<u>MT-609 Advanced Probability</u>

Conditional expectation, Discrete case, Existence and uniqueness, Product measure and Fubini's theorem, Martingales in discrete time, Martingale convergence theorem, Uniformly integrable martingales, Applications of martingales. Random processes in continuous time, Martingale regularization theorem, Convergence and Doob's inequalities, Weak convergence, Tightness, Characteristic functions, Large deviations, Cramer's theorem, Brownian motion, Wiener's theorem, Strong Markov property, Martingales for Brownian motion, Brownian motion and the Dirichlet problem, Zeros of Brownian motion, Poisson random measures, Integrals with respect to a Poisson random measure, Poisson Brownian motions L´evy processes.

<u>Reference Books:</u>

1. Advanced Probablity by Perla Sousi, 2013

2. Advanced Probablity by Alexander Sokol, 2013