UNIVERSITY OF LEICESTER

Programme Specification (Postgraduate)

FOR ENTRY YEAR: 2024/25

Date created: 10/10/2023 **Last amended:** **Version no.** 1

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

MSc Satellite Data Science

MSc Satellite Data Science with Industry

PG Dip/PG Cert* Satellite Data Studies

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	50%
100370	30%
100992	10%
100956	10%

2. Awarding body or institution

University of Leicester

3. a) Mode of study

Full-time or part-time

b) Type of study

Campus-based

4. Registration periods

MSc in Satellite Data Science

The normal period of registration is 12 months (full time) and 24 months (part time).

The maximum period of registration for the is 24 months (full time) and 48 months (part time)

PG Dip in Satellite Data Studies

The normal period of registration is 12 months (full time) and 24 months (part time).

The maximum period of registration for the is 24 months (full time) and 48 months (part 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. However, 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 6.5 with at least 6 in all four categories.

6. Accreditation of Prior Learning

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

7. Programme aims

The programme aims to

This interdisciplinary MSc in Satellite Data Science trains students in 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. 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 'Year in 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 exercises; discussions; problem-based learning; worksheets; guided reading	Report; exam
describe the physical principles of remote sensing system operation including optical, LiDaR, and radar (microwave) sensors together with the characteristics of the data they produce;	Lectures; tutorials; practical classes/ workshops; guided independent study	Practical exercises; discussions; problem-based learning; worksheets; guided reading	Report; exam
describe what is meant by data science, its key principles and practices;	Lectures; Seminars; Practical classes/workshops; guided independent study	Practical exercises; discussions; worksheets; project supervision; guided reading	Report; exam; project
apply techniques of data science to applications of satellite data analyses.	Lectures; seminars practical classes/workshops; guided independent study	Practical exercises; discussions; problem-based learning; worksheets; guided reading	Coding exercise; report; practical exercise; seminar presentation

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 exercises; discussions; worksheets; guided reading	Report; exam
Students should be able to: demonstrate a conceptual awareness of system-based computer science that allows the construction	Lectures; practical classes/workshops; guided independent study	Practical exercises; discussions; problem-based learning; worksheets; project supervision; guided reading	Project; coding exercise

of data processing workflows that are informed by state-of-the-art literature.			

iii) Techniques

Intended learning Outcome	Teaching methods	Learning Activities	Assessment Type
Students should be able to: plan and build scripts (shell or notebook) using open-source programming languages such as R or Python to process satellite and other geospatial data;	Lectures; practical classes/workshops; guided independent study	Practical exercises; discussions; problem-based learning; worksheets; guided reading	Project; coding exercise; report
deploy data wrangling techniques to structure and manipulate data and metadata;	Lectures; practical classes/workshops; guided independent study	Practical exercises; discussions; project supervision; problem-based learning; worksheets; guided reading	Project; coding exercise; report
demonstrate expertise in the processing and analyses of satellite imagery using R and Python, alongside computing tools such as R Openair, NASA Giovanni, Google Earth Engine and Sentinel Toolbox, to build meaningful workflows.	Lectures; seminars; practical classes/workshops; guided independent study	Practical exercises; discussions; worksheets; problem-based learning; guided reading	Report; exam; coding exercise; practical exercise; seminar presentation; essay

iv) Critical analysis

Intended learning Outcome	Teaching methods	Learning Activities	Assessment Type
Students should be able to: use satellite 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 exercises; discussions; project supervision; problem-based learning; worksheets; guided and independent reading	Report; exam; practical exercise; seminar presentation; essay; coding exercise; research proposal; dissertation
demonstrate a critical awareness of the different tools and operations that have been developed to support effective	Lectures; seminars; practical classes /workshops; guided independent study	Practical exercises; discussions; worksheets; problem-based learning; guided reading	Report; exam; practical exercise; seminar presentation

decision making;			
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 exercises; discussions; problem-based learning; worksheets; project supervision; guided and independent reading	Report; exam; practical exercise; seminar presentation; coding exercise; research proposal; dissertation

v) Presentation

Intended learning Outcome	Teaching methods	Learning Activities	Assessment Type
Students should be able to: present 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 exercises; discussions; problem-based learning; worksheets; project supervision; guided and independent reading	Coding exercise; report; practical exercise; seminar presentation; dissertation

vi) Appraisal of evidence

Intended learning Outcome	Teaching methods	Learning Activities	Assessment Type
Students should be able to: critically appraise satellite data and data products in problem solving contexts;	Lectures; project supervision; seminars; practical classes /workshops; tutorials; guided independent study	Practical exercises; discussions; problem-based learning; worksheets; project supervision; guided and independent reading	Report; practical exercise; seminar presentation; coding exercise; 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	Discussions; workshops; project supervision; guided and independent 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	Discussions; workshops; project supervision; guided and independent reading	Research proposal; dissertation
design, execute, and write-up a piece research within a specific physical or socio-economic context that is bounded by concepts of data science and utilizes appropriate satellite data or data products.	Lectures; tutorials; practical classes /workshops; project supervision; guided independent study	Discussions; workshops; project supervision; guided and independent reading	Research proposal; dissertation

ii) Communication skills

Intended learning Outcome	Teaching methods	Learning Activities	Assessment Type
Students should be able to: communicate effectively in a variety of written and oral formats.	Lectures; seminars; practical classes/ workshops; project supervision; guided independent study	Practical exercises; discussions; project supervision; problem-based learning; worksheets; guided reading	Report; exam; seminar presentation; research proposal; briefing note

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 exercises; discussions; project supervision; worksheets; 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 exercises; discussions; project supervision; worksheets; 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; practical classes/workshops; guided independent study	Practical exercises; discussions; project supervision; problem-based learning; worksheets; guided reading	Projects; reports; exams; coding exercises;

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 exercises; project supervision; discussions; problem-based learning; worksheets; guided and independent reading	Exams; reports; practical exercises; seminar presentations; coding exercises; dissertation
explore key problem spaces with contemporary discourses and approaches	Lectures; tutorials; practical classes /workshops; project supervision; guided independent study	Practical exercises; discussions; problem-based learning; worksheets; project supervision; guided and	Exams; reports; practical exercises; seminar presentations; coding exercises; research proposal;

		independent reading	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 and workshops; project supervision	Practical exercises; discussions; worksheets; project supervision; guided and independent 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 understanding of their employability skills and strengths (an ability to work independently/ part of a team, critical/creative thinking, programming, time management, leadership etc);	Discussions with Personal Tutors; engagement with Careers and Employability Service	Reflective activities; online quizzes	Online quizzes (Formative assessment)
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 SGGE 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	Lectures; seminars; practical classes/	Discussions; seminar readings; guided and	Reports; exams; briefing papers; oral

Science and the Satellite Data Scientist in contributing to and delivering collaborative projects in a range of interdisciplinary management and policy-setting contexts.	workshops; case studies; guided independent study	independent reading	presentations;

For the Year in Industry variant, the additional programme outcomes apply

ix) 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.

The following additional progression requirements for this programme have been approved by the Quality and Standards Sub Committee.

a) Course transfers

n/a

b) Year in Industry

For the Year in Industry variant the additional progression points apply.

1. If a student does not achieve a **pass level** (50% or above) in all semester 1 taught modules level they will *normally* revert to the degree without industry. A Progression Board of Examiners will be held after semester 1 which will determine if students remain on the "with industry" variant of their programme.
2. If a student does not achieve a **pass level** (50% or above) in all semester 2 taught modules they have the *option* of reverting to the degree without industry, or if they wish to remain on "with industry" programme, they must delay any plans for placements until September and they must pass any resits in July/August. A Progression Board of Examiners will be held after semester 2 and also after the reassessment period which will determine if students remain on the "with industry" variant of their programme.
3. If a student fails to secure a placement by June 1 (or alternative date set by CDS) in their second semester of study, then they will *normally* revert to the degree without industry.
4. If the industrial placement ends early due to the behaviour of the Placement Student not being in accordance with the University's Regulations for Students, Student Responsibilities. The Placement Student they will *normally* revert to the degree without industry and will need to return to the University to carry out an in-house dissertation in the School or Department, as per the without industry degree. To prevent such an incident from happening, processes are in place to identify any possible issues or concerns early in the industrial placement role. This includes a start check, regular communications, visits to the workplace (physical and/or virtual) and evaluation. Communication and contact between the Placement Student, Placement Provider and University provides support should issues arise.
5. If the student discontinues their industrial placement then they will *normally* revert to the degree without industry and carry out an in-house project in the School or Department, as per the without industry degree.

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

13. Indications of programme quality

External examiners reports

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: 2024/25

Date created: 14/12/2020 **Last amended:** 10/10/2023 **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.

Updates to the programme

Academic year	Module	Change
2024/25	MA7203 Statistics for Data Science	New core module
2024/25	MA7419 Fundamentals of Data Science	New core module
2024/25	MA7411 Overview of Data Science Practice	New core module
2024/25	GY7701 Fundamentals of GIS	Deleted core module
2024/25	CO7093 Big Data and Predictive Analytics	Deleted core module
2024/25	GY7702 R for Data Science	Deleted core module
2024/25	GY7714 Research for Change	New optional module
2024/25	GY7413 Information Visualisation	New optional module
2024/25	MA7442 Modelling Data	New optional module
2024/25	GY7707 Geospatial Data Analytics	Deleted optional module

MSc in Satellite Data Science,
Level 7/Year 1 Delivery Year 2024/25 Intake Month September Mode of Study Full Time Structure

Credit breakdown

Status	Year long	Semester 1	Semester 2	Summer
Core	n/a	60 credits	30 credits	60 credits
Optional	n/a	n/a	30 credits	n/a

180 credits in total

Core modules

Delivery period	Code	Title	Credits
Semester 1	GY7705	Remote Sensing	15 credits
Semester 1	MA7411	Overview of Data Science Practice	15 credits
Semester 1	MA7419	Fundamentals of Data Science	15 credits
Semester 1	MA7203	Statistics for Data Science	15 credits
Semester 2	GY7709	Satellite Data Analysis in Python	15 credits
Semester 2	PA7201	Earth Observations of the Atmosphere	15 credits
Summer	GY7720	Dissertation	60 credits

Notes

N/A Option modules

Delivery period	Code	Title	Credits
Semester 2	GY7708	Geographical Artificial Intelligence	15 credits
Semester 2	GY7711	Field Data Capture	15 credits
Semester 2	GY7714	Research for Change	15 credits

Semester 2	GY7413	Information Visualisation	15 credits
Semester 2	MA7442	Modelling Data	15 credits

Notes
This is an indicative list of option modules and not definitive of what will be available. Option module choice is also subject to availability, timetabling, student number restrictions and, where appropriate, students having taken appropriate pre-requisite modules.

Level 7/Year 1 Delivery Year 2024/25 Intake Month September Mode of Study Part Time Structure

Credit breakdown

Status	Year long	Semester 1	Semester 2
Core taught	n/a	30 credits	30 credits
Optional	n/a	n/a	n/a
Dissertation	n/a	n/a	n/a

60 credits in total

Core modules

Delivery period	Code	Title	Credits
Semester 1	GY7705	Remote Sensing	15 credits
Semester 1	MA7419	Fundamentals of Data Science	15 credits
Semester 2	GY7709	Satellite Data Analysis in Python	15 credits
Semester 2	PA7201	Earth Observation of the Atmosphere	15 credits

Level 7/Year 2 Delivery Year 2025/26 Intake Month September Mode of Study Part Time Structure

Credit breakdown

Status	Year long	Semester 1	Semester 2	Summer
Core	n/a	30 credits	n/a	60 credits
Optional	n/a	n/a	30 credits	n/a

120 credits in total

Core modules

Delivery period	Code	Title	Credits
Semester 1	MA7411	Overview of Data Science Practice	15 credits
Semester 1	MA7203	Statistics for Data Science	15 credits
Summer	GY7720	Dissertation	60 credits

Option modules

Delivery period	Code	Title	Credits
Semester 2	GY7711	Field Data Capture	15 credits
Semester 2	GY7708	Geographical Artificial Intelligence	15 credits
Semester 2	GY7714	Research for Change	15 credits
Semester 2	GY7413	Information Visualisation	15 credits
Semester 2	MA74x2	Modelling Data	15 credits

Notes

This is an indicative list of option modules and not definitive of what will be available. Option module choice is also subject to availability, timetabling, student number restrictions and, where appropriate, students having taken appropriate pre-requisite modules.

MSc in Satellite Data Science with Industry
Level 7/Year 1 Delivery Year 2024/25 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.

Year 2

Core Modules

Delivery period	Code	Title	Credits
Semester 1	ADGY7223	On Placement	n/a
Semester 2	ADGY7223	On Placement	n/a
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)