Programme Specification: Environmental Sustainability and Data Science MSc

UNIVERSITY OF WESTMINSTER

Course record information

Name and level of final award	• Master of Science - Environmental Sustainability and Data Science The award is Bologna FQ-EHEA second cycle degree or diploma compatible
Name and level of intermediate awards	• Postgraduate Diploma (Pg Dip) - Environmental Sustainability and Data Science • Postgraduate Certificate (Pg Cert) - Environmental Sustainability and Data Science
Awarding body/institution	University of Westminster
Teaching institution	University of Westminster
Status of awarding body/institution	Recognised Body
Location of delivery	Primary: Central London
Language of delivery and assessment	English
QAA subject benchmarking group(s)	
Professional statutory or regulatory body	
Westminster course title, mode of attendance and standard length	• Environmental Sustainability and Data Science, Full-time, September start - 1 year standard length • Environmental Sustainability and Data Science, Part-time day, September start - 2 years standard length
Valid for cohorts	From 2026/7

Admissions requirements

There are standard minimum entry requirements for all postgraduate courses. Students are advised to check the standard requirements for the most up-to-date information. For most courses a decision will be made on the basis of your application form alone. However, for some courses the selection process may include an interview to demonstrate your strengths in addition to any formal entry requirements. More information can be found here: https://www.westminster.ac.uk/courses/postgraduate/how-to-apply.

Aims of the programme

In today's rapidly evolving world, the intersection of innovation, data science, and environmental sustainability is crucial for addressing global challenges. The substantial rise in data availability and advancements in data science in recent years offers opportunities to analyse complex environmental systems and extract actionable insights from real-world data to address these challenges. This course aims to equip students with the knowledge and skills to address environmental challenges through the development and application of new technologies, processes, and solutions derived from biological systems and the use of data-driven decision-making tools. In this course:

- students will develop a comprehensive understanding of the theory of environmental sustainability through the analysis of case studies.
- through fieldwork students will learn practical and analytical skills to monitor and interpret environmental data to evaluate the impact of human activities on ecosystems, and inform sustainable decision-making.
- students will gain expertise in data science techniques, including programming in R and Python, machine learning and big data analysis, to interpret and manage complex environmental datasets.
- drawing inspiration from nature-based systems and processes, students will design and implement green technologies to address environmental challenges and promote sustainable practices.
- through collaboration with industry experts and engaging with cutting-edge research, students will explore the principles of the circular economy, to minimise waste, optimise resource use, and will implement circular economy principles effectively for their own innovative solutions.
- students will engage with local communities, to understand their perspectives, and foster collaborative approaches to develop and implement sustainable solutions that reflect community needs and priorities.
- students will critically evaluate case studies on environmental policy, their effectiveness will be assessed and data-driven recommendations developed for achieving sustainable outcomes.

Employment and further study opportunities

Today's organisations need graduates with both good degrees and skills relevant to the workplace, i.e. career/employability skills. The University of Westminster is committed to developing employable graduates by ensuring that:

- Career development skills are embedded in all courses
- Opportunities for part-time work, placements and work-related learning activities are widely available to students
- Staff continue to widen and strengthen the University's links with employers in all sectors, involving them in curriculum design and encouraging their participation in other aspects of the University's career education and guidance provision
- Staff are provided with up-to-date data on labour market trends and employers' requirements, which will inform the service delivered to students.

Governments, organisations, and industries worldwide are increasingly seeking professionals capable of using data to make informed, sustainable decisions to address contemporary global challenges. This growing demand has led to a significant rise in the need for environmental scientists with data science expertise. Graduates of the MSc in Environmental Sustainability will be uniquely positioned for a diverse range of employment opportunities, using their interdisciplinary expertise in environmental science, data science, and innovative problem-solving. Potential career paths include Environmental Data Scientist, Research Scientist, Environmental Policy Analyst, Environmental consultant, Community Sustainability Coordinator, Environmental Educator or Outreach Coordinator, Product Sustainability Manager and PhD researcher.

What will you be expected to achieve?

Course learning outcomes

Learning outcomes are statements of what successful students have achieved as a result of learning.

These are threshold statements of achievement the learning outcomes broadly fall into four categories:

The overall knowledge and understanding you will gain from your course (KU)

Graduate attributes are characteristics that you will have developed during the duration of your course (GA)

Professional and personal practice learning outcomes are specific skills that you will be expected to have gained on successful completion of the course (PPP)

Cognitive Skills, are learning outcomes that help build conceptual understanding that is necessary to devise and sustain arguments, and/or to solve problems and comment on research.

Key transferable skills that you will be expected to have gained on successful completion of the course. (KTS)

Level 7 course learning outcomes: upon completion of Level 7 you will be able to:

- LO001 Independently evaluate and address environmental challenges and their key drivers through a comprehensive understanding of environmental sustainability frameworks and UN Sustainable Development Goals. (KU) (KU)
- LO002 Critically analyse emerging environmental policies and existing bioinnovative solutions to evaluate their effectiveness in addressing key environmental challenges and promoting equity and resilience. (KU)
- LO003 Critically analyse and evaluate data science concepts, tools, and their limitations, applying a systematic approach to their role in developing sustainable solutions. (KU)
- LO004 Generate methodical strategies with data science knowledge to critically evaluate heterogeneous big datasets for developing sustainable solutions. (PPP)
- LO005 Actively engage with local communities and key stakeholders to identify environmental issues fostering collaborative approaches to develop and implement sustainable solutions reflective of community perspectives. (PPP)
- LO006 Design and develop innovative, sustainable solutions applying a systems thinking approach in collaboration with real-world clients, emphasising user experience and co-creation. (PPP)
- LO007 Competently apply technical skills gained through practical workshops, fieldwork, and laboratory training to monitor and strategically design sustainable initiatives that address complex environmental challenges. (PPP SS)
- LO008 Design, manage, and conduct an independent research project on an environmental issue, applying appropriate research methods to ethically gather, analyse, and disseminate their project outcomes while demonstrating critical thinking and adherence to research governance. (KTS)
- LO009 Systematically apply advanced interpersonal and collaborative skills to effectively communicate with various key stakeholders, using a range of communication styles tailored to each target audience. (KTS)

How will you learn?

Learning methods

The course adopts a comprehensive learning strategy that emphasises independent research, study and active engagement with key stakeholders. Our learning approach combines in-person and online teaching with students engaging in individual and collaborative active learning activities, group discussions, and presentations. The course can be completed as a full-time course over one year or as a part-time over 2 years. Their independent learning will be supported by a range of useful resources, including module handbook, online materials, the library, and Blackboard, the Virtual Learning Environment (VLE). Additionally, students must complete an independent research project and submit a dissertation worth 40 credits. Students will be guided in preparing for their dissertation project, allowing them to investigate an environmental challenge of their choice. We envisage to utilise our network to secure dissertation project opportunities with external organisations, ensuring practical relevance for the degree. The teaching team brings extensive experience validated by the UK professional body Advance HE and is sensitive to the diverse backgrounds of our students. They are active researchers in their fields, bringing current, real-world insights and innovations into the classroom. Most of the teaching sessions are captured on video (barring a few exceptions due to teaching methods or data privacy concerns) and made available on Blackboard, allowing students to revisit and review the content at their convenience.

Commitment to Equality, Diversity and Inclusion:

The School of Life Sciences is committed to the University of Westminster Equality, Diversity and Inclusion (EDI) policy with a local implementation based on three central elements:

Our commitment is to ensure an inclusive, safe and supportive learning, working and social environment which enables scientific research and teaching to flourish and encourages our future scientists to grow and realise their true potential.

Our goal is to empower all students and staff to critically reflect on their understanding and positionality, with respect to the wide-ranging global scientific perspectives (past and present); encouraging the open debate of differing points of view.

Our pledge is to respect and value our diverse Life Sciences community (within and beyond the University of Westminster) and foster an equitable culture as we move forward in the field.

These three elements inform and direct all our learning, teaching and research activities and have been central to our course design process as can be seen in the learning outcomes at module and course level. All staff and students in the school of Life Sciences are expected to embrace and respect these values.

The MSc in Environmental Sustainability course is committed to creating an inclusive and equitable learning environment. The curriculum will include case studies from regions and communities around the world, considering how different groups are affected by environmental issues, with a focus on how marginalised communities often face more severe impacts from climate change. It will feature readings and materials authored by individuals from diverse backgrounds and will introduce theories and practices on sustainability from global perspectives. A key aspect of the course will be the evaluation of social equity within environmental policies. The course will also address policies that advance environmental justice, providing students with the insights needed to advocate for and develop more equitable and inclusive environmental solutions. The course will incorporate community-based projects, involving work with diverse local communities. Students will be encouraged to engage with different community groups to understand their specific sustainability challenges and contribute to practical, community-focused solutions. Teaching methods will include collaborative learning, with group work that encourages students from diverse backgrounds to collaborate and share perspectives. The course will feature guest speakers from various demographics within the field of environmental sustainability (for example, sustainability consultants, policymakers, urban farmers, data scientists, etc.), providing students with a broad range of insights. The teaching staff comprises of diverse backgrounds, offering students a variety of role models. Inclusive teaching strategies that accommodate different learning styles and preferences will be implemented in the course. Anonymous marking will be employed to reduce unconscious bias in assessments, ensuring fair grading. Our teaching facilities, laboratories, and resources are designed to be accessible to students with varying abilities. When planning field trips, accessibility for all participants will be ensured for inclusivity. Learning resources are made available to the students in multiple formats to accommodate diverse learning needs. Students will benefit from a personal tutoring programme and a comprehensive range of extracurricular opportunities, encouraging them to integrate theory with practice as they study. Continuous formative feedback will be provided through online activities, group and one-to-one tutorials, and periodic reviews, giving students multiple points of guidance throughout the programme and before any summative assessments.

Teaching methods

The MSc in Environmental Sustainability course employs a diverse range of teaching methods to enhance students' learning experiences. These include practical workshops, fieldwork, laboratory sessions, lectures and tutorials, group work, poster sessions, and oral presentations. The teaching sessions will be delivered on-site in classrooms, laboratories, and specialist teaching spaces (e.g. health data computing suite) within the School of Life Sciences. Teaching methods will be flexible, using technology-enhanced classrooms allowing for interactive and engaging sessions. The University of Westminster uses the Blackboard Virtual Learning Environment (VLE) as a central hub for course content, online teaching sessions, and communication between staff and students. Module Blackboard sites will support learning activities, discussions, and the submission and grading of coursework, providing students with flexibility and easy access to learning resources. Students will be introduced to the appropriate use of Generative AI tools to support their learning and professional development. They will also be taught about the limitations and ethical considerations of AI, with an emphasis on maintaining academic integrity and avoiding misuse.

The course will provide students with opportunities to gain industry insights and exposure to real-world perspectives. Guest speakers from various sectors, including industry, governmental agencies, community organisations, charities, and research institutions (for example, DEFRA, Westminster City Council, La Loma Viva (Spain), Daiichi Sanko, Merck) will be invited to deliver seminars and share their professional experiences. This diverse approach will expose students to different viewpoints, deepen their understanding of environmental sustainability, and foster the development of critical thinking and employability skills through experiential learning. Case studies involving student-led learning will develop crucial teamwork and problem-solving abilities, enabling students to formulate strategies for tackling diverse environmental and sustainability issues. Students will also participate in community-based projects and engage in service-learning to address real-world environmental challenges. Field trips will be organised, allowing students to experience sustainability initiatives first-hand and draw inspiration from real-world examples. Examples of field trips may include the River Quaggy restoration and flood alleviation scheme, Walthamstow Wetlands, Hackney City Farm and Re-London: partnership of the Mayor of London and London’s boroughs to improve waste and resource management in the capital.

Assessment methods

Assessments evaluate a student's understanding, application of knowledge, critical thinking, and practical skills, while also providing feedback on their strengths and areas for improvement, to guide their learning, and support the development of essential skills. Assessments in this course is designed to meet the key course learning outcomes. Each module has specific aims and uses different teaching, learning, and assessment methods to achieve them. The course includes both formative and summative assessments. Formative assessments provide ongoing feedback and opportunities for improvement, ensuring that students are actively engaged in the learning process and progressively developing the required skills and understanding while summative assessments are typically used to evaluate student's overall understanding, application of knowledge, and competency in the course content at the end of a specific learning period. Assessments methods are varied and include:

- **Programming assignment** assesses student's programming skills using R and Python, writing and debugging programs to solve environmental challenges, and demonstrating their understanding of programming concepts and data science applications.
- **Virtual Case studies portfolio** will assess student's capabilities to critically analyse environmental sustainability cases and frameworks, challenge existing policies and decision-making processes, and make informed recommendations for improving environmental sustainability practices and policies.
- **Fieldwork report** will evaluate student's skills in conducting environmental fieldwork surveys, data collection and analysis, interpreting findings, communicating results effectively through report, and teamwork.
- **Technical report** will evaluate skills in handling, processing and analysing complex environmental data to develop sustainable solutions addressing environmental, social or economic challenges.
- **Group project** will evaluate student's ability to critically analyse a sustainability issue, propose and develop an innovative and sustainable solution, and develop a comprehensive implementation plan, demonstrating their research, problem-solving, strategic planning, and written communication skills.
- **Oral presentations** (Individual and group) will evaluate student's capability to effectively communicate and showcase innovative and sustainable solutions to various stakeholder groups, an essential skill across multiple disciplines.
- **Online Multiple-Choice Questions (MCQ)** will assess student's understanding of data science concepts and principles, as well as their ability to analyse the advantages and limitations of data science in addressing sustainability challenges.
- **Independent research project** will evaluate student's advanced research, analytical, project management, and communication skills through conducting comprehensive literature reviews, implementing robust methodologies, analysing data, critical thinking, problem-solving, dissertation writing, and documentation.

Detailed instructions for each piece of assessment are available in each module handbook. A diverse range of assessment methods will be employed to comprehensively evaluate student's written and communication skills. There will be elements of group work in the assessments. Working in groups will help students develop key employability skills like collaborative planning, effective communication, negotiation, and team-based project management. It also teaches them to appreciate the diverse strengths and skills that each group member contributes. These teamwork abilities are highly valuable across various sectors. When working on a dissertation for their independent research project, students will be able to put into practice the knowledge gained from their courses. This involves collecting and analysing data, then interpreting the findings. Compiling and presenting the research in a professional manner demonstrates key skills that employers value highly. These critical skills include in-depth subject knowledge, the ability to conduct research, critical thinking, and effective communication.

Graduate Attribute	Evident in Course Outcomes
Critical and creative thinker	LO001, LO002, LO003, LO004, LO005, LO006, LO007, LO008
Literate and effective communicator	LO008, LO009
Entrepreneurial	LO006
Global in outlook and engaged in communities	LO005, LO006, LO009
Socially, ethically and environmentally aware	LO001, LO005, LO006, LO009

Course Structure

This section shows the core and option modules available as part of the course and their credit value. Full-time Postgraduate students study 180 credits per year. Additional free text information on the choices may also be included,

for example where students must choose one of two modules.. Course structures can be subject to change each academic year following feedback from a variety of sources.

Modules

Level 7

Module Code	Module Title	Status	PT Year (where applicable)	UK credit	ECTS
7SUEV006W	Environmental Sustainability Challenges	Core	1	20	10
7COSC018W	Introduction to Data Science - Fundamentals of Programming	Core	1	20	10
7BIOM033W	Postgraduate Research Methods	Core	1	20	10
7SUEV007W	Bioinnovation Laboratory for Environmental Solutions	Core	2	20	10
7BIOM032W	Postgraduate Project	Core	2	40	20
7COSC019W	Sustainable Solutions with Machine Learning and Big Data	Core	2	20	10
7HMDS002W	Communicating Science	Option		20	10
7BUIS009W	Data Visualisation and Dashboarding	Option		20	10
7BIOT004W	Science, Technology and Commercialisation	Option		20	10
7SUEV004W	Sustainability Analytics and Reporting	Option		20	10
7BIOT002W	Sustainable Biotechnology	Option		20	10

Please note: Not all option modules will necessarily be offered in any one year. In addition, timetabling and limited spaces may mean you cannot register for your first choice of option modules.

Professional body accreditation or other external references

Course management

This course is one of a number of programmes in the School of Life Sciences, part of the College of Liberal Arts and Sciences within the University of Westminster, and is managed by a designated course leader. In addition to the course specific role of the course leader, the Head of School, other senior school staff and the Associate Heads of College, also provide support and management at their respective levels. The course leader is also collectively supported in the management and running of the course by the course teaching team through their responsibilities for individual modules and contributions to planning. Students will meet their course leader, teaching team, and the school's senior management members during the arrivals week. This will include a programme of events designed to help them with enrolment, registration, and orientation to the university processes and the culture of higher education. The course is monitored each year by the course leader and senior members of the School and College to ensure that it is running effectively and that issues that might affect the student experience have been appropriately addressed. Each course will have Course Representative meetings throughout the year and staff will consider the outcomes from these meetings, evidence of student progression and achievement and the external examiner’s reports to evaluate the effectiveness of the course. All courses are reviewed annually as part of the School, College and University Annual Monitoring processes, reporting finally to the Academic Council of the University which has overall responsibility for the maintenance of quality and standards in the University.

Academic regulations

The current Handbook of Academic Regulations is available at westminster.ac.uk/academic-regulations.

Course specific regulations apply to some courses.

Academic Support

Upon arrival, an induction programme will introduce you to the staff responsible for the course, the campus on which you will be studying, the Library and IT facilities and additional support available. You will be provided with a Course Handbook, which provides detailed information about the course. Each course has a course leader or equivalent. All students enrolled on a full-time course and part-time students registered for more than 60 credits a year have a personal tutor, who provides advice and guidance on academic matters. The University utilises a Virtual Learning Environment called Blackboard, where students access their course materials and can communicate and collaborate with staff and other students. Further information on Blackboard can be found at https://www.westminster.ac.uk/current-students/studies/your-student-journey/when-you-arrive/blackboard

The Academic Learning Development Centre supports students in developing the skills required for higher education. In addition to online resources in Blackboard, students can also attend Study Skills workshops and schedule one-to-one appointments. Further information on the Academic Learning Development Centre can be found at westminster.ac.uk/academic-learning-development.

Learning support includes our libraries, each of which holds a collection of resources related to the subjects taught at that site. Students can search the entire library collection online through the Library Search service to find and reserve printed books, and access electronic resources (databases, e-journals, e-books). Students can choose to study in the libraries, which have areas for silent and group study, desktop computers, laptops for loan, photocopying and printing services.

Support Services

The University of Westminster's Student and Academic Services department provides a range of advice and guidance. Further information on the advice available to students can be found at https://www.westminster.ac.uk/student-advice

The University of Westminster Students' Union also provides a range of facilities to support students during their time at the University. Further information on UWSU can be found at https://www.westminster.ac.uk/students-union

How do we ensure the quality of our courses and continuous improvement?

The course was initially approved by a University Validation Panel. University Panels normally include internal peers from the University, academic(s) from another university, a representative from industry and a Student Advisor.

The course is also monitored annually by the College to ensure it is running effectively and that any issues that might affect the student experience have been appropriately addressed. Staff will consider evidence from various sources, including student surveys, student progression and achievement, and reports from external examiners, to evaluate the effectiveness of the course and make necessary changes.

Periodic reviews are also conducted to ensure that the curriculum remains up-to-date and that the skills acquired on the course continue to be relevant to employers. Representative students meet with a panel to provide feedback on their experiences. Student feedback from previous years is also part of the evidence used to assess the course's performance.

How do we act on student feedback?

Student feedback is important to the University, and student views are taken seriously. Student feedback is collected in various ways.

- Through student engagement activities at the course and module level, students have the opportunity to express their voice in the running of their course. Course representatives are elected to expressly represent the views of their peers. The University and the Students' Union work together to provide a full induction to the role of the course representatives.
- There are also School Representatives appointed jointly by the University and the Students' Union who meet with senior School staff to discuss wider issues affecting student experience across the School. Student representatives are also represented on key College and University committees.;
- All students are invited to complete a questionnaire for each module. The feedback from this will inform the module leader on the effectiveness of the module and highlight areas that could be improved.
- Final-year undergraduate students will be asked to complete the National Student Survey, which helps inform the national university league tables. Postgraduate students will be asked to complete the Postgraduate Taught Survey (PTES).

This programme specification provides a concise summary of the main features of the course and the learning outcomes that a student may reasonably be expected to achieve and demonstrate if they take full advantage of the learning opportunities provided. This specification is supplemented by the Course Handbook, Module proforma and Module Handbooks provided to students.

Additional Details

The entry requirement for this course is a minimum of a lower second-class honours degree (2:2) in a relevant discipline, encompassing both science and social science subjects at the bachelor's level. For international applicants, the university's guidelines on language proficiency will apply, requiring an IELTS score of 6.5 overall, with no less than 6.0 in each component. This ensures that students possess the necessary level of English proficiency to actively engage in and succeed on the course.

While the course is open to applicants from non-science backgrounds, a minimum proficiency in science and mathematics at either GCSE or A-level is required.

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