

Probability and Risk

Module Information

2022.01, Approved

Summary Information

Module Code	5103STATS
Formal Module Title	Probability and Risk
Owning School	Computer Science and Mathematics
Career	Undergraduate
Credits	20
Academic level	FHEQ Level 5
Grading Schema	40

Teaching Responsibility

LJMU Schools involved in Delivery
Computer Science and Mathematics

Learning Methods

Learning Method Type	Hours
Lecture	20
Practical	15
Tutorial	20

Module Offering(s)

Display Name	Location	Start Month	Duration Number Duration Unit
JAN-CTY	CTY	January	12 Weeks

Aims and Outcomes

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 decision makers in making informed decisions in the face of uncertainty.
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After completing the module the student should be able to:

Learning Outcomes

Code	Number	Description
MLO1	1	Compare estimators on the basis of their important properties.
MLO2	2	Calculate sample-sizes on the basis of power considerations.
MLO3	3	Apply simulation - based techniques in more complex situations.
MLO4	4	Identify sources of uncertainty.
MLO5	5	Apply concepts of robustness, flexibility and sensitivity analysis to a number of application areas using statistical software.

Module Content

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, χ^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.
Module Overview	This module will extend your knowledge of the use of probability models to introduce the use of simulation models in order to enable you to familiarise yourself with risk techniques through which can assist decision makers in making informed decisions in the face of uncertainty.
Additional Information	In this module the basic tools of Risk – Analysis, Management and Assessment, are introduced. In particular, we discuss a number of probability distributions along with certain aspects of statistical inference. Finally, we study simulation techniques and their development on a computer.

Assessments

Assignment Category	Assessment Name	Weight	Exam/Test Length (hours)	Module Learning Outcome Mapping
Portfolio	coursework portfolio	50	0	MLO5, MLO1
Centralised Exam	examination	50	2	MLO2, MLO3, MLO4

Module Contacts

Module Leader

Contact Name	Applies to all offerings	Offerings

Robert Wilkinson	Yes	N/A
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Partner Module Team

Contact Name	Applies to all offerings	Offerings
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