

FACULTY OF BUSINESS

MASTER OF SCIENCE IN FINANCE WITH DATA ANALYTICS

LEARNING MODULE OUTLINE

Academic Year	2024-25	Semester	2		
Module Code	FIDA6124-121/122				
Learning Module	Data Analysis and Visualization				
Pre-requisite(s)	Nil				
Medium of Instruction	English				
Credits	3	Contact Hours 45			
Instructor	Dr. Thomas Li	Email	spli@mpu.edu.mo		
Office	M546	Office Phone	8599-3332		

MODULE DESCRIPTION

Big data analytics is the process of examining large and complex data to uncover information that can inform better business decisions. Analysing big data requires a variety of approaches, including techniques such as predictive analytics, machine learning, and statistical algorithms. The primary purpose of this module is to provide students with an understanding of the data analytics approach in finance. The first part of this module introduces the basics of a popular programming language in data analytics such as Python and its important packages for data analytics. Another more popular programming language instead of Python may be used. The second part will concentrate on the data analytics and data visualization techniques for financial applications. Topics covered may include financial time series analysis, Stochastic modelling, and derivatives analytics.

MODULE INTENDED LEARNING OUTCOMES (ILOS)

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

M1.	develop computer programs to load, represent and manipulate financial data with appropriate packages;
M2.	analyse, visualize, and forecast financial time series data;
M3.	evaluate stock prices using technical analyses and option valuation using simulations;
M4.	generate appropriate visualization representations for various types of financial data to facilitate data analysis and effective communication;
M5.	demonstrate good time management, teamwork, and leadership skills in completing individual assignments and group project at a professional level.



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

PILOs		M1	M2	М3	M4	M5
P1. N a c	Master critical knowledge of financial theories, financial models and data analytics in finance and apply it to a wide range of complex financial issues.	\checkmark	~	\checkmark	~	
P2. E e p	Expand knowledge of finance and data analytics through critically evaluating current issues informed by leading edge research and practice in the industry.	\checkmark	~	\checkmark	\checkmark	
P3. C f	Conduct applied research, particularly using data analytics, into inancial issues through a rigorous and systematic approach.	\checkmark	\checkmark	\checkmark	\checkmark	
P4. C a is	Communicate effectively, written and orally, to both professional and non-professional audiences on local and global financial ssues.					\checkmark
P5. C a ii	Demonstrate skills in time management, teamwork, leadership and independent study so that tasks can be planned and mplemented at a professional level.					\checkmark
P6. Io is e	dentify and address ethical dilemmas and social responsibility ssues to uphold high standards of integrity, professionalism and ethical behaviour.					

MODULE SCHEDULE, COVERAGE AND STUDY LOAD

Part I: Computer Programming for Data Analytics					
Week	Content Coverage	Contact Hours			
1	Python and Finance	3 Hours			
2-3	Mastering the Basics	4.5 Hours			
3-5	Using Python Packages	6 Hours			
Part II: Co	Part II: Computer Programming for Data Analytics				
Week	Content Coverage	Contact Hours			
5-6	Acquiring Financial Data	4.5 Hours			
7-8	Exploring Financial Time Series Data and Technical Analysis	4.5 Hours			
8-9	Data Preprocessing	4.5 Hours			
10-11	Visualizing Financial Time Series	4.5 Hours			
11-12	Time Series Forecasting and Analysis	4.5 Hours			
13-14	Stochastic Modelling	4.5 Hours			
14-15	Derivatives Analytics	4.5 Hours			



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	M5
T1: Interactive Lectures		\checkmark	\checkmark	\checkmark	
T2: In-Class Exercises and Case Studies	\checkmark	\checkmark	\checkmark	\checkmark	
T3: Individual Assignments		\checkmark	\checkmark	~	\checkmark
T4: Group Project	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark

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. Class Participation (Bonus)	[§] 5%	M1-M4
A2. Quizzes	30%	M1-M4
A3. Individual Assignments	30%	M1-M5
A4. Group Project	40%	M1-M5
TOTAL	100%	

§ The total scores for A1-A4 would not exceed 100% in total.

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



MARKING SCHEME

	Assessment	Criterion	Excellent	Very Good,	Satisfactory	Pass	Fail
	Task		(A, A-)	Good (B+, B, B-)	(C+, C, C-)	(D+, D)	(F)
A2.	Quizzes	Demonstrate the understanding of the subjects covered in classes and show active learning attitude	High	Significant	Moderate	Basic	Not even reaching marginal levels
A3.	Assignments	Demonstrate the ability to apply appropriate concepts, methods, and techniques to solve more straight- forward small- scaled problems.	High	Significant	Moderate	Basic	Not even reaching marginal levels
A4.	Group Project	Demonstrate the ability to analyse a larger-scaled problem and apply appropriate concepts, methods and techniques to solve it.	High	Significant	Moderate	Basic	Not even reaching marginal levels

The Class Participation marks (A1), being some additional bonus, will only be given the students who:

- (P) Actively participate in class discussions,
- (H) Help other classmates to solve their problems, and
- (A) Show active learning **attitude**.

Marks	Criteria
8-10	Demonstrate P, H, and A
5-7	Demonstrate mainly only two activities among P, H, and A
2-4	Demonstrate mainly only one activity among P, H, and A
0-1	Barely show any activity among P, H, and A



REQUIRED READINGS

Textbook:

Eryk Lewinson (2022) Python for Finance Cookbook, 2nd ed., Packt Publishing

Reference Book:

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

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/.

PLAGIARISM POLICY

When a student submits an assignment, he/she has a duty to ensure that his/her assignment has been checked by the *Turnitin* software, and the similarity score given by the *Turnitin* software cannot be higher than 30%. However, a special case can be determined by the instructor.