



UNIVERSITY OF THE  
**AEGEAN**



MSc  
“AI for Sustainable  
Business Development”

**STUDY GUIDE**

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## Introduction

(Department Assembly No. 10/29.04.2026)

The English-taught joint Master's programme 'Artificial Intelligence (AI) for Sustainable Business Development' (MSc 'AI for Sustainable Business Development') is the result of a collaboration between the University of the Aegean and Royal Holloway, University of London. The programme aims to provide students with the knowledge and skills found at the intersection of technology, management and sustainable development. These skills are considered essential for harnessing artificial intelligence (AI) to address complex sustainability challenges in the business world. The programme has broad applications across various sectors and geographical regions, making it an essential field of study for researchers, professionals, and business executives who wish to advance their careers and make a meaningful impact in their field. The programme is also aligned with the United Nations Sustainable Development Goals, as graduates will have the knowledge and skills to:

- Understand Artificial Intelligence and its role in business, and be able to integrate these technologies into business strategy.
- Create economic opportunities through the development of sustainable business models based on the utilisation of technology.
- Design initiatives for the practical application of ICT across multiple fields of application and business activities, including the energy transition, the circular economy and tackling climate change.

The programme promotes an interdisciplinary approach by combining technological, managerial and business knowledge and tools, such as data science and algorithmic techniques, with tools for integrating AI into corporate sustainability practices and the ethical and business dimensions of responsible AI use.

Upon completion of the proposed MSc programme 'Artificial Intelligence (AI) for Sustainable Business Development', graduates will be able to:

- Understand fundamental AI algorithmic techniques, including data analysis and machine learning, and apply them to real-world business sustainability challenges, such as resource optimisation, supply chain applications, waste reduction and tackling climate change.
- Integrate AI into sustainable business models to boost productivity, reduce costs and promote green innovation.
- Understand the economic implications of adopting sustainable practices and AI technologies in business.
- Understand the ethical issues involved in the development of AI and be familiar with international policies and guidelines relating to the development of AI globally.
- Work in interdisciplinary teams with stakeholders from industry, the public sector, and civil society to design effective AI solutions for sustainable development.

- Conduct research that advances understanding of the role of AI in sustainability, contributing to academic and professional knowledge.
- Apply theoretical knowledge to practical challenges and problems, delivering tangible results for businesses and organisations with a focus on sustainability.

Students on the Programme, as members of the academic community of both institutions (University of the Aegean and Royal Holloway, University of London), are part of a research environment that offers academic inquiry, a friendly atmosphere and support from the Programme's specialised and experienced academic staff, enabling them to fully capitalise on:

- Excellent career prospects in the modern world of AI, where the ability to innovate and adapt is an integral part of contemporary work.
- New opportunities to study topical issues in the fields of Generative Artificial Intelligence (GenAI), the development and evaluation of AI solutions, and their applications in sustainable business development.
- A network of contacts with leading academics and senior business executives, enabling them to study real-world business problems.

## Organisation of the Educational Process

The duration of study for the award of the joint Master's Degree is set at one full academic year (two academic semesters and the summer term). Students enrol at both partner institutions.

In the first semester, they take online courses equivalent to 30 ECTS credits via synchronous distance learning. These courses are taught and assessed by lecturers under the responsibility of the University of the Aegean.

Subsequently, in the second semester, students take courses equivalent to 30 ECTS credits in person at the partner Institution Royal Holloway, University of London (RHUL).

The Dissertation course is worth 30 credits and is completed online during the summer term, with no in-person attendance required.

The assessment of students for each learning activity may be carried out through written or oral examinations conducted in person or via distance learning, as well as through alternative methods, such as assignment submission or completion of written tests.

The technical equipment required of each student to attend the programme and be assessed is a computer (desktop or laptop), a webcam and a microphone, and an internet connection. The technical equipment may be updated in line with technological developments.

The terms and conditions for organising a Postgraduate Programme using synchronous and asynchronous distance learning methods, as well as matters relating to the organisation of the educational process using distance learning methods, are set out in the Regulations for Postgraduate and Doctoral Programmes of the University of the Aegean. (Annexes III and V of the Institution's Internal Regulations – Government Gazette 6876/B/19.12.2025).

## Structure of the Programme of Study and Courses

The structure of the Study Programme and the assessment methods applied to each course are as follows:

| <b>FIRST SEMESTER OF STUDIES:</b><br><b>Courses offered by the University of the Aegean via modern distance learning</b> |                                                                      |                         |                                                                                                                                                                                                                                            |             |
|--------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| <b>CODE</b>                                                                                                              | <b>TITLE</b>                                                         | <b>TYPE<br/>(CO/OP)</b> | <b>ASSESSMENT<br/>METHODS</b>                                                                                                                                                                                                              | <b>ECTS</b> |
| <u>I.1</u>                                                                                                               | <u>AI and Machine Learning</u>                                       | <b>CO</b>               | <ul style="list-style-type: none"> <li>• Final examination comprising multiple-choice and/or short-answer questions.</li> <li>• Written assignment with an oral examination /presentation.</li> </ul>                                      | <u>6</u>    |
| <u>I.2</u>                                                                                                               | <u>Machine Learning for Industrial Transformation and Innovation</u> | <b>CO</b>               | <ul style="list-style-type: none"> <li>• Final exam (40%)</li> <li>• Group project (60%)</li> </ul> <p>To successfully complete the course, students must achieve a pass mark (greater than or equal to 50%) in the final examination.</p> | <u>6</u>    |
| <u>I.3</u>                                                                                                               | <u>Technologies and Tools for AI Applications</u>                    | <b>CO</b>               | <ul style="list-style-type: none"> <li>• Final exam (60%)</li> <li>• Group project (40%)</li> </ul>                                                                                                                                        | <u>6</u>    |
| <u>I.4</u>                                                                                                               | <u>Sustainability Principles and Practices</u>                       | <b>CO</b>               | <p>Written exam with various question types (essay, multiple choice, true/false, matching) (60%)</p> <p>Oral presentation of group project (40%)</p>                                                                                       | <u>6</u>    |
| <u>I.5</u>                                                                                                               | <u>AI in Supply Chain Management</u>                                 | <b>OP</b>               | <ul style="list-style-type: none"> <li>• Final exam (70%)</li> <li>• Group project (30%)</li> </ul>                                                                                                                                        | <u>6</u>    |
| <u>I.6</u>                                                                                                               | <u>Circular Economy and AI Innovations</u>                           | <b>OP</b>               | <ul style="list-style-type: none"> <li>• Oral exam: 40%</li> <li>• Group Project: 30%</li> <li>• Presentation of assignment: 30%</li> </ul>                                                                                                | <u>6</u>    |
| <u>SS1001</u>                                                                                                            | <u>Academic Integrity* (Mandatory – Non-Condonable)</u>              | <b>NC</b>               | <u>100% - Online Moodle Quiz (20 minutes)</u>                                                                                                                                                                                              | <u>0</u>    |

|                                             |                  |
|---------------------------------------------|------------------|
| <b>TOTAL CREDITS FOR THE FIRST SEMESTER</b> | <b><u>30</u></b> |
|---------------------------------------------|------------------|

The Column "Type of the Module (Course)" contains the characterization CO: Compulsory, OP: Optional, NC: Non-Condonable

(\*) Offered by RHUL online and is a prerequisite for the successful completion of the MSc Programme (must be passed - Non-Condonable). The course is offered in both semesters (A or B).

| <b>SECOND SEMESTER OF STUDIES:</b>           |                                                  |                         |                                                      |                  |
|----------------------------------------------|--------------------------------------------------|-------------------------|------------------------------------------------------|------------------|
| <b>Courses offered in person by RHUL</b>     |                                                  |                         |                                                      |                  |
| <b>CODE</b>                                  | <b>TITLE</b>                                     | <b>TYPE<br/>(CO/OP)</b> | <b>ASSESSMENT<br/>METHODS</b>                        | <b>ECTS</b>      |
| <u>MN5823</u>                                | <u>AI and the Future of Work</u>                 | <b>CO</b>               | 100%<br>Individual Report<br>(2,500 words)           | <u>7.5</u>       |
| <u>MN5804</u>                                | <u>Responsible AI and Digital<br/>Innovation</u> | <b>CO</b>               | 100% -<br>Individual Narrated<br>Poster (15 minutes) | <u>7.5</u>       |
| <u>MN5816</u>                                | <u>Business Analytics in Practice</u>            | <b>CO</b>               | Project (100%)<br>[Analytical Model(s) +<br>Report]  | <u>7.5</u>       |
| <u>MN5819</u>                                | <u>Research and Consulting<br/>Methods</u>       | <b>CO</b>               | Research Proposal* (100%)                            | <u>7.5</u>       |
| <b>TOTAL CREDITS FOR THE SECOND SEMESTER</b> |                                                  |                         |                                                      | <b><u>30</u></b> |

(\*) This course is a prerequisite for undertaking a postgraduate dissertation.

| <b>SUMMER TERM:</b>                      |                           |                                       |                  |
|------------------------------------------|---------------------------|---------------------------------------|------------------|
| <b>Distance learning Master's Thesis</b> |                           |                                       |                  |
| <b>CODE</b>                              | <b>TITLE</b>              | <b>TYPE<br/>(Full-time/Part-time)</b> | <b>ECTS</b>      |
| <u>MN5XXX</u>                            | POSTGRADUATE DISSERTATION | <b>CO</b>                             | <u>30</u>        |
| <b>TOTAL CREDITS</b>                     |                           |                                       | <b><u>30</u></b> |
| <b>GRAND TOTAL</b>                       |                           |                                       | <b><u>90</u></b> |

The above curriculum is indicative. The number, type and content of the courses in the curriculum, as well as their distribution across semesters, may be adjusted by decision of the Joint Academic Committee to ensure the smooth operation of the Joint Postgraduate Programme.

The language of instruction for the courses is ENGLISH

The language of the dissertation is ENGLISH

## Brief description of courses

### First-semester courses

#### 1. Artificial Intelligence and Machine Learning.

The course offers a structured and comprehensive introduction to modern Artificial Intelligence (AI) and Machine Learning (ML). Students gain a solid understanding of the concepts, mathematical and computational foundations, and operational aspects of state-of-the-art techniques, tools, and infrastructure in the field of AI and ML.

The course is designed to equip students to critically evaluate and manage competitive IT systems, understand how these systems are developed and how models are applied and managed, and assess their implications in real organisational and social contexts. The course covers everything from classical ML approaches (e.g. linear models, decision trees) to advanced deep learning and genetic AI architectures and core models, highlighting both the advantages and limitations of the different model families.

Students learn how AI-based solutions are designed and managed throughout the machine learning lifecycle, from data collection and preprocessing to training, validation, development, and monitoring of models, whilst taking into account data governance, quality, and ethical and socio-technical constraints. A key aim of the course design is to equip students with the knowledge needed to integrate artificial intelligence into business strategy and operations. More specifically, the course will enable students to co-design and evaluate AI-based products and services, as well as lead or contribute to AI-driven transformation initiatives across various sectors and functional roles, such as finance, operations, marketing, strategy, and policy.

The course utilises case studies/exercises, text-based discussions and contemporary pedagogical approaches (e.g. group work and ‘flipped classroom’ activities).

In addition to the theoretical aspects, students will become familiar with the relevant development tools and platforms for each lecture topic, e.g. Python libraries, PyTorch/TensorFlow/Keras, business and cloud platforms.

#### 2. Machine Learning for Industrial Transformation and Innovation

The course takes a postgraduate approach to how Artificial Intelligence (AI) and Machine Learning (ML) are driving the transition towards data-driven, autonomous and adaptive decision-making in

Industry 4.0 systems. Modern decision-support architectures that utilise intelligent algorithms can collect and analyse information relevant to the decision-making context, offer personalised advice, suggest an optimal course of action, and adapt to a rapidly changing environment. From expert systems and tree inference techniques to natural language processing and evolutionary computation, this course offers a comprehensive approach to decision analysis grounded in AI principles. Students will study modern decision support systems suitable for critical business sectors where AI is transforming professional practice, including smart manufacturing, production planning, asset management, energy systems and smart infrastructure. Upon completion of the course, students will have gained a deep understanding of the functionality and comparative advantages of modern artificial intelligence techniques over classical operational research methods and will be able to identify and explore potential synergies between the two — often perceived as opposing — approaches to decision-making. The knowledge and practical experience gained will enable participants to design smart, adaptive, and data-driven solutions that address current and future industrial challenges.

### **3. Technologies and tools for artificial intelligence applications**

The course aims to provide students with a comprehensive understanding of how the technologies, tools and methodologies of artificial intelligence (AI) can be effectively applied to transform organisations and enhance business value. Over ten structured lectures, the course combines theoretical foundations with practical experience, covering the evolution from classical machine learning to generative AI, AI in practice, intelligent automation with RPA, and conversational systems and AI-driven customer experience. Students will explore how to design and develop intelligent workflows, create and coordinate autonomous agents, and develop practical applications using low-code platforms and artificial intelligence frameworks. Emphasis is placed on understanding the strategic, ethical, and human dimensions of AI adoption — how artificial intelligence is reshaping work, decision-making, and digital transformation — preparing participants to lead and innovate responsibly in business environments driven by AI.

### **4. Principles and practices of sustainability**

The intersection of Artificial Intelligence and Sustainability is no longer a niche academic interest; it is a global economic imperative. As companies transition towards ‘Net Zero’ and ‘Circular’ models, the lack of usable data is just as significant as the lack of intent.

Standard AI training focuses on algorithms, but often ignores the physical reality of the systems these algorithms aim to optimise. Without a deep understanding of Life Cycle Assessment (LCA), Planetary Boundaries and ESG regulatory frameworks, IT developers risk creating ‘optimised’ systems that inadvertently shift environmental burdens or fail to meet legal compliance standards (such as the EU Green Deal or the Corporate Sustainability Reporting Directive).

The course, ‘Principles and Practices of Sustainability’, is designed to provide the necessary specialist knowledge in the field, enabling artificial intelligence professionals to create meaningful, scientifically grounded solutions. This course provides a comprehensive foundation in the principles of environmental, social and economic sustainability. It has been specifically designed for students on the ‘Artificial Intelligence for Sustainable Business Development’ programme, with the aim of bridging the gap between sustainability and corporate strategy. Students will analyse the systemic challenges of the 21st century and master the frameworks required to measure, report on and transform business activities through data-driven sustainability

## 5. Artificial Intelligence in Supply Chain Management

This series of ten lectures is designed to provide a structured exploration of how Artificial Intelligence is transforming modern supply chain systems. The programme aims to equip participants with a comprehensive understanding of both the theoretical foundations of supply chain management and applied AI methodologies, with a primary focus on supervised learning (SL) and reinforcement learning (RL), and on their integration into complex operational environments.

By the end of the course, participants will have developed a strong understanding of how different types of artificial intelligence — Supervised Learning, Reinforcement Learning and Agent-based Artificial Intelligence — can be systematically applied to enhance efficiency, adaptability and intelligence at all levels of supply chain management. They will be able to interpret how predictive and autonomous decision-making models interact to form agent-based, self-optimising ecosystems that dynamically coordinate supply, production and logistics in real time.

## 6. Circular Economy and Artificial Intelligence Innovations

This module explores how Artificial Intelligence can be a crucial tool for the transition to a circular economy. As a key catalyst of the Fourth Industrial Revolution, AI can help cities and industries become more regenerative and sustainable by optimising resource use, designing circular products and supporting new business models. Through case studies in sectors such as food systems, waste management and manufacturing, students will explore the potential of digital technologies to redesign supply chains, support regenerative agriculture, automate material recovery and improve the life-cycle management of goods and resources. Students will critically evaluate the role of digital tools in supporting circular innovation and analyse the systemic implications of AI development.

The course focuses on three key areas of application of artificial intelligence in circular economy systems:

- 1) Design of circular products, components and materials.
- 2) Operation of circular business models – including the ‘product-as-a-service’ model – using real-time and historical data to improve asset utilisation, predictive maintenance and demand forecasting.
- 3) Optimisation of the supply chain and recycling infrastructure through artificial intelligence systems for disassembly, remanufacturing and material recovery.

By the end of the course, students will have acquired both theoretical and applied knowledge of how artificial intelligence technologies can be utilised to eliminate waste, preserve the value of materials, and drive systemic change across all sectors, thereby contributing to long-term environmental and economic resilience.

## Academic Integrity

(Compulsory module offered online by RHUL, available in both semesters, with no ECTS credits)

The module will outline the fundamental principles of academic integrity, with a focus on university assignments. Plagiarism, collusion, and outsourcing will be described as activities that undermine academic integrity, and the potential consequences of engaging in them will be outlined. Feedback-

based activities will provide students with opportunities to reflect and develop their understanding, whilst a final summative activity will assess whether students have demonstrated sufficient understanding of the principles of academic integrity.

## SECOND SEMESTER MODULES (LIVE ATTENDANCE AT RHUL)

### 1. Artificial Intelligence and the Future of Work

This module provides students with the knowledge and skills needed to respond to the transformative impact of Artificial Intelligence on the rapidly evolving landscape of work and professional roles. Students will gain a deep understanding of how artificial intelligence technologies are reshaping various professions and professional roles, from the potential for automation to the emergence of new job functions. By critically evaluating the latest news and predictions regarding the impact of AI on the workforce, students will learn to distinguish between hyperbole and realistic predictions, enabling them to make informed decisions and develop effective strategies for adapting to these changes. The course also provides opportunities for students to demonstrate practical skills in using and managing IT tools relevant to their professional interests, preparing them to make proactive use of these technologies. Recognising the increasing integration of ICT into organisations, the course explores leadership strategies for managing teams that incorporate ICT and promote innovation. Students will also propose innovative, technology-enabled solutions for remote working and virtual collaboration, equipping them with the tools to succeed in evolving work environments. Finally, the course enables students to take a leadership role in digital transformation, capable of harnessing the transformative potential of digital technology, assess its impact on business operations, and implement AI-based solutions to drive business success in the digital age.

### 2. Responsible AI and Digital Innovation

This course focuses on the social and ethical implications of artificial intelligence and digital technologies. It discusses the impact and consequences of artificial intelligence and digital transformation on individuals, organisations and societies globally. Students will be introduced to the framework for responsible digital innovation and will learn to apply their knowledge to the design, implementation, and adoption of artificial intelligence and digital technologies. With an emphasis on critical thinking, the course will be research-based, drawing on the latest academic literature and case studies, and will focus on supporting students as active learners, co-creators, and disseminators of knowledge.

### 3. Business Analytics in Practice

The course aims to enhance students' employability and their impact on society by applying business analysis skills to real-world business problems. The course provides a critical pedagogy involving international experts to challenge students' interpretations of data modelling and to create a framework for applying knowledge in this field. Learning experiences are co-created through a collaborative pedagogy to achieve high levels of student engagement in small, authentic learning environments, where students are encouraged to explore different interpretations and how these may introduce bias or be used to better understand and promote inclusivity and diversity. Students adopt

an interdisciplinary mindset to create unique and innovative solutions to practice-based problems, whilst learning to collaborate with others in a collaborative environment using industry datasets.

#### **4. Research and Consultancy Methods**

This module aims to provide students with theoretical and practical guidance on empirical research and consultancy related to the challenges of business analysis in an organisational setting. Emphasis is placed on developing analytical thinking, qualitative and quantitative research skills, and counselling practice, so that students are prepared to undertake their own project as part of their dissertation. The course covers a range of topics, including research approaches suitable for business analysis; quantitative and qualitative methods of data collection and analysis; innovations in digital research methods; consulting skills; and ethical aspects of conducting research related to business analysis.

#### **Summer term: Thesis (Distance learning)**

##### **Dissertation**

The ‘Dissertation’ module is a postgraduate-level module worth 30 ECTS credits, in which students undertake independent, substantive research in the field of Artificial Intelligence and its applications to sustainable business development. The course provides students with the opportunity to demonstrate advanced knowledge, research abilities and analytical skills through the systematic investigation of a clearly defined research problem.

Working individually under academic supervision, students are required to design, plan and carry out a coherent research project, appropriate in scope and depth for a postgraduate dissertation. The course emphasises the formulation of research questions, the justified selection and application of appropriate analytical or computational methods, and the critical evaluation and interpretation of results derived from the use of artificial intelligence and business analysis techniques.

Students are required to demonstrate appropriate engagement with relevant academic and professional literature to situate their research in context and substantiate their methodological and analytical decisions. The dissertation must demonstrate methodological soundness, analytical rigour, and the ability to construct a clear, well-reasoned argument supported by data and analysis. The ethical, legal and social aspects related to artificial intelligence and its business applications are treated as an integral part of the research process.

The assessment of the dissertation consists of the written text and the oral presentation (viva voce). The oral presentation allows students to express and critically justify their research objectives, methodological choices, analytical approach, findings and conclusions before an academic committee, demonstrating a deep understanding, critical judgement and the ability to engage in scholarly discussion.

Disclaimer: The information contained in this Guide for Postgraduate Students is accurate at the time of writing, in April 2026, but is subject to change in line with the policy of one or both partner institutions regarding the continuous improvement and development of the Programme. Every effort will be made to keep you informed of any such changes.