschitz assumptions. Applications to PDEs (Feynman-Kac formula) and Mathematical Finance (Black-Scholes formula).

References.

- [1] Z. Brzeźniak, T. Zastawniak, Basic stochastic processes. A course through exercises. Springer Undergraduate Mathematics Series. Springer-Verlag London, Ltd., London, 1999. x+225 pp.
- [2] P. Baldi, Stochastic calculus. An introduction through theory and exercises. Universitext. Springer, Cham, 2017. xiv+627 pp.