



# University of Pretoria Yearbook 2021

## Measure theory and probability 734 (WTW 734)

**Qualification** Postgraduate

**Faculty** [Faculty of Natural and Agricultural Sciences](#)

**Module credits** 15.00

**NQF Level** 08

**Programmes** [BScHons Applied Mathematics](#)

[BScHons Mathematics](#)

[BScHons Mathematics and Mathematics Education Applied Analysis](#)

[BScHons Mathematics and Mathematics Education Differential Equations and Modelling](#)

[BScHons Mathematics and Mathematics Education Algebra and Analysis](#)

[BScHons Mathematics of Finance](#)

**Prerequisites** Real analysis on third-year level

**Contact time** 2 lectures per week

**Language of tuition** Module is presented in English

**Department** Mathematics and Applied Mathematics

**Period of presentation** Semester 1

### Module content

Measure and integration theory: The Caratheodory extension procedure for measures defined on a ring, measurable functions, integration with respect to a measure on a  $\sigma$ -ring, in particular the Lebesgue integral, convergence theorems and Fubini's theorem.

Probability theory: Measure theoretic modelling, random variables, expectation values and independence, the Borel-Cantelli lemmas, the law of large numbers.  $L^1$ -theory,  $L^2$ -theory and the geometry of Hilbert space, Fourier series and the Fourier transform as an operator on  $L^2$ , applications of Fourier analysis to random walks, the central limit theorem.

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