

Liverpool John Moores University

Title: PROBABILITY AND INFERENCE
Status: Definitive
Code: **5000STATS** (103320)
Version Start Date: 01-08-2011

Owning School/Faculty: Computing and Mathematical Sciences
Teaching School/Faculty: Computing and Mathematical Sciences

Team	Leader
Peter Harris	Y

Academic Level: FHEQ5 **Credit Value:** 12.00 **Total Delivered Hours:** 38.00
Total Learning Hours: 120 **Private Study:** 82

Delivery Options

Course typically offered: Semester 1

Component	Contact Hours
Lecture	15.000
Practical	9.000
Tutorial	12.000

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Report	AS1	In-class test (worth 33% of the CWK marks), plus a Minitab-based coursework (worth 67% of the CWK marks).	50.0	
Exam	AS2	Examination	50.0	2.00

Aims

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

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

To introduce the student to the use of simulation methods.

Learning Outcomes

After completing the module the student should be able to:

- 1 Make use of a variety of probability distributions for modelling and inference.
- 2 Compare estimators on the basis of their important properties.
- 3 Carry out sample-size calculations on the basis of power considerations.
- 4 Apply simulation-based techniques in more complex situations.
- 5 Use Minitab for the above inferential analyses.

Learning Outcomes of Assessments

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

Report	1	2	3	4	5
Exam	1	2	3		

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.
The module is intended to be application-driven.*

Learning Activities

Lectures, tutorials, laboratory sessions, directed reading, coursework preparation and revision for examinations.

References

Course Material	Book
Author	Hogg, R.V. Tanis, F.A.
Publishing Year	2001
Title	Probability and Statistical Reference.
Subtitle	
Edition	6th Edition
Publisher	Prentice-Hall Inc
ISBN	0-13-027294-9

Course Material	Book
Author	Krzanowski, W. J.
Publishing Year	1998
Title	An Introduction to Statistical Modelling
Subtitle	
Edition	
Publisher	Arnold
ISBN	0-340-69185-9

Course Material	Book
Author	Dobson, A. J.
Publishing Year	2001
Title	An Introduction to Generalized Linear Models
Subtitle	
Edition	2nd Edition
Publisher	Chapman and Hall
ISBN	1-58488-165-8

Course Material	Book
Author	Baron, M.
Publishing Year	2007
Title	Probability and Statistics for Computer Scientists
Subtitle	
Edition	
Publisher	Chapman & Hall/CRC
ISBN	1-58488-641-2

Notes

A number of probability distributions are introduced and certain aspects of statistical inference are considered. Simulation techniques are then discussed, leading to the development of such simulations on a computer.