MSC IN DATA SCIENCE AND ANALYTICS

MAYNOOTH UNIVERSITY

STUDENT HANDBOOK 2024-2025

INTRODUCTION

This MSc is a full-time 12-month conversion course (started in 2017) designed to prepare students for the fast expanding job market in Data Science and Analytics. Students will gain the knowledge and skills to collect, process, analyse and visualise data in order to extract useful information, explore patterns and evaluate models. The course is a collaboration between the **Departments of Mathematics & Statistics, Computer Science** and the **National Centre for Geocomputation**.

Modules cover programming, statistics and databases, and advanced topics in modern statistical machine learning. The course includes material on the social and ethical consequences of the use of data and the implications for business and government. Applications from many industry sectors will be explored in our Case Studies module. In the Project module, students will put these technical skills into practice. They will gain experience in report writing, presentations and teamwork. Students also do a 30-credit thesis.

NEW: students have the option to pursue a **spatial pathway** that includes instruction in geocomputation using R and Python, geographical information systems (GIS), and the design and execution of a spatially-informed data analytics project using Python.

Applicants must have a recognised primary degree which is considered equivalent to Irish university primary degree level. The degree should be at level 8 in any subject and should include course work in Differential and Integral Calculus, Linear Algebra and Probability and Statistics.

Please visit Maynooth University International Office website for information about English language tests accepted and required scores. The requirements specified are applicable for both EU and non-EU applicants.

MODULES

C= Compulsory module, O= Optional module

Module	Topic	Semester	Credits	C/O
CS620C	Structured programming	1	10	O
ST661	**R for data analytics**	**1**	**5**	**C**
ST633	**Linear models**	**1**	**5**	**C**
ST645	**Bayesian Data Analysis**	**1**	**5**	**C**
CS621C	**Spatial databases**	**1**	**10**	**C**
DS663	Statistical methods for data science 1	1	5	O
CS322	Music programming 2	1	5	O
CS401	Machine Learning and Neural Networks	1	5	O
NCG617	Introduction to Geocomputation	1	5	O (spatial pathway)
NCG618	Advanced Topics in Geocomputation	1	5	O (spatial pathway)
ST644	**Statistical machine learning**	**2**	**5**	**C**
NCG612	**Case studies in data science and analytics**	**2**	**5**	**C**
NCG613	Data analytics project	2	5	O (spatial pathway)
NCG619	Geographical Information Science in Practice	2	5	O (spatial pathway)
NIR605	Critical data studies	2	5	O
ST634	Generalised Linear Models	2	5	O
ST662	Topics in data analytics	2	5	O
CS615C	Internet solutions engineering	2	10	O
ST606 NCG616 CS648	Masters Project and Dissertation	Summer	30	C

CS620C is an intensive programming course that runs 3 weeks, from 9.30 to 5pm each day **before** of the start of semester 1. In 2024, lecture start date CS620C is **September 2nd.**

Lectures for all other **semester 1** modules begin in the week of **September 23rd, 2024**.

CHOOSING MODULES

Module details and descriptions are on the [University course finder](). From this page, click on 'Year 1' and then 'Data Science and Analytics'. Follow links to modules for descriptions.

Students should select enough modules to bring the **taught module credit total to 60** (including compulsory modules). You can chose any of the optional modules from the list above, but make sure to check the module descriptions for pre/co-requisites.

Please register for 30 or 35 credits in Semester 1. This choice does not have to be finalised until the third week of the semester, but we advise you to register before the start of the semester. For all second semester modules and the thesis, students do not have to finalise their choices until the new year.

Compulsory modules

All students should take the compulsory modules ST661 (5), ST633 (5), ST645 (5), CS621C (10), NCG612 (5) and ST644 (5).

Optional modules

It is recommended that students without a programming background take CS620C (10). Students with little or no background in Statistics should take DS663 (5).

Students intending to follow the **spatial pathway** must select modules NCG613 (5) and NCG616 (30), and one of NCG617 (5), NCG618 (5), or NCG619 (5).

Thesis

The project or thesis is an important part of the MSc, making up 30 credits out of a total of 90. Students will carry out projects under the individual supervision of a staff member in Mathematics & Statistics, Computer Science or the National Centre for Geocomputation.

When registering, all students should choose **one** of ST606, NCG616 and CS648. This is a **preliminary choice**.
In **the first week of Semester 2** (**4th -7th February 2025**) students will choose one of the three Departments via Moodle poll. NOTE: if you are interested in pursuing the spatial pathway you should select the NCG616 as your thesis department. Once allocated to departments, students must change their official University registration to reflect this final choice. Each Department will allocate students to projects.

Initial work on the project will begin in semester 2, after students have been allocated to departments and supervisors. Once course work and exams are finished in May, you will commence working full-time on the project. A written dissertation will be submitted in **August 2025**.

Students are welcome to discuss their **module choices** with the Course Director (Katarina.Domijan@mu.ie) and **thesis choice** with Dr Catherine Hurley (Catherine.Hurley@mu.ie).
For enquiries about the **spatial pathway**, please contact Dr Kevin Credit (kevin.credit@mu.ie).
For information about CS620C contact joseph.duffin@mu.ie.

LOCATIONS

The MSc is jointly offered by the Department of Mathematics and Statistics, located in Logic House, South Campus, the Department of Computer Science located in the Eolas Building, and the National Centre for Geocomputation (NCG) located in Iontas, both on the North Campus.

LECTURES

The official start of term is **Monday September 23rd 2024**. International students are advised to arrive in Maynooth at least one week in advance of this date. You will find information on key term dates here. Module timetables will be available early in September, check here. Some modules will have additional tutorials. Lecturers will advise you of this on the first day of class.
Attendance at all lectures, labs and tutorials is required.

ASSESSMENT

Students will find assessment information for modules on course finder. The lecturer will give you more details at the start of the semester. Module pass marks are either 40% or 50%. Pass by compensation is allowed in some cases when students obtain a mark of at least 35%. The University Marks and Standard document explains this.

MSC THESIS ASSESSMENT

MARK	DESCRIPTION
90-100	Outstanding
80-89	Excellent
70-79	Very good
60-69	Good
50-59	Satisfactory
40-49	Barely satisfactory
30-39	Fail

EXAMS

Some modules are examined by continuous assessment or in class exams. Others are examined during the official University examination periods which are two weeks in January and two weeks in May. Repeat exams (for modules offering them) take place in August. Check the key term dates link for details.

PLAGIARISM

Students should make themselves aware of the [University policy on plagiarism](#).

To understand a bit more about plagiarism and how to avoid it there is lots of material, see [here](#).

You can check your work on [turnitin](#).

STUDENT SUPPORTS

- The University has a [Career development centre](#), which offers career related talks and employer presentations.
- There is also a [general student services office](#), which has links to information on finding accommodation, student health and budgeting.

MOODLE

Moodle is Maynooth University's online learning environment. To log in to Moodle, you need to enter your Maynooth University username and password in the login area. You will find material there related to your modules.

COMPUTERS

[The University computer centre website](#) has information about email accounts, and the [publicly available computer labs](#) and wifi.
MSc students will also have accounts for the computer labs in Logic House.