

# University of Pretoria Yearbook 2019

## Measure theory and probability 734 (WTW 734)

<b>Qualification</b>	Postgraduate
<b>Faculty</b>	Faculty of Natural and Agricultural Sciences
<b>Module credits</b>	15.00
<b>Programmes</b>	BScHons Applied Mathematics BScHons Mathematics BScHons Mathematics and Mathematics Education Algebra and Analysis BScHons Mathematics and Mathematics Education Applied Analysis BScHons Mathematics and Mathematics Education Differential Equations and Modelling BScHons Mathematics of Finance
<b>Prerequisites</b>	Real analysis on third-year level
<b>Contact time</b>	2 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Mathematics and Applied Mathematics
<b>Period of presentation</b>	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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