

Liverpool John Moores University

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Title: PROBABILITY AND RISK
Status: Definitive
Code: **5003STATS** (117452)
Version Start Date: 01-08-2018

Owning School/Faculty: Applied Mathematics
Teaching School/Faculty: Applied Mathematics

Team	Leader
Robert Wilkinson	Y
Gabriela Czanner	

Academic Level: FHEQ5 **Credit Value:** 24 **Total Delivered Hours:** 74
Total Learning Hours: 240 **Private Study:** 166

Delivery Options

Course typically offered: Standard Year Long

Component	Contact Hours
Lecture	22
Practical	9
Tutorial	41

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Technology	AS1	Simulation using Minitab	25	
Report	AS2	Extensive analysis of a risk situation	25	
Exam	AS3	Examination	50	2

Aims

To extend the student's knowledge of, and experience in, the use of probability

models.

To deepen the student's understanding of important topics in inference.

To introduce the students to the use of simulation models.

To enable the student to familiarise themselves with risk techniques through which they can assist decisionmakers in making informed decisions in the face of uncertainty.

Learning Outcomes

After completing the module the student should be able to:

- 1 Use a variety of probability distributions for modelling and inference.
- 2 Compare estimators on the basis of their important properties.
- 3 Calculate sample-sizes on the basis of power considerations.
- 4 Apply simulation - based techniques in more complex situations.
- 5 Identify sources of uncertainty.
- 6 Apply concepts of robustness, flexibility and sensitivity analysis to a number of application areas.
- 7 Develop an awareness of the ways in which risk can be managed.
- 8 Use Minitab for the above inferential analyses.

Learning Outcomes of Assessments

The assessment item list is assessed via the learning outcomes listed:

Simulation using Minitab	1	2	8
Risk analysis	5	6	
Examination	3	4	7

Outline Syllabus

Review of some aspects of the theory of probability, Bayes' Theorem.

Discrete probability distributions: binomial, Poisson, hypergeometric, geometric.

Continuous probability distributions: normal, exponential, lognormal, X^2 , T and F .

Introductory power and sample size calculations.

The bootstrap.

Inference for linear combinations of normally distributed random variables.

An introduction to the use of ranking methods.

Goodness of fit tests, contingency tables.

Uncertainty in specification of problems, data sources, model, forecasts, objectives.

Robustness, flexibility, sensitivity. Decision making tools. Paper analysis. Decision Trees. Bayesian Analysis. Project Management.

Learning Activities

Lectures, tutorials, laboratory sessions, directed reading, simulation.

Notes

A number of probability distributions are introduced and certain aspects of statistical inference are considered.

Simulation techniques are discussed, leading to the development of such simulations on a computer.

The basic tools of Risk – Analysis, Management and Assessment, are introduced.