

Module code	BAI709		Level	7
Module title	Data Modelling and Machine Learning			
Status	Core			
Teaching Period	Spring			
Courses on which the module is taught	MSc Data Science for Business and Innovation			
Prerequisite modules	None			
Notional learning hours	200	Credit value	20	ECTS Credits 10
Field trips?	N/A			
Additional costs	N/A			
Content notes	N/A			

1. Module description

Data science is reshaping how organisations make decisions, and this module gives you the technical and analytical foundations to contribute to that process. Supported by AI, you will develop practical data modelling skills, using tools like Python and SQL across two connected parts.

In the first part, you will be introduced to core methods of supervised learning from a statistical perspective, including descriptive statistics, linear regression, and classification models. You will learn how to understand and assess model assumptions, interpret results, apply statistical inference, and evaluate data quality. You will develop the ability to diagnose modelling issues, judge the suitability of different analytical approaches, and generate evidence-based insights across a range of business and managerial contexts.

In the second part, you extend these foundations into business-focused machine learning and unsupervised learning. You will study core algorithms and apply them to business problems including sales forecasting, customer segmentation, demand prediction, and fraud detection. You will develop the ability to select, implement, and critically evaluate models, with emphasis on predictive performance, model behaviour, and practical limitations.

Across both parts of the module, you will develop technical competence, statistical reasoning, and critical judgement. This will enable you to apply data science methods rigorously and appropriately in support of innovation and data-informed decision-making in contemporary business environments.

2. Learning Outcomes

Upon successful completion of this module, you will be able to:

Innovation (MLO2)

Create and implement data-driven solutions to real business problems by selecting, building and interpreting statistical and machine learning models to generate actionable insight.

Decision-making (MLO4)

Formulate informed, evidence-based decisions in complex managerial contexts by critically evaluating model outputs, assessing their reliability, and translating analytical findings into organisational recommendations.

Communication (MLO5)

Communicate persuasively the methodology, results, and limitations of data modelling work to both technical and non-technical audiences using appropriate written, visual, and oral formats.

Discipline Skills (MLO8)

Combine and employ statistical and machine learning techniques, including supervised and unsupervised methods to analyse business data, evaluate model performance, and derive well justified conclusions.

3. Learning and teaching methods, and reasonable adjustments

You will experience applied learning through practical usage of relevant software tools. Your sessions will be largely lab-based, providing critical exposure to relevant technologies. As such, the module takes an active-learning approach which places you at the centre of your own learning journey. Each week, you will engage in a variety of data-focused activities that get you to apply theoretical concepts in a practical way, acquire new information, share your ideas and perspectives, participate in discussions, collaborate with your peers, and reflect on your learning. Through this approach to learning, you'll develop new knowledge and skills and practice applying them to real-world workplace situations in the form of case studies, workshops, and projects. These activities, along with formative assessments and feedback, will culminate in the summative assessment(s) which will showcase how you have met the learning outcomes of the module.

Learning hours			200
Directed learning			48
Workshops	IT Lab sessions		
12	36		
Guided/Self-guided learning			152

Students seeking reasonable adjustments should consult the current Disability Policy:
<https://www.regents.ac.uk/policies>

4. Assessments and weighting, reasonable adjustment, and feedback methods

Assessment component 1: Presentation, 30% TMM, 10 minutes ($\pm 10\%$)

You will be provided with a dataset drawn from a managerial or business context. You will structure, clean, and analyse the data using appropriate statistical techniques in order to extract relevant managerial insights. You will identify key patterns and relationships and support your findings with tables and graphical visualisations. You will communicate the main results of your analysis clearly and concisely.

Assessment component 2: Report, 70% TMM, 2500 words ($\pm 10\%$)

Individually, you will address a real managerial or business problem using data drawn from an organisational context. You will collect, prepare, and analyse the data using statistical and machine learning methods covered in the course. You will select appropriate models, justify your methodological choices, and interpret the results in relation to the managerial problem. You will translate analytical findings into actionable business insights, demonstrating creativity and innovative thinking in addressing real-world managerial challenges. Your work will be presented in a written report structured as a professional consultancy report.

Further details of the precise assessment components and allocation of marks will be specified in the module assignment brief.

Mapping of assessment tasks:

Assessment components	LO2	LO4	LO5	LO8
Assessment 1		x	x	x
Assessment 2	x	X	x	x

The above assessment components are summative. You will have the opportunity for formative assessment and feedback before each summative assessment.

5. Indicative resources

Core Reading:

James, G., Witten, D., Hastie, T. and Tibshirani, R. (2023) *An Introduction to Statistical Learning: With Applications in R*. 2nd ed. New York: Springer.

Further readings:

Kelleher, J.D., Mac Namee, B. and D'Arcy, A. (2020) *Fundamentals of Machine Learning for Predictive Data Analytics: Algorithms, Worked Examples, and Case Studies*. Cambridge, MA: MIT Press.

Peck, R. and Olsen, C. (2025) *Introduction to Statistics and Data Analysis*. 7th ed. Boston, MA: Cengage Learning.

NB: This list of indicative resources is illustrative only and subject to change. A full list of resources will be provided on the module Blackboard site and updated from time to time.