澳門理工大學
Universidade Politécnica de Macau
Macao Polytechnic University

FACULTY OF BUSINESS

MASTER OF SCIENCE IN FINANCE WITH DATA ANALYTICS

LEARNING MODULE OUTLINE

Academic Year	2023-24	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 Siu Pan	Email	spli@mpu.edu.mo
Office	M546, Meng Tak building	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 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	M3	M4	M5
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

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
3-4	Using Python Packages	4.5 Hours
5	Acquiring Financial Data	3 Hours
Part II: Computer Programming for Data Analytics		
Week	**Content Coverage**	**Contact Hours**
6	Data Preprocessing	3 Hours
7	Visualizing Financial Time Series	3 Hours
8-9	Exploring Financial Time Series Data and Technical Analysis	4.5 Hours
9-10	Time Series Forecasting and Analysis	4.5 Hours
11-12	Monte Carlo Simulation in Finance	4.5 Hours
12-13	Asset Allocation	4.5 Hours
14-15	Backtesting Trading Strategies	6 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	✓	✓	✓	✓	
T2: In-Class Exercises and Case Studies	✓	✓	✓	✓	
T3: Individual Assignments	✓	✓	✓	✓	✓
T4: Group Project	✓	✓	✓	✓	✓

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	20%	M1-M4
A3. Individual Assignments	30%	M1-M5
A4. Group Project	50%	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 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 (A, A-)	Very Good, Good (B+, B, B-)	Satisfactory (C+, C, C-)	Pass (D+, D)	Fail (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.