Liverpool John Moores University

Title:	STATISTICS FOR EXPERIMENTAL METHODS
Status:	Definitive
Code:	**5049TECH** (106134)
Version Start Date:	01-01-2012

Owning School/Faculty:	Engineering
Teaching School/Faculty:	Engineering

Team	emplid	Leader
Lesley Wright		Y

Academic Level:	FHEQ5	**Credit Value:**	12.00	**Total Delivered Hours:**	24.00
Total Learning Hours:	120	**Private Study:**	96		

Delivery Options
Course typically offered: Semester 2

Component	Contact Hours
Lecture	12.000
Tutorial	12.000

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Essay	AS1	Coursework 1 : written assignment	40.0	
Essay	AS2	Coursework 2 : in-class test	60.0	

Aims

To enable students to understand and use basic descriptive statistics, probability and the methods of statistical inference relevant to experimental design

Learning Outcomes

After completing the module the student should be able to:

1   execute appropriately exploratory graphical and numerical analysis of a set of data
2   use methods of enumeration for calculating probabilities and probability distributions
3   calculate confidence intervals for simple models
4   carry out hypothesis tests appropriately on some simple models
5   carry out appropriate analysis of regression and correlation

Learning Outcomes of Assessments

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

CW   1   2   3   4   5

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Outline Syllabus

Descriptive statistics – graphical displays and numerical summaries.

Probability – methods of enumeration, independent and mutually exclusive events, conditional probability, tree diagrams.

Probability distributions – Binomial, Poisson, Normal distributions

Samples and Populations – Central Limit Theorem and its importance

Confidence interval estimation – mean of a population, use of t distribution, mean of a Binomial probability, mean of a population of differences, unpaired samples

Hypothesis testing – use in testing population mean, binomial probability, mean of a population of differences, the difference in means of two populations.

Correlation – Pearson correlation coefficient and its interpretation. Hypothesis test.

Regression – linear regression, line of best fit, confidence intervals

Use of chi-squared tests – association of categorical variables, goodness-of-fit.

Use will be made of appropriate software, eg. MINITAB, EXCEL, throughout

Learning Activities

Lectures, tutorials, directed reading and software investigation.

References

Course Material	Book
Author	Rees, D.G.
Publishing Year	1991
Title	Essential Statistics
Subtitle	
Edition	2nd
Publisher	Chapman and Hall

ISBN	0412320304

Course Material	Book
Author	Dretzke, B.J.
Publishing Year	1998
Title	Statistics With Microsoft Excel
Subtitle	
Edition	1st
Publisher	Prentice Hall
ISBN	0139565337

Course Material	Book
Author	Vining, G. and S.M. Kowalski
Publishing Year	2006
Title	Statistical Methods for Engineers'
Subtitle	
Edition	2nd
Publisher	Thomson
ISBN	0534384730

Course Material	Book
Author	Johnson, R.A.
Publishing Year	2005
Title	Miller and Freund's Probability and Statistics for Engineers
Subtitle	
Edition	
Publisher	Pearson
ISBN	0131278401

Notes

This module introduces the practical statistical methods which will enable students to design and analyse experiments.