



UK

SYLLABUS 2025-2026

Data Science and Artificial Intelligence in Finance

MODULE SPECIFICATION

Module Code	2425_DFC_2_EN_027 / 2526_DFC_3_EN_014
Campus	Oxford
Department(s)	Law, Finance and Control
Level / Semester	Masters Year 2 (M2); Equivalent to FHEQ level 7 Semester 10
Language of Instruction	English
Teaching Method	☒ In-person (face-to-face) ☐ Distance learning (live online) ☐ e-Learning (asynchronous) ☐ Hybrid: _____
Pre-requisite(s)?	None
ECTS <i>Reminder: 1 ECTS = between 20 and 30hr- student workload</i>	4
Equivalent FHEQ credits	8
Study Hours	100 hours which comprise of 28 directed learning and 72 independent learning/assessment hours

MODULE DESCRIPTION

Module Aims	This module examines the application of data science and artificial intelligence (AI) in the financial sector. Students will gain practical skills in using machine learning, big data analytics, and AI-driven tools to address key financial challenges such as risk management, fraud detection, and algorithmic trading. By the end of the module, students will be able to design and implement data science and AI solutions for financial problems, analyse large datasets to derive actionable insights, and evaluate the ethical implications of AI in finance.
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Teaching Arrangement	The module will be delivered through lectures, seminars, and workshops.
Learning Outcomes	By the end of this module, students should be able to: 1. Demonstrate proficiency in using machine learning, big data analytics, and AI-driven tools to solve financial challenges. 2. Design and implement AI-based models for risk management, fraud detection, and algorithmic trading. 3. Process and interpret financial data using advanced analytical methods to derive actionable insights. 4. Assess the ethical considerations and regulatory requirements associated with AI and data science in the financial sector. 5. Critically evaluate the role of AI and data science in transforming financial decision-making and operational processes.
Competency Goals <i>(Knowledge, expertise and interpersonal skills)</i>	PGE_M_CG01 - To be equipped with efficient business skills
	PGE_M_CG02 - To be entrepreneurially-minded
	PGE_M_CG04 - To be a project manager with a strategic overview
Alignment with Programme Learning Goals	PGE_M_CG01_LO01 - To apply appropriate financial skills
	PGE_M_CG01_LO05 - To identify the appropriate methodology to solve a problem
	PGE_M_CG01_LO04 - To use information technology
	PGE_M_CG01_LO06 - To apply knowledge in order to meet the expectations of the professional world
	PGE_M_CG02_LO02 - To develop open-mindedness
	PGE_M_CG02_LO01 - To understand the environment of a company whatever the activity sector
	PGE_M_CG01_LO05_I01 - To diagnose a situation
	PGE_M_CG04_LO01 - To do a global analysis of the firm in its environment
	PGE_M_CG01_LO01_I01 - To realise a financial analysis
	PGE_M_CG01_LO05_I02 - To select the appropriate methodological approach and data processing

	PGE_M_CG01_LO06_I01 - To solve in a team an advanced professional issue
	PGE_M_CG02_LO02_I01 - To assess their own strengths and weaknesses
	PGE_M_CG04_LO01_I02 - To distinguish between what is a strategic situation and what is not

SESSION TOPICS / MODULE SCHEDULE

(Please note, a session/sequence may be more than one scheduled class)

<u>Session 1: Introduction to Data Science and AI in Finance</u> <i>Content:</i> • Overview of data science and artificial intelligence in financial services • Key applications and industry trends • Machine learning techniques for finance <i>Assignments:</i> • Assignments will be announced closer to the relevant session dates
<u>Session 2: Supervised and Unsupervised Learning Methods</u> <i>Content:</i> • Deep learning applications in financial modelling • Model evaluation and performance metrics • Big data analytics in financial decision-making <i>Assignments:</i> • Assignments will be announced closer to the relevant session dates
<u>Session 3: Data Collection, Processing, and Visualisation</u> <i>Content:</i> • Predictive analytics for financial forecasting • Sentiment analysis and natural language processing in finance • AI applications in risk management and fraud detection <i>Assignments:</i> • Assignments will be announced closer to the relevant session dates
<u>Session 4: Credit Scoring and Risk Assessment Models</u> <i>Content:</i> • Fraud detection techniques using AI and machine learning • Case studies on AI-driven risk management strategies • Algorithmic trading and portfolio optimisation <i>Assignments:</i> • Assignments will be announced closer to the relevant session dates
<u>Session 5: Automated Trading Strategies and High-Frequency Trading</u> <i>Content:</i> • Portfolio management using AI-driven insights

Last reviewed: 25/07/2025

- Reinforcement learning for investment strategies
- Ethical and regulatory considerations in AI and finance

Assignments:

- Assignments will be announced closer to the relevant session dates

Session 6: Ethical Challenges of AI Adoption in Finance

Content:

- Bias, fairness, and transparency in AI models
- Global regulatory frameworks and compliance requirements
- Practical implementation and case studies

Assignments:

- Assignments will be announced closer to the relevant session dates

Session 7: Hands-On Projects Using AI and Data Science Tools

Content:

- Real-world case studies from financial institutions
- Best practices for deploying AI solutions in financial services

Assignments:

- Assignments will be announced closer to the relevant session dates

KEY TEXTS

1. Klaas, J. (2019) *Machine learning for finance: The practical guide to using data-driven algorithms in banking, insurance, and investments*. Packt Publishing.
2. Guida, T. (2018) *Big data and machine learning in quantitative investment*. Chichester, United Kingdom: John Wiley & Sons.
3. Lui, A. and Ryder, N. (eds.) (2021) *FinTech, artificial intelligence and the law: Regulation and crime prevention*. Abingdon, United Kingdom: Routledge.

SUPPLEMENTARY TEXTS

1. Additional readings and materials will be provided closer to the relevant session dates.

MODES OF ASSESSMENT

Continuous Assessment (40%)	Project report
Final Exam (60%)	Written exam

MODULE DESIGN TEAM

- Author: *Mitra Arami*
- Reviewer: *Diego Salzman*
- External Reviewer: *Marios Tsatsos*

Last reviewed: 25/07/2025