ST118-15 Probability 1

24/25

Department
Statistics
Level
Undergraduate Level 1
Module leader
Martyn Parker
Credit value
15
Module duration
10 weeks
Assessment
Multiple
Study location
University of Warwick main campus, Coventry

Description

Introductory description

This module is an introduction mathematical proof and its applications to probability. The module introduces the topics of set theory, counting, probability and expectation and looks at the methods of proof needed to produce fundamental results in these areas. At its core is the aim to allow students to develop logical arguments applied to sets and simple experiments involving probabilistic outcomes.

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. It is useful for all subsequent modules in probability or statistics.

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 topics: naïve set theory, logic, counting arguments, probability spaces and axioms, conditional probability, random variables, joint distributions, expectation.

Learning outcomes

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

- interpret mathematical notation accurately
- compare problem solving and visualisation techniques to compile concise, coherent and rigorous mathematical arguments
- calculate and interpret probabilistic computations
- know and interpret key notions relating to random variables and their distributions.

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 andprobabilistic 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.
- 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.
- Verbal communication: Students will engage with their personal tutors and peers in mathematical dialogue concerning questions from the module.
- 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.

Study

Study time

Type	Required
Lectures	30 sessions of 1 hour (20%)
Seminars	9 sessions of 1 hour (6%)
Private study	85 hours (57%)
Assessment	26 hours (17%)
Total	150 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 do not need to pass all assessment components to pass the module.

Assessment group D1

	Weighting	Study time	Eligible for self-certification
Term-time assignments	20%	24 hours	No

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.

In-person Examination	80%	2 hours	No

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

- Answerbook Pink (12 page)

Assessment group R1

	Weighting	Study time	Eligible for self-certification
In-person Examination - Resit	100%		No

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

- Answerbook Pink (12 page)

Feedback on assessment

Individual feedback will be provided on 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 ST118

Availability

Courses

This module is Core for:

- Year 1 of USTA-G302 Undergraduate 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)

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