Programme Specification (Postgraduate)

FOR ENTRY YEAR: 2025/26

Date created: 14/04/2025 **Last amended:** **Version no.** 1

1. Programme title(s) and code(s)

MSc Data Science (Satellite Data)

MSc Data Science (Satellite Data) with Industry

PG Dip Data Science Studies (Satellite Data)

PG Cert Data Science Studies (Satellite Data) *

Notes

* An award marked with an asterisk is only available as an exit award and is not available for students to register onto.

HECOS Code

HECOS Code	%
101056	30%
100370	50%
100992	10%
100956	10%

2. Awarding body or institution

University of Leicester

3. a) Mode of study

Full-time

b) Type of study

Campus-based

4. Registration periods

MSc Data Science (Satellite Data)

- The normal period of registration is 12 months (full time).
- The maximum period of registration for the is 24 months (full time)

PG Dip in Data Science Studies (Satellite Data)

- The normal period of registration is 9 months (full time).
- The maximum period of registration is 18 months (full time)

Note: Normal and maximum periods of full-time registration for the 'with industry' MSc variant accommodate an extra period of registration corresponding to the placement duration, such that normal period is between 18-24 months (dependent on length of placement obtained) and the maximum period is 36 months.

5. Typical entry requirements

Students are required to have a first, upper second or lower second class honours degree (or equivalent) in any subject or several years appropriate professional experience. Students with nonstandard qualifications are expressly encouraged to apply and will be considered on a case-by-case basis. In particular we give due consideration to prior professional experience gained by mature students in relevant areas of work. In such cases applicants would be expected to provide detailed information on work experience to enable its full evaluation by admissions staff. We also consider alternative qualifications, for example in different subject areas, where these are supported by relevant experience within the field of the MSc programme. Students for whom English is not their first language are required to achieve a minimum IELTS score of 6.

6. Accreditation of Prior Learning

No accredited prior learning would be accepted for exemption from modules on the programme.

7. Programme aims

This interdisciplinary MSc in Data Science (Satellite Data) trains students in Data Science with an emphasis on the development and use of satellite observations of the earth and its atmosphere for understanding the natural environment and how it is being impacted by human behaviour. Students are taught the basic operational principles of different remote sensing / earth observation platforms and sensors, learn how to use a variety of data- and image-processing techniques and software, and gain practical experience of using satellite data and data products in a number of applied terrestrial and atmospheric contexts. The uptake, use, and commercialisation of satellite data demands expertise in Data Science and students will be trained in a broad range of data science techniques, including machine learning. These skills are not limited to a career focused on satellite observations. They address the shortage of qualified data scientists in the UK and abroad and successful students will be in a strong position for a career in a range of data science sectors. Students taking the 'with industry' version of this degree can seek placements with a range of organisations associated with satellite and data science sectors of the economy.

The 'with industry' variant of this programme is in accordance with the University's standard model

8. Reference points used to inform the programme specification

- QAA Benchmarking Statement
- Framework for Higher Education Qualifications (FHEQ)
- UK Quality Code for Higher Education
- University Education Strategy
- University Assessment Strategy [log in required]
- University of Leicester Periodic Developmental Review Report
- External Examiners' reports (annual)
- United Nations Education for Sustainable Development Goals
- Student Destinations Data

9. Programme Outcomes

Unless otherwise stated, programme outcomes apply to all awards specified in 1. Programme title(s).

a) Discipline specific knowledge and competencies

i) Knowledge

Intended learning Outcome	Teaching methods	Learning Activities	Assessment Type
Students should be able to: describe and illustrate the range and availability of remotely sensed data and data products and their breadth of application in a variety of Earth Observation contexts;	Lectures; Tutorials; Practical classes/workshops; Guided independent study	Practical exercise; Formative assessment; Discussion; Literature search; Problem-based learning; Guided reading	Report; MCQ test, Practical exercise, Presentation
describe the physical principles of remote sensing system operation with reference to a range of sensors together with the characteristics of the data they produce;	Lectures; Tutorials; Practical classes/workshops; Guided independent study	Practical exercise; Discussion; Problem-based learning; Formative assessment; Online research; Literature search; Guided reading	Report; MCQ test, Practical exercise; Presentation
describe what is meant by data science, its key principles and practices;	Lectures; Seminars; Practical classes/workshops; Guided independent study	Practical exercise; Discussion; Problem-based learning; Formative assessment; Online research; Guided reading	Report; Exam; Project
apply techniques of data science to applications of data analyses including satellite data analyses.	Lectures; Seminars; Practical classes/workshops; Guided independent study	Practical exercise; Discussion; Problem-based learning; Formative assessment; Online research; Literature search; Guided reading	Exam; MCQ test; Presentation; Report; Practical exercise

ii) Concepts

Intended learning Outcome	Teaching methods	Learning Activities	Assessment Type
Students should be able to: describe at a simplified-level the physics-based concepts that underpin the acquisition of data from satellite sensors;	Lectures; Practical classes/workshops; Guided independent study	Practical exercise; Formative assessment; Discussion; Guided reading	Report; MCQ test

demonstrate a conceptual awareness of system-based data science that allows the construction of data processing workflows that are informed by state-of-the-art literature.	Lectures; Practical classes/workshops; Guided independent study	Practical exercise; Discussion; Problem-based learning; Project supervision; Formative assessment; Online research; Guided reading	Project; Exam; Report;

iii) Techniques

Intended learning Outcome	Teaching methods	Learning Activities	Assessment Type
Students should be able to: plan and build scripts using open-source programming languages to process satellite and other data;	Lectures; Practical classes/workshops; Guided independent study	Practical exercise; Discussion; Problem-based learning; Formative assessment; Online research; Literature search; Guided reading	Project; Exam; Report; Presentation; MCQ test; Practical exercise
deploy data wrangling techniques to structure and manipulate data and metadata;	Lectures; Practical classes/workshops; Guided independent study	Practical exercise; Discussion; Problem-based learning; Formative assessment; Online research; Guided reading	Project; Report; Exam
demonstrate expertise in the processing and analyses of satellite imagery and other data using open-source programming languages, to build meaningful workflows.	Lectures; Seminars; Practical classes/workshops; Guided independent study	Practical exercise; Discussion; Formative assessment; Online research; Literature search; Problem-based learning; Guided reading	Report; Project; MCQ test; Practical exercise; Presentation; Essay

iv) Critical analysis

Intended learning Outcome	Teaching methods	Learning Activities	Assessment Type
Students should be able to: use satellite and other data products, processed in a robust way and underpinned by scientific reasoning, to generate information that is meaningful and useful to society and/or tackles societal challenges;	Lectures; Seminars; Tutorials; Practical classes/ workshops; Project supervision; Guided independent study	Practical exercise; Discussion; Project supervision; Workshop; Problem-based learning; Formative assessment, Online research; Literature search; Guided reading	Report; Exam; MCQ test; Practical exercise; Presentation; Concept map; Research proposal; Dissertation
demonstrate a critical awareness of the different tools and operations that have been developed to support effective decision making;	Lectures; Seminars; Practical classes /workshops; Guided independent study	Practical exercise; Discussion; Problem-based learning; Formative assessment; Online Research; Guided reading	Report; Exam; Practical exercise; Presentation; MCQ test

critically analyse the limitations of remotely sensed data and data products for understanding the natural environment and how it has been, and is being, impacted by anthropogenic activities.	Lectures; Seminars; Practical classes /workshops; Tutorials; Project supervision; Guided independent study	Practical exercise; Discussion; Formative assessment; Workshop; Problem-based learning; Project supervision; Guided reading	Report; MCQ test; Practical exercise; Presentation; Research proposal; Dissertation

v) Presentation

Intended learning Outcome	Teaching methods	Learning Activities	Assessment Type
Students should be able to: present a range of data including Earth Observation data and data products in a variety of formats and to a variety of audiences.	Lectures; Seminars; Practical classes /workshops; Tutorials; Project supervision; Guided independent study	Practical exercise; Discussion; Workshop; Problem-based learning; Project supervision; Literature search; Guided reading	MCQ test; Report; Concept map; Practical exercise; Presentation; Research proposal; Dissertation

vi) Appraisal of evidence

Intended learning Outcome	Teaching methods	Learning Activities	Assessment Type
Students should be able to: critically appraise data, including satellite data and data products in problem solving contexts.	Lectures; Project supervision; Seminars; Practical classes /workshops; Tutorials; Guided independent study	Practical exercise; Formative assessment; Online research; Workshop; Discussion; Problem-based learning; Project supervision; Literature search; Guided reading	Report; Exam; Practical exercise; Presentation; MCQ test; Research proposal; Dissertation

b) Transferable skills

i) Research skills

Intended learning Outcome	Teaching methods	Learning Activities	Assessment Type
Students should be able to: conduct literature searches;	Lectures; Tutorials; practical classes /workshops; Project supervision; Guided independent study	Discussion; Workshop; Project supervision; Guided reading	Research Proposal; Dissertation
read, analyse and reflect critically on scientific texts and other source materials;	Lectures; Tutorials; Practical classes /workshops; Project supervision; Guided independent study	Discussion; Workshop; Project supervision; Guided reading	Research proposal; Dissertation
design, execute, and write-up a piece research within a specific physical or	Lectures; Tutorials; Practical classes /workshops; Project supervision;	Discussion; Workshops; Project supervision; Guided reading	Research proposal; Dissertation

socio-economic context that is bounded by concepts of data science and utilizes appropriate satellite data or data products.	Guided independent study		

ii) Communication skills

Intended learning Outcome	Teaching methods	Learning Activities	Assessment Type
Students should be able to: communicate effectively in a variety of formats.	Lectures; Seminars; Practical classes/ workshops; Project supervision; Guided independent study	Practical exercise; Discussion; Formative assessment; Online research; Workshop; Project supervision; Literature search; Problem-based learning; Guided reading	Report; Exam; Presentation; MCQ test; Practical exercise; Research proposal; Dissertation

iii) Data presentation

Intended learning Outcome	Teaching methods	Learning Activities	Assessment Type
Students should be able to: explain and discuss fundamental concepts related to presenting data textually and visually;	Lectures; Practical classes/workshops; Guided independent study	Practical exercise; Formative assessment; Online research; Guided reading	Project; Report
critique different visualisation methods and design effective data visualisations using software tools or scripting languages.	Lectures; Practical classes/workshops; Guided independent study	Practical exercise; Formative assessment; Online research; Guided reading	Project; Report

iv) Information technology

Intended learning Outcome	Teaching methods	Learning Activities	Assessment Type
Students should be able to: demonstrate competence in a range of software tools and scripting languages for the processing, analyses and visualisation of satellite and other types of data.	Lectures; Seminars; Practical classes/workshops; Guided independent study	Practical exercise; Discussion; Formative assessment; Online research; Problem-based learning; Guided reading	Project; Report; Essay; Exam

v) Problem solving

Intended learning Outcome	Teaching methods	Learning Activities	Assessment Type
Students should be able to: analyse satellite data within problem solving contexts;	Lectures; Tutorials; Practical classes /workshops; Project supervision; Guided independent study	Practical exercise; Discussion; Formative assessment; Project supervision; Literature search; Problem-based learning; Workshop; Guided reading	MCQ test; Report; Practical exercise; Presentation; Research proposal; Dissertation
explore key problem spaces with contemporary discourses and approaches.	Lectures; Tutorials; Practical classes /workshops; Project supervision; Guided independent study	Practical exercise; Formative assessment; Discussion; Workshops; Literature search; Project supervision; Guided reading	MCQ test; Report; Practical exercise; Presentation; Concept map; Essay; Research proposal; Dissertation

vi) Working relationships

Intended learning Outcome	Teaching methods	Learning Activities	Assessment Type
Students should be able to: work effectively and collaboratively with their peers and staff (discuss ideas, formulate plans, organise time/allocate tasks, offer and receive constructive criticism) to produce data products, reports and presentations.	Lectures; Seminars; Tutorials; Practical classes/workshops; Project supervision	Discussion; Workshop; Practical exercise; Project supervision; Guided reading	Research proposal; Dissertation; Essay; Report

vii) Managing learning

Intended learning Outcome	Teaching methods	Learning Activities	Assessment Type
Students should be able to: effectively engage with different formal and informal learning opportunities;	All modules. All teaching methods	All learning activities	All assessments
organise and manage their time to meet targets and deadlines.	All modules. All teaching methods	All learning activities	All assessments

viii) Career management

Intended learning Outcome	Teaching methods	Learning Activities	Assessment Type
Students should be able to: demonstrate an awareness and	Discussions with Personal Tutors; engagement with Careers and	Reflective activities; online quizzes	Online quizzes (Formative assessment)

understanding of their employability skills and strengths (an ability to work independently/ part of a team, critical/creative thinking, programming, time management, leadership etc);	Employability Service		
engage with career and personal development planning that support students to secure careers in a range of industrial, commercial, governmental and non-governmental job markets;	Workshops run jointly by the School and CES on Postgraduate career options and planning; participation in School, College and University careers events, engagement with Personal Tutors; engagement with Careers and Employability services.	Application coaching, Career coaching, Mock interviews/assessments, Business coaching, CV writing workshops	Online quizzes (Formative assessment)
describe and reflect upon the role of Data Science and the Satellite Data Scientist in contributing to and delivering collaborative projects in a range of interdisciplinary management and policy-setting contexts.	Lectures; Seminars; Practical classes/workshops; Guided independent study	Practical exercise; Discussion; Formative assessment; Online research; Guided reading	Report; Exams; Concept map; Presentation

For the with Industry variant, additional programme outcomes apply

PG Diploma

Intended learning Outcome	Teaching methods	Learning Activities	Assessment Type
Intended Learning Outcomes for this award remain similar to the full MSc programme. However, it is recognised that outcomes that are predominately demonstrated by the dissertation will not be as effectively met.	Teaching methods for this award remain similar to the full MSc programme. However, it is recognized that for the PG Diploma there will be no teaching associated with the dissertation	Learning activities for this award remain similar to the full MSc programme. However, it is recognised that for the PG Diploma the dissertation will not be a learning activity	Assessment types for this award remain similar to the full MSc programme. However, it is recognised that the dissertation will not be used as a method to evidence any of the learning outcomes

10. Progression points

This programme follows the standard Scheme of Progression set out in Senate Regulations – see the version of *Senate Regulation 6 governing postgraduate programmes* relevant to the year of entry.

In cases where a student has failed to meet a requirement to progress, he or she will be required to withdraw from the course.

a) Course transfers

n/a

b) With Industry

For the year with industry variant additional progression points apply

11. Criteria for award and classification

This programme follows the standard scheme of postgraduate award and classification set out in Senate Regulations – see the version of *Senate Regulation governing postgraduate programmes* relevant to the year of entry.

12. Special Features

Embedding the teaching of generic Data Science skills within specific (earth observation) disciplinary contexts

For the Year Industry variant, the additional Special Features apply

12a. Research-inspired Education

Students on this programme will advance through the four quadrants of the University of Leicester Research-inspired Education Framework as follows:

RiE Quadrant	Narrative
	The programme aims to give practical knowledge of the concepts and techniques making up the area of practice known as data science, and their relationship to other areas of practice involving the collection and analysis of data. The use of satellite observations of the earth and its atmosphere for understanding the natural environment and how it is being impacted by human behaviour is given particular emphasis. The curriculum ensures that the knowledge and skills you gain are applicable across a range of professional data science fields.
Research-briefed Bringing staff research content into the curriculum.	Research-briefed: Experience a challenging and inspiring learning environment informed by cutting-edge research. You will benefit from the strong research background of the University of Leicester's Schools of Geography, Geology & Environment, Physics and Astronomy, and Computing and Mathematical Sciences, many members of which also work in Space Park Leicester, the National Centre for Earth Observation, the Institute for Space and the Institute for Environmental Futures. Our staff bring their research straight into the classroom, making learning exciting and relevant. Throughout the programme, staff emphasise how Data Science methodologies and techniques can be used to ensure that your conclusions are reliable, reproduceable, and free from bias.
Research-based Framed enquiry for exploring existing knowledge.	Research-based: Engage in computer practicals and assessments grounded in real-world problems, data and different stakeholder perspectives. This workshop-led, hands-on approach helps you contextualize data management, methods, and modelling.

Research-oriented Students critique published research content and process.	Research-oriented: Learn to critically appraise published research with expert guidance and training. You will engage with academic literature through various classroom activities and assessments, honing your ability to think critically and analytically and to publish code to open-source repository standards. You will be able to search information effectively, and demonstrate advanced analytical skills to interpret data and other collected information into a clear and substantial report. Practical work emphasises the importance of transparency and replicability in data science.
Research-apprenticed Experiencing the research process and methods; building new knowledge.	Research-apprenticed: Receive comprehensive training in report writing, group work, presentation skills, reading research papers, and library skills, including the use of reference management software. Research-focused training includes topics such as types of research, stakeholder identification, project design and qualitative and qualitative methods. This training culminates in a final dissertation project, where you'll push the boundaries of knowledge using on independent research, supported by an expert supervisor.

As part of studying at a research-intensive university, students on this programme have the following extra or co-curricular opportunities available to them to gain exposure to research culture:

The School has a full programme of weekly seminars by outside speakers, to which Masters students are encouraged to attend through promotion in the School newsletter and through lecture shout-outs. Staff also pen their latest research findings within the School newsletter, and pin their latest journal papers to their relevant VLE module sites in a virtual noticeboard.

The School of Computing and Mathematical Sciences organises a series of talks for students in Data Science which are delivered by internal and external speakers. Some of the external speakers invited include a speaker from Space Park Leicester, and a speaker from an actuarial consulting firm who talks about the use of data in actuarial sciences. Topics covered by the internal speakers, include the use of data in healthcare, and in the museum data service.

The School of Physics and Astronomy has a programme of weekly “Space Lattes” events hosted by the National Space Centre together with monthly “Cosmic Coffee” academia/industry interactions and a programme of specialist lectures, both at Space Park Leicester, to which MSc students are encouraged to attend through promotion via standard student comms channels (e.g. Teams and email) and Space Park advertising.

Teaching on this programme will be research-informed (it draws consciously on systematic inquiry into the teaching and learning process itself) in the following way:

Our teaching of geospatial data analyses draws on the body of learning and teaching research carried out during the Leicester-led HEFCE Spatial Literacy in Learning and Teaching project.

More generally, all Schools support all staff involved in teaching to gain an accredited Higher Education teaching qualification, in which they demonstrate their use of teaching theory to support their own practice and reflect on their current teaching and continuing professional development.

In the School, academic staff meet twice per year to discuss the latest developments in teaching and learning, for example most recently in regard to generative artificial intelligence. Selected

staff conduct horizon scanning of the latest journal papers in Journal of Geography in Higher Education and bring ideas at the forefront of innovation to their peers.

In CMS, all module convenors are part of teaching pods, which group similar fields together. These pods are designed to provide a forum for discussion between teaching-focussed and teaching/research staff, and as a way for more experienced staff to support others by, for example, peer observation and feedback. This provides a platform for staff to share considerations and observations of their teaching experience and obtain research-based input.

13. Indications of programme quality

External examiners reports

For the 'with Industry' variant the additional indications of programme quality apply

14. External Examiners reports

The details of the External Examiner(s) for this programme and the most recent External Examiners' reports for this programme can be found at exampapers@Leicester [log-in required]

UNIVERSITY OF LEICESTER

Programme Specification (Postgraduate) FOR ENTRY YEAR: 2025/26

Date created: 14/04/2025 **Last amended:** **Version no.** 1

Appendix 1: Programme structure (programme regulations)

The University regularly reviews its programmes and modules to ensure that they reflect the current status of the discipline and offer the best learning experience to students. On occasion, it may be necessary to alter particular aspects of a course or module.

MSc in Data Science (Satellite Data)

Level 7/Year 1 Delivery Year 2025/26 Intake Month September Mode of Study Full Time Structure

Credit breakdown

Status	Year long	Semester 1	Semester 2	Summer
Core	n/a	60 credits	60 credits	60 credits
Optional	n/a	n/a	n/a	n/a

180 credits in total

Core modules

Delivery period	Code	Title	Credits
Semester 1	PA7201	Earth Observations of the Atmosphere	15 credits
Semester 1	MA7441	Overview of Data Science Practice	15 credits
Semester 1	MA7419	Fundamentals of Data Science	15 credits

Delivery period	Code	Title	Credits
Semester 1	MA7203	Statistics for Data Science	15 credits
Semester 2	GY7424	Remote Sensing	15 credits
Semester 2	MA7442	Modeling Data	15 credits
Semester 2	GY7413	Information Visualisation	15 credits
Semester 2	CO7441	Creative Problem Solving	15 credits
Summer	GY7720	Dissertation	60 credits

Notes

N/A

MSc in Data Science(Satellite Data) with Industry

Level 7/Year 1 Delivery Year 2025/26 Intake Month September Mode of Study Full Time Structure

Year 1

Programme structure is as for the full-time taught component of the non-industry degree, with the addition of:

Year 2

Summer	GY7720	Dissertation	60

Appendix 2: Module specifications

See taught postgraduate module specification database [log in required] (Note - modules are organized by year of delivery)