7501 (Probability and Statistics)

Year:	2014–2015
Code:	MATH7501
Level:	Intermediate
Value:	Half unit (= 7.5 ECTS credits)
Term:	2
Structure:	3 hour lectures per week, 1 hour problem class. Assessed coursework.
Assessment:	90% examination, 10% coursework
Normal Pre-requisites:	MATH1402. Some basic knowledge of probability is essential, as covered in MATH1301 or the post-examination course on Probability.
Lecturer:	Dr R Chandler
Problem class teacher:	Dr I Strouthos

Course Description and Objectives

The aim of the course is to introduce students to the theory of probability and some of the statistical methods based upon it. Many physical processes involve random components which can only be modelled using probabilistic methods. Statistical theory is vital for analysing scientific data where it is necessary to distinguish genuine patterns from random fluctuations.

Recommended Texts

Wackerley, Mendenhall and Scheaffer, *Mathematical Statistics with Applications* (6th edition), Duxbury Press.

Detailed Syllabus

- Joint probability distributions: joint and conditional distributions and moments; seiral expectation; multinomial and multivariate normal distributions.
- Moment and probability generating functions; properties; sums of independent random variables.
- Statement of weak law of large numbers.
- Statement of the Central Limit Theorem.
- Introduction to statistics. Data, estimation and hypothesis testing.
- Normal probability models. χ^2, t and F distributions. Confidence intervals.
- Regression and correlation. Least-squares.