

# DATA SCIENCE AND STATISTICAL LEARNING

## MASTER OF SCIENCE (MSc)



The University of Limerick offers programmes of education and research to doctorate level in the following areas: **science, engineering, mathematics, computing, education, business, social science, humanities, dance and music.**

The extensive modern campus of the University is located on the banks of the River Shannon, approximately 5km from the centre of Limerick city. The University has excellent educational, cultural, sporting and residential facilities and accommodates some 15,000 students.

## INTRODUCTION

The MSc in Data Science and Statistical Learning provides an exciting opportunity for students with a quantitative background to specialise in the rapidly expanding field of data science, with an emphasis on statistical perspectives. The course modules have been carefully developed with a focus on statistics and computing to assist students in developing skills in statistical modelling, data visualisation and interpretation, database management, statistical programming, network analysis and predictive algorithms. Students are also provided with an opportunity to specialise in more applied elements of data science through the undertaking of a research project and dissertation.

## OBJECTIVES

- To enable graduates of quantitative disciplines to redirect their training towards the rapidly growing field of data science.
- To provide students with a fundamental grounding in the key skills of data science including; data manipulation, data interrogation and visualisation, statistical modelling, and scientific computation.
- To provide students with technical research and presentation experience, through the undertaking of a research project and writing of an MSc dissertation.

## PROGRAMME OF STUDY

The first two semesters will comprise of coursework from a set of mandatory core modules. These modules will provide training across the field of data science including; data manipulation, database management, statistical modelling and inference, and scientific computation. Practical problems will be drawn from the industrial, commercial, medical, environmental and life sciences domains.

The purpose of the core modules is to teach students how to use both descriptive and predictive analytics to interrogate, analyse, and develop models for collected data. It will facilitate understanding and exploration of the fundamental methods, frameworks, and statistical modelling techniques to make sense of data and make informed decisions.

The coursework will be followed by the preparation of a dissertation over the summer months under close supervision by a member of academic staff. The dissertation will be at research level, and may focus on a problem that has arisen through Department links with industry.

## PROGRAMME OUTLINE

### SEMESTER 1

- Statistical Inference for Data Science
- Fundamentals of Statistical Modelling
- Scientific Computation
- Database Systems in Practice
- Text Analytics and Natural Language Processing

### SEMESTER 2

- Statistical Learning
- Quantitative Research Methods for Science, Engineering and Technology
- Networks and Complex Systems
- Applied Big Data and Visualisation
- Artificial Intelligence and Machine Learning

### SUMMER SEMESTER

#### Research Project:

Students will specialise their dissertation studies in one of the three sub-disciplines: Mathematics and Statistics, Electronic and Computer Engineering, or Computer Science and Information Systems.

## CAREERS

Data science skills are some of the most highly sought after by employers both nationally and internationally. There is a rapidly increasing demand for individuals with strong proficiencies in data analysis and scientific computation. Examples of potential fields of employment (and employers) include:

ICT (e.g. Apple, Facebook, Google, LinkedIn, Microsoft, Tenable, TikTok);

Financial services and management consulting (e.g. Accenture, AIB, Aon, Bank of Ireland, Deloitte, EY, KPMG, PWC, Zurich);

Manufacturing and pharmaceuticals (e.g. Abbott, Eli Lilly, Glanbia, Johnson & Johnson, Regeneron);

Research and development roles in a wide variety of applied fields, as well as strengthening applicant candidacy for application to PhD programmes.

## ENTRANCE REQUIREMENTS

Applicants must have a first or second class (minimum 2.2) honours undergraduate degree (Level 8 – National Qualifications Authority of Ireland or equivalent) in Mathematics, Statistics, Computer Science, or other relevant quantitative discipline, or equivalent qualification that is recognised by the University as meeting this requirement. The University reserves the right to shortlist and interview applicants as deemed necessary.

## FEES

Information on fees and semester dates is available from the university webpage [www.ul.ie/finance](http://www.ul.ie/finance).

## CONTACT

Applicants who wish to discuss detailed elements of the programme may contact the Course Director:

#### Dr James Sweeney

Department of Mathematics and Statistics

Email: [james.a.sweeney@ul.ie](mailto:james.a.sweeney@ul.ie)

Telephone: +353 (0)61 202 609

Web: [www.maths.ul.ie](http://www.maths.ul.ie)

## HOW TO APPLY

Please apply online at <https://www.ul.ie/gps/>

Postgraduate Admissions Office

Graduate and Professional Studies

University of Limerick

Tel: +353 61 234377

Email: [postgradadmissions@ul.ie](mailto:postgradadmissions@ul.ie)

Web: <https://www.ul.ie/gps/>

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