Probability Theory and Stochastic Calculus

Syllabus

* Probability theory
	+ Probability spaces
	+ Random variables
	+ Stochastic processes
* Information and conditioning
	+ Conditional expectation
	+ Martingales
* Brownian motion
* Stochastic calculus
	+ Itô’s integral
	+ Itô formula
* Stochastic differential equations
* Connection with PDEs
	+ Feynman-Kac theorem
* Change of measure
	+ Girsanov theorem
	+ Martingale representation theorem
* Black-Scholes model

Textbooks

* Shreve (2004). Stochastic calculus for finance II, Springer.
* Ballotta, L. and Fusai, G. (2018). Tools from Stochastic Analysis for Mathematical Finance: A Gentle Introduction. Available at SSRN: [https://ssrn.com/abstract=3183712](https://ssrn.com/abstract%3D3183712)