

# Mathematics & Statistics

BSc Hons • MMathStat



THE UNIVERSITY OF  
WARWICK



“ I thoroughly enjoyed the diverse range of subjects and flexibility provided by the degree.”

C Nam  
PhD student  
Statistics

# Mathematics & Statistics (BSc Hons)

## Single Honours Degrees in Mathematics & Statistics

There has never been a more exciting time to study or practise statistics, and the coming decades promise an increasingly prominent role for statistics. All fields of social, political and physical science, including economics, biology, chemistry and physics depend upon correct statistical reasoning. Intelligent involvement in politics and the understanding of day-to-day news items increasingly requires an understanding of the statistics involved.

Mathematics & Statistics is a single honours degree designed for students who are interested in the practical problems arising from huge amounts of data and from their intelligent analysis using modern mathematical and statistical theory.

The extremely wide variety of employment opportunities for statisticians covers areas such as the applied sciences, commerce and industry, accountancy and finance, government, teaching and research, computing and information technology, especially in biology and medicine.

In all situations, statistical methods are needed to extract information from existing data, to understand the underlying process that produced the data, and to predict future outcomes. These provide sound principles for complicated problems arising in areas such as modern biology, market research, engineering, medical and social research, psychology, linguistics and many others.

The two main subjects are:

### Pure Mathematics

An understanding of the fundamental structures of mathematics that underlie both school mathematics and the more advanced concepts of modern statistical theory and methods.

### Probability and Statistics

Using mathematics in practical situations involving uncertainty such as:

- predicting the future level of unemployment or the outcome of elections;
- discovering which genes discriminate between diseased and un-diseased patients;
- using mathematical theory in automatic speech recognition;
- estimating fair prices for bets or pricing financial instruments;
- modelling climate and weather systems incorporating a scientific understanding of uncertainty.



## Admission

Admission to Mathematics & Statistics requires a top grade in an A-level or comparable mathematics course (e.g. Mathematics, Pure Mathematics, Mathematics with Statistics) with experience of Further Mathematics being an advantage.

No previous knowledge of Statistics or computing is required.



For further details about the BSc or integrated Master's degrees in Mathematics and Statistics, and the associated MORSE degrees please write for a course guide to the:

Course Selector  
Department of Statistics  
University of Warwick  
Coventry CV4 7AL

Statistics@warwick.ac.uk

BSc Mathematics & Statistics: GG13  
.MathStat: GGC3

## Opportunities for Statisticians

There is a wide variety of careers open to, and taken up by, Mathematics & Statistics graduates from Warwick.

For example:

### Industry

Industry is continually short of well qualified people in particular areas like statistics. Mathematics & Statistics provides an excellent grounding for work in this area.

### Research

A significant number of our students go on to take postgraduate degrees and research posts in industry, medical schools, government departments and elsewhere.

### Teaching

Schools are still desperately short of mathematics teachers, and in the current climate people who can teach another subject in addition to mathematics are especially welcome. After further study, a university career is also possible.

### The Professions

Actuaries, Cost Accountants, Chartered Accountants. Mathematics & Statistics graduates may obtain exemptions from some of the examinations for each of these professions.

### Management

Modern managers need to understand mathematical methods such as statistics and decision theory. Familiarity with computers is important too, but communication skills are absolutely vital. The use of project work and report writing in the Mathematics & Statistics course allows students to develop these skills.

Even when employment prospects are not generally good, the University's Career Office classifies Mathematics & Statistics students as being in high demand. Most have no difficulty finding a suitable job, and nearly all go into the careers listed above, for which the degree is particularly relevant.

## The Structure of the Mathematics & Statistics Degree

The degree course begins with one and a half years of structured study which builds a strong foundation in Pure Mathematics and Statistics. During this time students have considerable free time to take up optional studies of their own choice; in their final year they are entirely free to follow up the areas which interest them most.

### ■ First year

The first year concentrates on building a firm understanding of pure mathematics and probability. Courses include mathematical analysis and algebra, probability and decisions, statistical computing and introductory practical statistics. No previous knowledge, other than A-level mathematics, is assumed. Optional courses include introductory computer programming and various mathematical topics. Approximate division of time for a 'normal load' of ten 30-lecture courses: Maths 40%, Probability and Statistics 30%, Computing 10%, Options (in all areas) 20%.

### ■ Second year

The second year places rather more emphasis on the application areas, while still retaining a strong pure mathematics content. Courses include further mathematical analysis and methods, statistical theory and practice, and a variety of options. Approximate divisions of time: Maths 20%, Statistics 50%, Options 30%.

### ■ Final years

At the end of the second year of the integrated Master's, successful students will either progress to the third and final year of the BSc programme or remain on the integrated Master's and choose between one of the following three streams:



### 1. Advanced Statistics

**Objective:**

to provide students with advanced mathematical and statistical theory; to prepare them for careers in business, industry or government; and also to lead them to the boundaries of research on various topics in statistics.

**Possible modules include:**

Multivariate Statistics, Stochastic Control, Time Series and Forecasting, Brownian Motion.

### 2. Biology and Medicine

**Objective:**

to prepare students for research and development careers as scientific leaders in fields such as biostatistics, genomics, clinical trials, health policy and drug development.

**Possible modules include:**

Medical Statistics, Topics in Mathematical Biology, Designed Experiments, Probability Theory in Bioinformatics.

### 3. Computing in Statistics

**Objective:**

to prepare students for careers with close collaborations with engineers, scientists and social scientists such as researchers, project managers and consultants, who all need a theoretical background to produce workable solutions.

**Possible modules include:**

Bayesian Statistics & Decision Theory, Monte Carlo Methods, Bayesian Forecasting and Intervention.

## Flexible Study

The Mathematics & Statistics course as a whole is extremely flexible, and there are opportunities for incorporating further mathematical, statistical, science and computing options, and even music and language courses. Most students in fact opt to take more than the normal load of courses (and receive extra credit for doing so). Students may additionally choose to spend an 'intercalated' year in an approved industry or business between their last two years at Warwick and graduate with a BSc or integrated Master's degree in Mathematics & Statistics (with Intercalated Year).



## Mathematically - Oriented Degrees at Warwick

Since its formation as one of the new universities in 1965, Warwick has been carefully developed into one of the strongest universities for mathematical science in Europe. A fully comprehensive range of Mathematical degrees is available, including Mathematics & Statistics and the MORSE (Mathematics, Operational Research, Statistics & Economics) course at both Bachelor and Master's level.

Warwick has a thriving and internationally renowned Mathematics Department with interests in many areas of pure and applied Mathematics, and links with other departments concerned with applicable Mathematics. Several lecturers, for example Ian Stewart, are also well-known authors.

The Statistics Department was formed in 1972, has expanded to become one of the largest UK statistics departments and has established an enviable international reputation in teaching and research. The Centre for Research in Statistical Methodology (CRiSM) is a multi-million pound government initiative which further strengthens this achievement. The excellence of the department research output directly impacts teaching: our lecturing staff are active researchers in a broad range of areas in probability and statistics, from theory of statistics and probability to applications in biology, economics, finance and medicine.

Warwick also has a large number of excellent mathematicians and statisticians based in other departments, offering modules that have proved popular with Mathematics & Statistics students. These include modules covering business, economics and computer science.

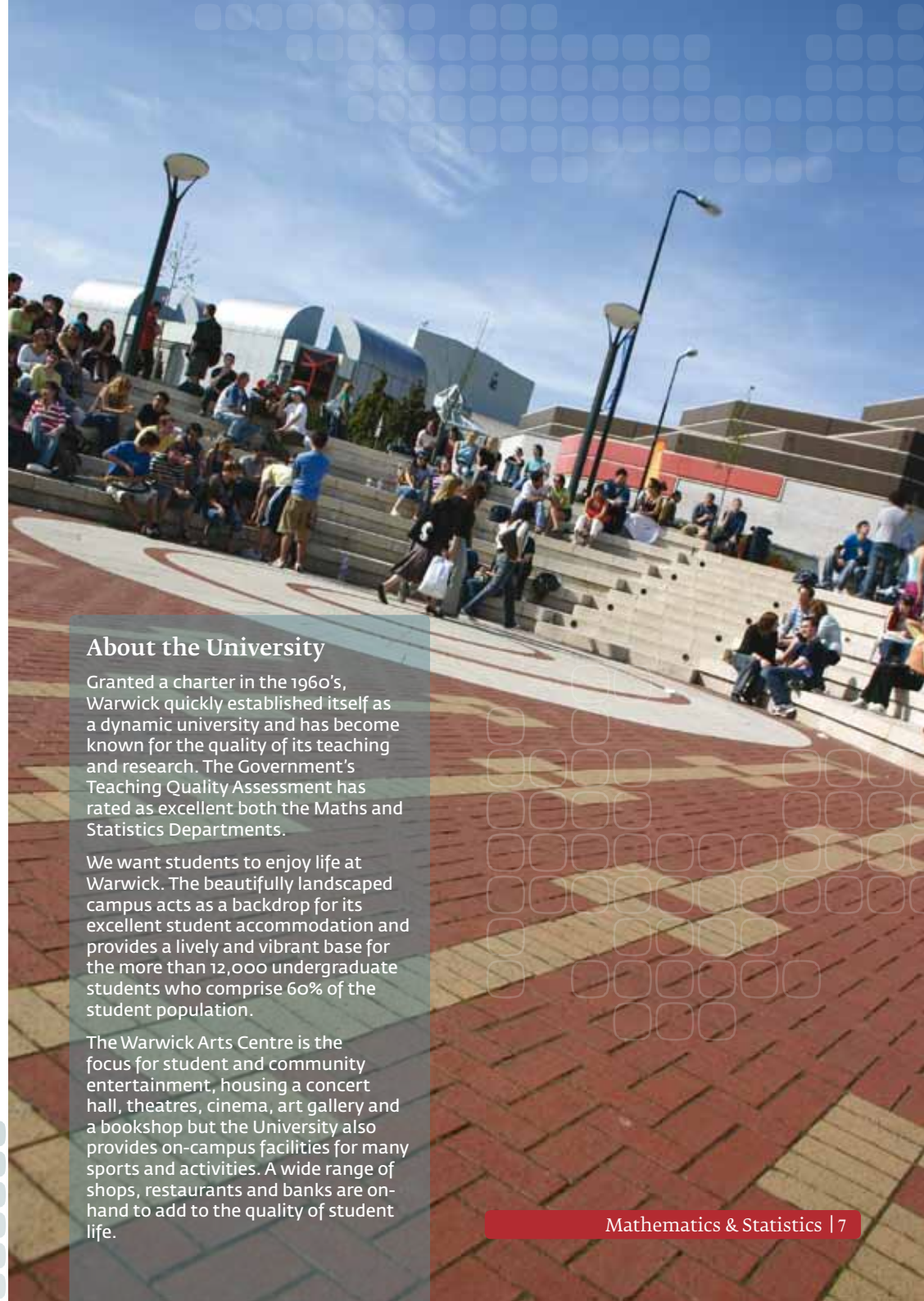
A number of university centres contribute to the teaching of the course in the final year of the Integrated Master's programme.

The Biology and Medicine stream will have input from the Warwick Systems Biology Centre which studies the understanding of a biological system through mathematical and computational modelling. The Computing in Statistics stream will have input from the Centre for Scientific Computing which looks at how computers can be used to solve complex problems in engineering and science.

The Mathematics & Statistics degree is administered by the Statistics Department, but each subject is taught by specialists from the relevant department. Small-group tutorials provide an important back-up to lecture classes in the first two years. Much of the teaching is designed specifically for Statistics students and is directed to their needs and level: even when substantial numbers of students are being taught together, the Statistics students are often the largest single group.

Students occasionally find that one or other of the characteristics of Mathematics & Statistics is not, after all, suitable for them. For such students it is possible to transfer to another related degree course. For instance, if they wanted to take optional subjects that are not possible in Mathematics & Statistics, then they could transfer to another of the mathematically-related degree courses.

Because of the flexible structure of the Mathematics & Statistics degree there are several transfers possible even at the end of the first year. However, transfer into the course from another degree course (except for MORSE) is not usually possible at this stage, because the full range of Mathematics & Statistics subjects will not have been covered.



### About the University

Granted a charter in the 1960's, Warwick quickly established itself as a dynamic university and has become known for the quality of its teaching and research. The Government's Teaching Quality Assessment has rated as excellent both the Maths and Statistics Departments.

We want students to enjoy life at Warwick. The beautifully landscaped campus acts as a backdrop for its excellent student accommodation and provides a lively and vibrant base for the more than 12,000 undergraduate students who comprise 60% of the student population.

The Warwick Arts Centre is the focus for student and community entertainment, housing a concert hall, theatres, cinema, art gallery and a bookshop but the University also provides on-campus facilities for many sports and activities. A wide range of shops, restaurants and banks are on-hand to add to the quality of student life.

For further information contact:

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**Department of Statistics**  
University of Warwick  
Coventry CV4 7AL United Kingdom

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