



Cardiff School of Mathematics

Masters Programmes in
Operational Research, Applied Statistics and Risk



MSc in Operational Research and Applied Statistics

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Our new and innovative MSc programmes will equip you with the necessary analytical skills, methods and ways of thinking to tackle and analyse complex organisational problems, help make better decisions, and to become confident statistical analysts. Delivered by experts in the fields of Operational Research and Statistics, the skills that you will learn are highly transferable for use within industry, business and the public sector. You will study a variety of problem-solving techniques, allowing you to build and use mathematical and statistical models, alongside skills to develop your abilities to communicate effectively to others. We enjoy close collaboration with a number of organisations who employ Operational Researchers, Statisticians and Financial/Risk Modellers, and critical to our programmes is the opportunity for you to put the theory into practice, through case studies and project work in the 'real-world'. Studying our MSc programmes offers the possibility of exciting and rewarding career opportunities and progression.

Both programmes prepare you with essential techniques in Operational Research and Applied Statistics, and allow you to then select from a number of interesting and varied optional courses in topics such as supply chain modelling, healthcare, and Statistics and Operational Research for Government (delivered with input from the Office for National Statistics and Welsh Assembly Government). The MSc in Operational Research, Applied Statistics and Risk, which is a unique MSc degree combination in the UK, is for those who wish to study in greater depth risk models, particularly for application to financial markets but also to other sectors. As well as studying the foundations in Operational



Research and Applied Statistics, you will study further topics in actuarial risk, financial modelling and credit risk scoring.

We have designed and structured the programmes with both full and part-time students in mind. Full-time students will complete the programme in 12 months, which includes a 3 month period working with a company on a real problem of importance to that company.

Part-time students will complete the taught programme in 24 months with up to a further 12 months to complete the project dissertation.

Cardiff School of Mathematics have competitive fees and are able to offer bursaries (for reduction in programme fees) of up to £1,000 for UK/EU students and up to £2,000 for International Students. In addition to the bursaries, the School has a number of scholarships on offer for full-time UK/EU students which will pay the entire fees and in some cases additional support towards living costs.

Operational Research and Statistics at Cardiff University



Cardiff University is recognised in independent government assessments as one of Britain's leading teaching and research universities. Founded by Royal Charter in 1883, the University today combines impressive modern facilities and a dynamic approach to teaching and research with its proud heritage of service and achievement.

From its outstanding central location amidst the parks, Portland-stone buildings and tree-lined avenues that form the city's elegant civic centre, the University's students and staff are drawn from throughout the world, attracted by its international reputation and commitment to innovation and excellence in all areas of activity. Cardiff is a member of the Russell Group of Britain's leading research universities.

The Operational Research and Statistics Group within the Cardiff School of Mathematics has a considerable international reputation and expertise. The group attracts significant research funding, with many academic staff at the forefront of their research fields, contributing to both policy and practice on a local, national and international level whilst contributing to professional bodies, working with industrial partners and publishing in leading academic journals.

Our research expertise helps inform research-led teaching on the MSc programmes, allowing students to study topics at the cutting-edge of the subject. The group benefits from close collaboration with several other Schools within Cardiff University, with Departments in other university institutions across Wales through the Wales Institute of Mathematical and Computational Sciences (WIMCS, www.wimcs.ac.uk), and across the UK as a member of the LANCS initiative consisting of four universities (Lancaster, Nottingham, Cardiff and Southampton, www.lancs-initiative.ac.uk).



Martin Brand

Director of Survey
Methodology Division,
Office for National
Statistics

"As a large employer in this field, we wholeheartedly welcome the MScs now offered by Cardiff University. This is able to provide just the sort of statistics and OR skills that we look for when employing postgraduates".

Programme Structure and Content

Both programmes cover the fundamental topics in Operational Research and Applied Statistics, including the use of specialist software packages, spreadsheet modelling and computer programming skills. Topics include:

Computer Simulation	Reliability Theory	Probability Theory	Regression Models
Optimisation	Inventory Control	Estimation	Multivariate Methods
Queueing Systems	Scheduling	Hypothesis Testing	Non-parametric Statistics
Decision Theory	Heuristics	Analysis of Variance	Sample Surveys

Students may then choose from a range of interesting and varied option modules from the list shown below.

Semester 1	Options (Select 4 modules)
Operational Research Methods	Time Series and Forecasting
Statistical Methods	Supply Chain Modelling
Communication and Research Skills	Statistics and Operational Research for Government
Semester 2	SAS Programming
Computational Methods	Healthcare Modelling
Project Dissertation	Business and Risk Strategy *
	Financial Mathematics and Modern Actuarial Risk Theory *
	Credit Risk Scoring *
	* Must be chosen by students on the MSc in Operational Research, Applied Statistics and Risk

Students will be eligible to include the duration of their studies towards professional accreditation of both the OR Society (CandORS status) and the Royal Statistical Society (GradStat status).

Project Work



An important feature of the MSc programme is to undertake a project dissertation. This allows the student to apply the methods and skills acquired in the taught part of the programme in a real-world setting, and will typically involve working with a company on a project of importance.

Cardiff School of Mathematics already has well established and strong links with many employers of Operational Researchers and Applied Statisticians, who regularly offer projects and/or recruit our students, including:

Admiral Insurance
Barclaycard
British Airways
Corus
Department of Health
Dstl
EADS
Ernst & Young
Friends Provident
GE Aviation
GlaxoSmithKline
Government OR Services

Health Solutions Wales
Lloyds Banking Group
National Leadership and Innovation Agency for Healthcare (NIAH)
NATS
Office for National Statistics
PA Consulting
Pfizer
PricewaterhouseCoopers
Roche
South East Wales Trials Unit (SEWTU)
Welsh Assembly Government

Part-time Students

By adopting an efficient modular approach to teaching, part-time students will typically only need to be in the University for lectures and workshops for the equivalent of one day per week over 24 weeks each year, and complete the taught component of the programme over two years with up to a further year to complete the project dissertation.



Operational Research Methods and Statistical Methods are taught in one-day blocks per week for 10 weeks. Computational Methods is taught in one-day blocks per week for 5 weeks. Option modules are taught in half-day blocks per week for 5 weeks. Assessment is a mixture of written exams (in January and May) and coursework assignments. The Communication and Research Skills module consists of workshops, a case-study, and a written assignment. Part-time students who are in employment will usually be expected to undertake their project work within their own organisation.

Whilst there is no formal requirement on programme pathway for part-time students, one based on the following structure is strongly suggested.

Year 1

Semester 1

Either Operational Research Methods or Statistical Methods

Semester 2

Computational Methods

Two option modules

Year 2

Semester 1

Either Operational Research Methods or Statistical Methods (whatever module was not chosen in year 1)

Communication and Research Skills

Semester 2

Two option modules

Summer

Initial work on Project Dissertation*

Year 3*

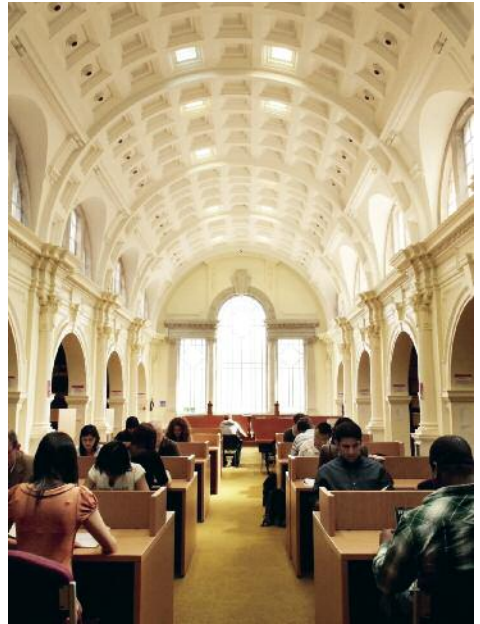
Work on Project Dissertation.

* N.B. It is possible to complete the programme within two years if the student works full-time on the Project Dissertation during the summer of year 2, submitting by the September deadline.

Who is Eligible and How to Apply



We recognise that appropriate work experience is an important component in deciding on an applicant's suitability, and so this will be taken into account with particular emphasis given to experience directly relevant to the programmes of study.



Applications are welcome from people with:

- A first degree (minimum second class honours) from a recognised university in a numerate subject such as Mathematics, Operational Research, Statistics, Management Science, Economics, Engineering, Computer Science, Geography or a suitable Science degree.
- A good level of English language, both written and oral (applicants whose native language is not English will normally require an IELTS score of 6.5 or TOEFL 600).
- Willingness to engage with staff and students for mutual benefits.
- Motivation to establish or accelerate a career in Operational Research and Statistics.

For further details of the MSc programmes, information on bursaries and scholarships and how to apply please see:

www.cardiff.ac.uk/maths/masters

Kate Chamberlain
Chief Statistician, Welsh
Assembly Government

"The Welsh Assembly Government enjoys excellent links with the Cardiff School of Mathematics. The range of topics covered within the MSc programmes will benefit students and enhance recruitment opportunities and ongoing professional development".

Cardiff: The City

Lively, elegant, confident, cosmopolitan, Cardiff caters for all tastes, offering everything from the excitement of a vibrant city life to the peace and tranquillity of the nearby coast and countryside.

A city with both heritage and ambition Cardiff has a distinctive character, a good quality of life, and a growing national and international reputation.

It is presently host to numerous large and high profile events, including Britain's largest free summer festival.

As the capital city of Wales it is home to many national institutions including the National Museum of Wales and the much-admired Millennium Stadium. The city centre skyline is testimony to its heritage and ambition, with landmark buildings ranging from the ornate civic centre to the historic Cardiff Castle.



Cardiff Bay, the city's waterfront



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