

Module Details	
Module Title	Machine Learning and Artificial Intelligence in Finance (Distance Learning)
Module Code	AFE7523-B
Academic Year	2022/3
Credits	20
School	School of Management
FHEQ Level	FHEQ Level 7

Contact Hours	
Type	Hours
Directed Study	164
Online Lecture (Synchronous)	10
Online Lecture (Asynchronous)	14
Laboratories	12 Online

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

Module Aims
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.

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 the 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, 5 of which will include synchronous lectures and 7 asynchronous ones. The five synchronous lectures, which involves student interaction with module lecturers and tutors, include a mix of learning activities such as four 2-hour 'live' lectures focusing on delivering content, case studies, tasks, group-based discussions, guest lecturing, and discussing answers to student tasks. One additional 2-hour synchronous lecture will focus on the design of and preparation for the assessment, module revision, and the collection and review of student feedback which will be used to improve module delivery.

The seven asynchronous lectures include 2-hour per week pre-recorded presentations or talks on a particular topic, links to relevant videos and online resources and lists of questions and tasks for self-study. Students can watch the presentations, videos and work on the answers and tasks at their own time. Formal lectures will focus on the theoretical aspects and applications of AI and ML.

In addition, each week contains 1-hour 'live' laboratory which 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. For online students, the lab sessions will be held online using open-source software (i.e., Python) and database (i.e., Eikon).

All sessions are delivered online using digital legal resources and appropriate learning technologies. The Virtual Learning Environment (VLE) for each module is the hub of knowledge through which all module materials are accessed and where a big part of student work takes place.

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.

All the synchronous lectures and tutorials will be offered in a proper time to consider the differences in time zones. Further, all lectures and tutorials will be recorded and uploaded on Canvas for further access and review.

Students will be set tasks to monitor their progress, in addition to formal assessment. All teaching will be supported by information supplied on the virtual learning environment, Canvas. Directed study will be provided to enable students to work towards the final summative assessments.

Formative feedback will be provided throughout the entire module.

The final assessment will be individual coursework (LOs, 2&3) and a group research coursework (LOs 1&2) which critically evaluate students' understanding of LOs. 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 assessments 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 <https://bradford.rl.talis.com/index.html>

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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