

ST119-10 Probability 2

23/24

Department

Statistics

Level

Undergraduate Level 1

Module leader

Saul Jacka

Credit value

10

Module duration

10 weeks

Assessment

Multiple

Study location

University of Warwick main campus, Coventry

Description

Introductory description

This module follows Probability 1 developing the theory of probability distributions, conditional expectation, modelling and other fundamental concepts. This module aims to develop students' ability to create probabilistic arguments and models.

This module is core for students with their home department in Statistics and is not available to students from other departments. Students from other departments should consider ST120 Introduction to Probability.

[Module web page](#)

Module aims

The aims of the modules are

- to introduce students to the nature of mathematics as an academic discipline;
- to develop mathematical comprehension and reasoning skills in a concepts- and proof-oriented setting;
- to develop communication skills in mathematics including proof writing;
- to develop systematic problem-solving skills;
- to lay the foundation for concurrent and subsequent modules in probability and statistics by

introducing the key notions of mathematical probability;

- to introduce the techniques for calculating with probabilities and expectations.
- to build a foundation for independent learning including self-regulation and assessment literacy.

Outline syllabus

This is an indicative module outline only to give an indication of the sort of topics that may be covered. Actual sessions held may differ.

This module covers the following: common families of probability distributions, conditional expectation, probabilistic modelling, moment generating functions and the central limit theorem

Learning outcomes

By the end of the module, students should be able to:

- interpret key ideas of probability and calculate associated probabilities and expectations of random variables
- interpret concepts relating to the theory of probability distributions
- describe the role of randomness in mathematical modelling of real world situations

Indicative reading list

Ross, S. (2014). A first course in probability. Pearson;

Pitman, J. (1999). Probability, Springer texts in Statistics;

Suhov and Kelbert, Probability and Statistics by Example: Basic Probability and Statistics.

[View reading list on Talis Aspire](#)

Subject specific skills

- Demonstrate facility with advanced mathematical and probabilistic methods.
- Select and apply appropriate mathematical and/or statistical techniques.
- Demonstrate knowledge of key mathematical and statistical concepts, both explicitly and by applying them to the solution of mathematical problems.
- Create structured and coherent arguments communicating them in written form.
- Construct and develop logical mathematical arguments with clear identification of assumptions and conclusions.
- Reason critically, carefully, and logically and derive (prove) mathematical results.

Transferable skills

- Problem solving: Use rational and logical reasoning to deduce appropriate and well-

reasoned conclusions. Retain an open mind, optimistic of finding solutions, thinking laterally and creatively to look beyond the obvious. Know how to learn from failure.

- Self awareness: Reflect on learning, seeking feedback on and evaluating personal practices, strengths and opportunities for personal growth.
 - Communication: Written: Present arguments, knowledge and ideas, in a range of formats.
 - Professionalism: Prepared to operate autonomously. Aware of how to be efficient and resilient. Manage priorities and time. Self-motivated, setting and achieving goals, prioritising tasks.
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Study

Study time

| Type | Required | Optional |
|---------------|-----------------------------|----------------------|
| Lectures | 20 sessions of 1 hour (16%) | 2 sessions of 1 hour |
| Seminars | 5 sessions of 1 hour (4%) | |
| Private study | 73 hours (59%) | |
| Assessment | 26 hours (21%) | |
| Total | 124 hours | |

Private study description

Weekly revision of lecture notes and materials, wider reading and practice exercises working on problem sets and preparing for the examination.

Costs

No further costs have been identified for this module.

Assessment

You must pass all assessment components to pass the module.

Assessment group D

| | Weighting | Study time |
|-----------------------|-----------|------------|
| Term-time assignments | 20% | 24 hours |

There will be approximately weekly problem sets. Each problem set will contain a number of individual questions based on the material delivered in the lectures. Problem sheets are supported by seminars, including both analytical and computational tasks.

| | Weighting | Study time |
|-----------------------|------------------|-------------------|
| In-person Examination | 80% | 2 hours |

You will be required to answer all questions on this examination paper.

- Answerbook Pink (12 page)
- Students may use a calculator
- Cambridge Statistical Tables (blue)

Assessment group R1

| | Weighting | Study time |
|-------------------------------|------------------|-------------------|
| In-person Examination - Resit | 100% | |

You will be required to answer all questions on this examination paper.

- Answerbook Pink (12 page)
- Students may use a calculator
- Cambridge Statistical Tables (blue)

Feedback on assessment

Individual feedback will be provided on formative problem sheets by class tutors. A cohort-level feedback will be available for the examination. Students are actively encouraged to make use of office hours to build up their understanding, and to view all their interactions with lecturers and class tutors as feedback.

[Past exam papers for ST119](#)

Availability

Courses

This module is Core for:

- USTA-G302 Undergraduate Data Science
 - Year 1 of G302 Data Science
 - Year 1 of G302 Data Science
- Year 1 of USTA-G304 Undergraduate Data Science (MSci)
- Year 1 of USTA-G300 Undergraduate Master of Mathematics, Operational Research, Statistics and Economics
- Year 1 of USTA-G1G3 Undergraduate Mathematics and Statistics (BSc MMathStat)

- USTA-GG14 Undergraduate Mathematics and Statistics (BSc)
 - Year 1 of GG14 Mathematics and Statistics
 - Year 1 of GG14 Mathematics and Statistics
- USTA-Y602 Undergraduate Mathematics,Operational Research,Statistics and Economics
 - Year 1 of Y602 Mathematics,Operational Research,Stats,Economics
 - Year 1 of Y602 Mathematics,Operational Research,Stats,Economics