



# University of Pretoria Yearbook 2022

## Measure theory and probability 734 (WTW 734)

<b>Qualification</b>	Postgraduate
<b>Faculty</b>	<a href="#">Faculty of Natural and Agricultural Sciences</a>
<b>Module credits</b>	15.00
<b>NQF Level</b>	08
<b>Programmes</b>	<a href="#">BScHons (Mathematics and Mathematics Education) (Algebra and Analysis)</a> <a href="#">BScHons (Mathematics and Mathematics Education) (Applied Analysis)</a> <a href="#">BScHons (Mathematics and Mathematics Education) (Differential Equations and Modelling)</a> <a href="#">BScHons <i>Applied Mathematics</i></a> <a href="#">BScHons <i>Mathematics</i></a> <a href="#">BScHons <i>Mathematics of Finance</i></a>
<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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specific regulations and information as stipulated in the relevant yearbook. Ignorance concerning these regulations will not be accepted as an excuse for any transgression, or basis for an exception to any of the aforementioned regulations.