

Course topics

This is not an exhaustive list and these topics are subject to change, but this should provide a rough idea of what the course will be about.

- (1) Countable measure spaces. Relation between Lebesgue and Riemann integrals. Lebesgue–Stieljes integral. Change of variable formula. Moments of a random variable. Exchanging the order of integration (Tonelli / Fubini theorems).
- (2) Inequalities: Markov, Chebyshev, Jensen, Hölder, Minkowski.
- (3) Almost sure convergence, convergence in probability, L^p -convergence. Continuous mapping theorem. Law of large numbers. Uniform integrability.
- (4) Hahn–Jordan decomposition. Radon–Nikodym theorem. Conditional expectation.
- (5) Fourier transform. Characteristic function. Convolution. Gaussian distribution on \mathbb{R}^d . Weak convergence, convergence in distribution. Portmanteau theorem.
- (6) Central limit theorem.