Programme Specification (Postgraduate)

FOR ENTRY YEAR: 2023/24

Date created: 14/12/2020 **Last amended:** 03/11/2022 **Version no.** 1

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

MSc/PG Dip*/PG Cert* Satellite Data Science
MSc/PG Dip Satellite Data Science with Industry

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	25%
100956	25%
100369	25%
100992	15%
100370	10%

2. Awarding body or institution

University of Leicester

3. a) Mode of study

Full-time or part-time

For with Industry: The taught modules would all be taken in the first two semesters. This is followed by the industrial placement, which is between 3 and 12 months long. This is followed by the in-house project, taking 10 weeks.

b) Type of study

Campus-based

For with industry: The taught modules and project are campus based. The industrial placement is off campus, on the site of the Placement Provider.

4. Registration periods

The normal period of registration for the MSc in Satellite Data Science is 12 months (full time) and 24 months (part time).

The maximum period of registration for the MSc in Satellite Data Science is 24 months (full time) and 48 months (part time)

Note: Normal and maximum periods of registration for the 'with industry' 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 and/or ii) 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.

For the aims, learning outcomes and special features of the Year in Industry, please see https://le.ac.uk/study/postgraduates/courses/industry

7. Programme aims

The programme aims to provide students with training in data science techniques with an emphasis placed on application to satellite observations of the Earth's surface and atmosphere. Students will learn a range of skills suitable for a range of Earth observation & data science careers in industry or further academic research. Specifically, the objectives of this course are:

- To develop analytical skills to use and process big datasets from satellites and other sensors.
- To learn computer programming languages (Python and R).
- To effectively utilise and modify open-access big data processing environments such as python and R.
- To ensure students are familiar with the extensive application of Earth observations to multiple sectors throughout the world.
- To ensure students can evaluate/critique both the potential and the limitations of current software, and information quality.
- To allow students to use data from space-based sensors to understand and tackle pressing global environmental challenges related to the biosphere and atmosphere.
- To build a high level of competence in independent learning skills; original research methodology; original research implementation; oral presentations; report writing; web-based and multimedia communication.

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 Learning Strategy
- University Assessment Strategy
- 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 Outcomes	Teaching and Learning Methods	How Demonstrated?
Articulate core knowledge and principles of Earth observations to illustrate application of these data to complex processes in the Earth system	Lectures, seminars, targeted reading and literature review, journal discussions, computer practicals, self-directed research projects	Essays, project reports, practical exercises, oral and/or poster seminar presentations, dissertation

ii) Concepts

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
Ability to describe and evaluate fundamental knowledge of Earth observations; computer programming; quantitative/statistical analysis techniques and tools	Lectures, seminars, targeted reading and literature review, journal discussions, computer practicals, self-directed research projects	Essays, project reports, practical exercises, oral presentations (in optional modules), dissertation

iii) Techniques

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
Demonstrate a comprehensive understanding and practical application of the fundamental knowledge of Earth observations, through the use of computer programming, and quantitative/statistical techniques and tools.	Lectures, seminars, targeted reading and literature review, journal discussions, computer practicals, self-directed research projects	Practical exercises, project reports, essays, oral and/or poster seminar presentations, dissertation

iv) Critical analysis

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
Critical appraisal of published material. Ability to apply understanding of concepts with independence, rigour and self-reflexivity	Lectures, seminars, targeted reading, practical classes, self-directed project work, self-directed research work.	Essays, project reports, oral presentations, dissertation.

v) Presentation

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
Presentation of: project results to professional standard; thematic data analyses and maps to a professional standard. Ability to organise and structure research material; ability to deliver written and oral seminar reports and summaries	Self-directed project work, self-directed research work.	Essays, project reports, oral presentations, dissertation.

vi) Appraisal of evidence

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
Ability to analyse and evaluate a variety of complex problems related to Earth observations. Ability to assess the relevance and quality of a substantial range of primary and secondary literatures and materials. Ability to mount and sustain an independent level of inquiry at an advanced level. Ability to identify, assemble, analyse and manage complex datasets; ability to analyse and assess a body of thematic data using appropriate techniques and data models	Targeted reading, practical classes, self-directed project work, self-directed research work	Project reports, oral presentations, oral presentations, dissertation.

b) Transferable skills

i) Research skills

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
Ability to: independently analyse complex ideas and construct sophisticated critical arguments; plan and manage projects that use Earth observation data; locate, organise and analyse evidence; report on findings; demonstrate programming and data analytical skill; effectively visualise data.	Core lectures, practicals and seminars, problem- oriented practical exercises, project work	Project reports, practical exercises, oral seminar presentations, exams, dissertation

ii) Communication skills

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
Ability to: deliver oral presentations; respond to questions; write clearly and concisely; make effective use of graphical summaries; communicate results from data analysis in an accessible way.	Seminars, problem-solving exercises, classroom discussions, meetings with supervisors	Oral seminar presentations, essays, seminar reports, project reports, exams, dissertation

iii) Data presentation

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
Ability to: present project results clearly and effectively; use appropriate IT and computational resources; to undertake basic statistical summaries and analysis; employ appropriate and effective graphical representations of Earth observation data	Targeted seminar and practical sessions, essay, seminar, dissertation and practical report feedback	Seminar reports, group-project reports, dissertation

iv) Information technology

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
The whole course is centered around data, data analysis, and computer programming Confident and informed use of personal computer hardware and associated software including programming	Computer-based practical classes; project/dissertation work using computers/computer software	Project reports, practical exercises, oral presentations (in optional modules), dissertation
Ability to: collect and process satellite data from a variety of sources	Computer-based practical classes; project/dissertation work using computers/computer software	Project reports, practical exercises, oral presentations (in optional modules), dissertation

v) Problem solving

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
Solving spatial problems, writing data processing code, hypothesis testing	Research methods module; practical classes, project work, independent research project	Project reports, practical exercises, exams, dissertation

vi) Working relationships

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
Project management; organisational skills; time management; ability to contribute and comment on ideas; working in groups	Problem-oriented practical exercises, seminars, dissertation proposal meeting, coordinator-student meetings	Oral seminar presentations, seminar reports, group-project reports, meeting coursework deadlines

vii) Managing learning

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
Identifying a credible research project; establishing an effective research timetable; managing information; reflecting on and writing up results. Developing specialised analytical skills.	Dissertation module; seminars, practical classes, project work	Project reports, practical exercises, oral seminar presentations, exams, dissertation

viii) Career management

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
The ability to see how skills learnt in a university can be used in 'real world' settings; appreciation of the knowledge and skills required by the Satellite Data Science specialist in an industrial setting	Induction week session with Career Development Services, personal tutor sessions, work placement (where 'with industry')	Discussions with personal tutors and concerning career progression and the applications of GIS.

ix) PG Diploma and PG Certificate

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
Intended Learning Outcomes for these exit awards remain similar to the full MSc programme. However, it is recognised that for: 1. PG Diploma – outcomes that are predominately demonstrated by the dissertation will not be as effectively met. 2. PG Certificate – given a student can exit from the programme having successfully passed a range of modules, it is clear that not all of the learning outcomes will be achieved with this award.	Teaching and Learning methods for these exit awards remain similar to the full MSc programme. However, it is recognized that for: 1. PG Diploma – there will be no teaching and learning associated with the dissertation 2. PG Certificate – the teaching and learning methods will be dependent on the set of modules successfully completed	Demonstration of Intended Learning Outcomes for these exit awards remains similar to the full MSc programme. However, it is recognised that for: 1. PG Diploma – the dissertation will not be used as a method to evidence any of the learning outcomes 2. PG Certificate – the demonstration of learning outcomes will be dependent on the set of modules successfully completed

x)

10. Special features
11. Indicators of programme quality
12. Criteria for award and classification

This programme follows the standard scheme of taught postgraduate award and classification set out in Senate Regulations – see the version of *Senate Regulation 6 governing taught postgraduate programmes of study* relevant to year of entry.

13. Progression points

Progression is as defined in ***Senate Regulation 6: Regulations governing taught postgraduate programmes*** with the additional requirement that students must pass (50%) the dissertation proposal element (worth 5% of the module mark) before being allowed to proceed to the dissertation itself. Should students fail to achieve a pass, they will be allowed one resit, as set out in Senate Regulation 6. A student who does not pass the dissertation proposal at the second attempt will not be able to progress to the dissertation component of the Degree and therefore can only, at best, graduate with a PG Diploma.
For those students on a "with industry" option (where this is available)

Students are subject to the following additional progression rules:

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.

14. Rules relating to re-sits or re-submissions

As defined in Senate Regulations - refer to the version of *Senate Regulation 6 governing taught postgraduate programmes of study* relevant to year of entry.

15. 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]

16. Additional features (e.g. timetable for admissions)

Admissions are in October only.

UNIVERSITY OF LEICESTER

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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 Satellite Data Science,
Credit breakdown

Status	Year long	Semester 1	Semester 2	Other delivery period
Core taught	n/a	60 credits	30 credits	n/a
Optional	n/a	n/a	30 credits	n/a
Dissertation/project	n/a	n/a	n/a	60 credits

180 credits in total

Part time students to take 60 credits in Year 1 and 120 credits in Year 2.

Level 7/Year 1 2023/24

Core modules

Delivery period	Code	Title	Credits
Semester 1	GY7701	FUNDAMENTALS OF GIS	15 credits
Semester 1	GY7702	R FOR DATA SCIENCE	15 credits

Delivery period	Code	Title	Credits
Semester 1	GY7705	REMOTE SENSING	15 credits
Semester 1	PA7201	EARTH OBSERVATIONS OF THE ATMOSPHERE	15 credits
Semester 2	GY7709	SATELLITE DATA ANALYSIS IN PYTHON	15 credits
Semester 2	CO7093	BIG DATA AND PREDICTIVE ANALYSIS	15 credits
Summer	GY7720	Dissertation	60 credits

Notes
Core modules taken by part-time students will be in Year 1: GY7705 & PA7201 (Semester 1) GY7709 & CO7093 (Semester 2). Year 2: GY7701 & GY7702 (Semester 1) & GY7707, GY7708 or GY7711 (Semester 2, choose 2). Dissertation to be completed Summer Year 2.

Option modules

Delivery period	Code	Title	Credits
Semester 2	GY7707	GEOSPATIAL DATA ANALYTICS	15 credits
Semester 2	GY7708	GEOGRAPHICAL ARTIFICIAL INTELLIGENCE	15 credits
Semester 2	GY7711	FIELD DATA CAPTURE	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 (Part Time)

Credit breakdown

Status	Year long	Year 1 Semester 1	Year 1 Semester 2	Year 2 Semester 1	Year 2 Semester 2	Other delivery period
Core taught	n/a	30 credits	30 credits	30 credits	n/a	n/a
Optional	n/a	n/a	n/a	n/a	30 credits	n/a
Dissertation/project	n/a	n/a	n/a	n/a	n/a	60 credits

180 credits in total

Core modules

Year 1

Delivery period	Code	Title	Credits
Semester 1	GY7705	REMOTE SENSING	15 credits
Semester 1	PA7201	EARTH OBSERVATIONS OF THE ATMOSPHERE	15 credits
Semester 2	GY7709	SATELLITE DATA ANALYSIS IN PYTHON	15 credits
Semester 2	CO7093	BIG DATA AND PREDICTIVE ANALYSIS	15 credits

Year 2

Delivery period	Code	Title	Credits
Semester 2	GY7701	FUNDAMENTALS OF GIS	15 credits
Semester 2	GY7702	R FOR DATA SCIENCE	15 credits
Term 3	GY7720	DISSERTATION	60 credits

Option modules

Year 2

Delivery period	Code	Title	Credits
Semester 2	GY7707	GEOSPATIAL DATA ANALYTICS	15 credits
Semester 2	GY7708	GEOGRAPHICAL ARTIFICIAL INTELLIGENCE	15 credits
Semester 2	GY7711	FIELD DATA CAPTURE	15 credits

MSc in Satellite Data Science with Industry

Credit breakdown

Status	Year long	Semester 1	Semester 2	Other delivery period
Core taught	n/a	60 credits	30 credits	n/a
Optional	n/a	n/a	30 credits	n/a
Dissertation/project	n/a	n/a	n/a	60 credits

180 credits in total

Programme structure is as for the non industry degree, with the addition of:

Year 1
Core Modules

Delivery period	Code	Title	Credits
Semester 1	ADGY7221	Placement Preparation 1	n/a
Semester 2	ADGY7222	Placement Preparation 2	n/a

Year 2

Core Modules

Delivery period	Code	Title	Credits
Semester 1	ADGY7223	On Placement	n/a
Semester 2	ADGY7223	On Placement	n/a
Term 3	GY7720	Dissertation	60 credits

Appendix 2: Module specifications

See taught postgraduate module specification database (Note - modules are organized by year of delivery).