On-line course materials

MATH10282 - Introduction to Statistics

Year: 1 - **Semester:** 2 - **Credit Rating:** 10

Requisites

Prerequisites
MATH10141 Probability 1

Aims

The aims of this course unit are to help students

develop a knowledge of basic statistical concepts and methodology which build on the ideas in probability studied in MATH10141;

develop practical statistical skills.

Brief Description

The course gives a general introduction to statistics and is a prerequisite for all future statistics courses.

Learning Outcomes

On successful completion of this course unit students will be able to

understand introductory statistical ideas and methodology;

use the statistical computing software R to analyse data.

Future topics requiring this course unit

The statistics content is required for MATH20802, Statistical Methods and MATH20812, Practical Statistics 1. The background in R is also very useful for MATH20812, Practical Statistics I.

Syllabus

Populations and samples, random sampling. [1]

Representing sample data the histogram, boxplot, numerical summary measures. [2]

Probability models for data. [2]

Sampling distributions of sample statistics - the sample mean and its distribution under Normality, using the Central Limit Theorem, the sample proportion, the sample variance, the chi-squared distribution. [2]

Point estimation the bias and variance of an estimator, choosing between competing estimators. [2]

The likelihood function and maximum likelihood estimators for discrete variables. [2]

Confidence intervals. Single sample procedures for a Normal mean and variance, the population proportion. Two sample procedures for the difference between two Normal means and the difference between two population proportions. [3]

Hypothesis testing introductory ideas and concepts. [2]

Tests based on a single sample the Normal mean (variance known and unknown), the Normal variance, a non-Normal mean parameter, the Binomial probability parameter. Relationship between CIs and hypothesis testing. [3]

Calculation of the probability of rejecting the null for a given value of the population parameter. [1]

Tests based on two independent samples for differences between two Normal means, two non-Normal means, two population proportions. [2]

Teaching & Learning Process (Hours Allocated To)

Lectures	Tutorials/ Example Classes	Practical Work/ Laboratory	Private Study	Total
22	11	0	67	100

Assessment and Feedback

Two coursework assignments (20%) plus a two hour end of semester examination (80%).

Further Reading

G M Clarke and D Cooke, A Basic Course in Statistics (Fourth Edition) Oxford University Press, 1998;

Robert V Hogg, Introduction to Mathematical Statistics (Sixth Edition) Prentice Hall, 2005;

Sheldon M Ross, Introduction to Probability and Statistics for Engineers and Scientists (Third edition) Elsevier Science, 2004;

Michael J Crawley, Statistics: An Introduction Using R. John Wiley & Sons Ltd, 2007

Staff Involved

Dr Peter Foster - Lecturer

Data source is EPS system

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