



Course information 2024-25

ST104a Statistics 1

General information

MODULE LEVEL: 4

CREDIT: 15

NOTIONAL STUDY TIME: 150 hours

MODE: Locally Taught, Independent Learner Route and Online Taught

Summary

This half course introduces students to the basic statistical concepts which they may need to understand and use in the other courses they intend to study in their degree or diploma.

Conditions

Please refer to the relevant programme structure in the EMFSS Programme Regulations to check:

- where this course can be placed on your degree structure; and
- details of prerequisites and corequisites for this course.

You should also refer to the Exclusions list in the EMFSS Programme Regulations to check if any exclusions apply for this course.

Aims and objectives

The emphasis of the course is on the application of statistical methods in management, economics and the social sciences. Attention will focus on the interpretation of tables and results and the appropriate way to approach statistical problems. Treatment is at an elementary mathematical level. Ideas of probability and statistical inference are introduced and are further developed in the half course ST104B Statistics 2.

Learning outcomes

At the end of this course and having completed the essential reading and activities students should be able to:

- Be familiar with the key ideas of statistics that are accessible to a student with a moderate mathematical competence.
- Be able to routinely apply a variety of methods for explaining, summarising and presenting data and interpreting results clearly using appropriate diagrams, titles and labels when required.
- Be able to summarise the ideas of randomness and variability, and the way in which these link to probability theory to allow the systematic and logical collection of statistical techniques of great practical importance in many applied areas.
- Have a grounding in probability theory and some grasp of the most common statistical methods.
- Be able to perform inference to test the significance of common measures such as means and proportions and conduct chi-squared tests of contingency tables.
- Be able to use correlation analysis and simple linear regression and know when it is appropriate to do so.

Employability skills

Below are the three most relevant employability skills that students acquire by undertaking this course which can be conveyed to future prospective employers:

1. Complex problem solving
2. Decision making
3. Communication

Essential reading

Abdey, J. *Business Analytics: Applied Modelling and Prediction*. (London: SAGE Publications, 2023) first edition [ISBN 9781529774092]

Lindley, D.V. and W.F. Scot *New Cambridge Statistical Tables*. (Cambridge: Cambridge University Press, 1995) second edition [ISBN 9780521484855]

Assessment

This course is assessed by a two-hour and fifteen-minute closed-book written examination (80%) and a sixty-minute Multiple Choice Question assessment (20%). The Multiple Choice Question assessment will examine students' knowledge on Chapters 1 – 5 of the course.

Syllabus

This course introduces some of the basic ideas of theoretical statistics, emphasising the applications of these methods and the interpretation of tables and results.

Mathematics primer and the role of statistics in the research process: Elementary summation signs and an example of statistics applied to research.

Data visualisation and descriptive statistics: Graphical representations of data, measures of location and dispersion.

Probability theory: Probability properties, conditional probability, Venn and tree diagrams

Random variables, the normal and sampling distributions: Properties of discrete random variables, and introduction of the normal distribution including common sampling distribution.

Interval estimation of means and proportions: Construction and interpretation of confidence intervals for means and proportions for samples drawn from one population and two populations.

Hypothesis testing principles: The design and mechanics of hypothesis testing.

Hypothesis testing of means and proportions: Common statistical tests of means and proportions for samples drawn from one population and two populations.

Contingency tables and the chi-squared test: Testing for evidence of associations between two categorical variables and basic goodness-of-fit tests.

Sampling and experimental design: Elements of sampling design, aspects of survey design, observation and experimental studies.

Correlation and linear regression: An introduction to the ideas of scatter diagrams, correlation and linear regression, and least squares estimation of intercept and slope.