

Module Details	
Module Title	Machine Learning and Artificial Intelligence in Finance
Module Code	AFE7518-B
Academic Year	2023/4
Credits	20
School	School of Management
FHEQ Level	FHEQ Level 7

Contact Hours	
Type	Hours
Directed Study	164
Laboratories	12
Lectures	24

Availability	
Occurrence	Location / Period
BDA	University of Bradford / Semester 2

Module Aims
<p>This module aims to provide students with knowledge of machine learning using well-known programming language, Python. More specifically, students will learn about the purpose of Machine Learning and where it applies to the real world of finance. Also, through this immersive, hands-on module, students will be equipped with an understanding of the fundamentals of AI and machine learning such as supervised vs unsupervised learning, model evaluation and Machine Learning algorithms, and how they apply to financial functions such as classification, lending processes, portfolio management, risk management, regulatory compliance and beyond.</p>

## Outline Syllabus

### Indicative Content:

- ? Fundamental and core concepts of AI and ML
- ? Big Data in Finance Landscape
- ? Econometrics and financial modelling review
- ? Machine Learning definitions and framework
- ? Machine Learning modeling and Metrics
- ? Supervised Learning
- ? Unsupervised Learning
- ? Reinforcement Learning
- ? Deep Learning
- ? Artificial Intelligence
- ? Modern Financial Modeling
- ? Implementing Machine Learning Models in Python

## Learning Outcomes

Outcome Number	Description
1	Explain and critically apply a range of state-of-the-art principles, concepts, methods, tools, and technologies in ML and AI, and discuss their current and potential application and impact in the field of finance.
2	Define and apply machine learning techniques and big data technology, analytics, and associated business strategies which underpin the understanding and application of AI solutions for financial analysis and investment.
3	Understanding main algorithms of Supervised and Unsupervised Learning, and to use ML open source Python packages to design, test, and implement ML algorithms in Finance.

## Learning, Teaching and Assessment Strategy

The learning and teaching will be directed, supported, and reinforced through a combination of face-to-face lectures and laboratories, as well as through directed and self-directed study. The module will be delivered over 12 weeks where each includes 2-hour lecture. 11 lectures involves student interaction with module lecturers and tutors focusing on the theoretical aspects and applications of AI and ML in finance. One additional 2-hour lecture at the end of semester allocates to the design of and preparation for the summative assessment, module revision, and collection feedback which will be used to improve module delivery.

12 Laboratory sessions will complement formal lectures and will be an opportunity for students to do some hands-on-system work and implementing ML techniques to solve financial problems using the ML open-source Python package. These activities may be based on case studies or problem-solving exercises.

An online module manual on Canvas provides an outline of the module structure, content, learning and teaching strategy and assessment format. The manual is complemented by more detailed study guides which provide guidance on the topic of the weekly study and contain the learning materials (lectures notes, tutorial tasks, self-study tasks), the reading lists, and other useful information for each week.

Formative feedback will be provided throughout the entire module to help students better prepare for the summative assessments.

The final assessments will be individual coursework and a group research coursework which critically evaluates students' understanding of LOs. The results of group coursework should be presented by groups in classroom. The individual and group-based coursework contribute 20% and 80% towards their module grade, respectively. Appropriate feedback, formative and summative, will be given for the assessment. The assessment will assess all the learning outcomes specified in this document.

Mode of Assessment			
Type	Method	Description	Weighting
Summative	Coursework - Written	Individual assignment (2000 words)	80%
Summative	Coursework - Written	Group Assignment/Presentation (1000 words)	20%

Reading List
To access the reading list for this module, please visit <a href="https://bradford.rl.talis.com/index.html">https://bradford.rl.talis.com/index.html</a>

*Please note:*

*This module descriptor has been published in advance of the academic year to which it applies. Every effort has been made to ensure that the information is accurate at the time of publication, but minor changes may occur given the interval between publishing and commencement of teaching. Upon commencement of the module, students will receive a handbook with further detail about the module and any changes will be discussed and/or communicated at this point.*

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