FACULTY OF BUSINESS
MASTER OF SCIENCE IN FINANCE WITH DATA ANALYTICS
LEARNING MODULE OUTLINE

Academic Year	2024/2025	Semester	1
Module Code	FIDA6125-211/212		
Learning Module	Big Data in Finance		
Pre-requisite(s)	Nil		
Medium of Instruction	English		
Credits	3	Contact Hours	45
Instructor	DR. LAI TSZ MING, TERENCE	Email	tmlai@mpu.edu.mo
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MODULE DESCRIPTION

This module provides students with advanced knowledge in big data analytics in the finance domain. It will highlight how big data analytics shape the way finance is practised. The module starts with an introduction to advanced concepts in data analytics such as data clustering, multi-factor models, neural networks, machine learning, and deep learning. The second part of the module allows students to apply the knowledge acquired to investigate in a few real-life financial problems.

MODULE INTENDED LEARNING OUTCOMES (ILOS)

On completion of this learning module, students will be able to:

M1.	Outline the main concepts in machine learning such as neural networks, and deep learning;
M2.	Perform multi-factor analysis and data clustering analysis on financial data, and relevant applications;
M3.	Critically evaluate stocks/options/derivatives with classifiers and/or machine learning/deep learning.
M4.	Demonstrate programming skills to implement the financial strategies and analyze their results.

These ILOs aims to enable students to attain the following Programme Intended Learning Outcomes (PILOs):

PILOs	**M1**	**M2**	**M3**	**M4**
P1. Master critical knowledge of financial theories, financial models and data analytics in finance and apply it to a wide range of complex financial issues.	✓	✓	✓	✓

P2. Expand knowledge of finance and data analytics through critically evaluating current issues informed by leading edge research and practice in the industry.	✓	✓	✓	
P3. Conduct applied research, particularly using data analytics, into financial issues through a rigorous and systematic approach.				
P4. Communicate effectively, written and orally, to both professional and non-professional audiences on local and global financial issues.				
P5. Demonstrate skills in time management, teamwork, leadership and independent study so that tasks can be planned and implemented at a professional level.				
P6. Identify and address ethical dilemmas and social responsibility issues to uphold high standards of integrity, professionalism and ethical behaviour.				

MODULE SCHEDULE, COVERAGE AND STUDY LOAD

Week	Content Coverage	Contact Hours
1-2	Machine Learning-Based Approaches to Time Series Forecasting	5
2-4	Multi-Factor Models	5
4-5	Asset Allocation	5
6-9	Applied Machine Learning and Data Clustering	10
9-12	Neural Networks, Deep Learning	10
12-15	Applications	10

TEACHING AND LEARNING ACTIVITIES

In this learning module, students will work towards attaining the ILOs through the following teaching and learning activities:

Teaching and Learning Activities	M1	M2	M3	M4
T1. Lectures,	✓	✓	✓	✓
T2. videos,	✓	✓		
T3. case studies,	✓	✓	✓	✓
T4. group discussion	✓	✓	✓	✓

ATTENDANCE

Attendance requirements are governed by the Academic Regulations Governing Master's Degree Programmes of the Macao Polytechnic University. Students who do not meet the attendance requirements for the learning module shall be awarded an 'F' grade.

ASSESSMENT

In this learning module, students are required to complete the following assessment activities:

Assessment Activities	Weighting (%)	ILOs to be Assessed
A1. Project(s)	50%	M1-M4
A2. Assignment(s)	50%	M1-M4

The assessment will be conducted following the University's Assessment Strategy (see www.mpu.edu.mo/teaching_learning/en/assessment_strategy.php). Passing this learning module indicates that students will have attained the ILOs of this learning module and thus acquired its credits.

MARKING SCHEME

	Assessment Task	Criterion	Excellent	Very Good, Good	Satisfactory	Pass	Fail
			A, A-	B+, B, B-	C+, C, C-	D+, D	F
			88% - 100%	73% - 87%	58% - 72%	50% - 57%	0 – 49%
1.	Projects /Assignments (if applicable)	Demonstrate the understanding of the subjects	High	Significant	Moderate	Basic	Not even reaching marginal levels
2.	Oral presentation (if applicable)	Demonstrate the ability to answer questions on topics covered in the outline					

REQUIRED READINGS

REFERENCES

Eryk Lewinson (2022) *Python for Finance Cookbook*, Packt.

Jiri Pik, Sourav Ghosh, (2021) *Hands-On Financial Trading with Python_ A practical guide to using Zipline and other Python libraries for backtesting trading strategies*, Packt Publishing

Stefan Jansen (2020) *Machine Learning for Algorithmic Trading_ Predictive models to extract signals from market and alternative data for systematic trading strategies with Python*, Packt Publishing

Krish Naik, (2019) *Hands on Python for Finance: A practical guide to implementing financial analysis strategies using Python*, Packt Publishing

Irene Aldridge & Marco Avellaneda (2021) *Big Data Science in Finance*, Wiley.

Hands-On Python for Finance [Video], By Matthew Macarty

https://www.packtpub.com/product/hands-on-python-for-finance-video/9781789800975

Marcos Lopez de Prado (2018) *Advances in Financial Machine Learning*, Wiley.

Yves Hilpisch (2019) *Python for Finance*, 2nd ed., O'Reilly.

James Ma Weiming (2019) *Mastering Python for Finance*, 2nd ed., Packt.

Eryk Lewinson (2022) *Python for Finance Cookbook*, Packt.

Sergio Consoli, Diego Reforgiato Recupero, and Michaela Saisana (Editors) (2021) *Data Science for Economics and Finance: Methodologies and Applications*, Springer (Open Access).

STUDENT FEEDBACK

At the end of every semester, students are invited to provide feedback on the learning module and the teaching arrangement through questionnaires. Your feedback is valuable for instructors to enhance the module and its delivery for future students. The instructor and programme coordinators will consider all feedback and respond with actions formally in the annual programme review.

ACADEMIC INTEGRITY

The Macao Polytechnic University requires students to have full commitment to academic integrity when engaging in research and academic activities. Violations of academic integrity, which include but are not limited to plagiarism, collusion, fabrication or falsification, repeated use of assignments and cheating in examinations, are considered as serious academic offenses and may lead to disciplinary actions. Students should read the relevant regulations and guidelines in the Student Handbook which is distributed upon the admission into the University, a copy of which can also be found at www.mpu.edu.mo/student_handbook/.