

Module code

SPM-2203

Type of module

Undergraduate: Mathematical Sciences – Major Core

Probability and Statistics



Modular credits

4

Total student engagement

56 hours

Prerequisite

SPM-1201
Mathematical Methods
for the Sciences

Anti-requisite

None

Aims

To develop students' ability to apply probability and statistical techniques to analyse data, model uncertainty, and draw evidence-based conclusions in real-world contexts.

Module learning outcomes (MLO)

On successful completion of this module, a student will be expected to be able to:

MLO 1

Analyse categorical and numerical data using appropriate descriptive and inferential statistical technique.

MLO 2

Apply probability concepts and probability distributions to model real-world problems.

MLO 3

Evaluate statistical inferences, including estimation and hypothesis testing, and justify conclusions.

MLO 4

Construct and interpret regression models to explain relationships and make predictions.

MLO 5

Evaluate statistical findings and communicate them effectively in collaborative team settings.

Module contents

Descriptive statistics: tables, graphs, measures of central tendency and variability

Probability: basic rules and concepts

Discrete probability distributions: Bernoulli, Binomial, Poisson, Geometric

Continuous probability distributions: Uniform, Exponential, Gamma, Beta, Normal

Approximation results: Chebyshev's inequality, Normal and Poisson approximations

Statistical inference: Sampling distributions, central limit theorem, estimation, confidence intervals, hypothesis tests

Joint distributions and correlation:
Joint, marginal, conditional;
covariance, correlation; bivariate
normal distribution

Simple linear regression:
Estimation, inference, prediction

Assessment

60%

Examination

40%

Coursework

Examination
60%

Class tests
35%

■ Examination — 60% ■ Class tests — 35% ■ Tutorial participation — 5%

Formative assessment

Weekly discussion
and feedback

Summative assessment

COMPONENT

WEIGHTING

Examination

60%

Coursework

40%

Individual

40%

Class tests

35%

Tutorial participation

5%

Graduate attributes and skills

Programme learning objectives (PLO) addressed

1

PLO 1 (Core Mathematical Knowledge)

2

PLO 2 (Analytical Problem-Solving)

3

PLO 3 (Computational and Digital Tools)

4

PLO 4 (Mathematical Communication)

Sustainability concept addressed

4

SDG 4 Quality Education

Digital skills/software used (not limited to)

■ Communication software (e.g. CANVAS, Microsoft Teams)

■ Statistical computing and data analysis software (e.g. R, SPSS, Python)

Micro-credentialling option

No

Stackable towards GenBESTARI Undergraduate Degree Programme or other relevant Lifelong Learning Programmes

No

Document details

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