MSc IN FINANCIAL MATHEMATICS 2025

DEPARTMENT OF MATHEMATICS
FACULTY OF SCIENCE
UNIVERSITY OF COLOMBO

HANDBOOK

MSc in Financial Mathematics
Department of Mathematics
University of Colombo

15 Years of Service to the Nation

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01. INTRODUCTION TO MSc IN FINANCIAL MATHEMATICS

The MSc in Financial Mathematics is an interdisciplinary postgraduate program that integrates advanced mathematical theory, computational tools, and financial theory to equip students with the skills necessary to operate in the complex and data-driven world of modern finance. The program is structured to offer specialized tracks that reflect the diverse needs and career aspirations of students.

Considering new trends in the field of Quantitative Finance and Finance Intelligence, starting from year 2025 batch, the program provides three pathways, namely,

Financial Analysis (FA)

Financial Engineering (FE)

Financial Intelligence (FI)

MSc in Financial Mathematics

Financial Analysis (FA)
Focuses on understanding market trends, investment strategies, and risk management using quantitative and statistical tools.

Financial Engineering (FE)
Emphasizes the creation and implementation of complex financial instruments and strategies using mathematical modeling and computational algorithms.

Financial Intelligence (FI)
Combines machine learning, artificial intelligence, and behavioral finance to derive insights and predictive analytics in financial decision-making.

Each of these path is designed to offer a focused yet flexible curriculum that balances theoretical foundations with practical applications and professional experiences. The MSc in Financial Mathematics offers a rigorous, flexible, and forward-thinking curriculum that prepares graduates to thrive in the data-intensive and mathematically sophisticated environment of modern finance. With three clearly defined paths, Financial analysis, Financial Engineering, and Financial Intelligence- students can tailor their studies to match their professional aspirations. The program not only addresses the current demands of the financial industry but also anticipates future developments, making it a valuable investment in a successful and adaptable carrier.

02. RATIONALE

The rationale behind offering a MSc in Financial Mathematics degree program lies in the increasing complexity of Financial Markets and the growing demand for professionals who possess a unique blend of skills in Finance, Applied Mathematics, Statistics, and Computer Science. MSc in Financial Mathematics emerged as a field in response to the need for sophisticated quantitative tools and models to address challenges in Insurance, Banks, Financial Analysis, Financial Consultancy and Financial Simulation sectors.

Some of the key reasons supporting the rationale for a MSc in Financial Mathematics.

Bridging Theory and Practice

Financial markets are driven by complex, dynamic systems where the ability to model uncertainty and forecast trends is critical. This program provides students with theoretical grounding in mathematical theory, statistical inference, and computational methods, while also teaching their practical applications in asset pricing, portfolio optimization, and risk assessment.

Meeting Industry Demand

There is a growing demand for professionals who can interpret large financial datasets, develop models for derivative pricing, or apply machine learning algorithms to market behavior. Employers across banking, investment management, insurance, and fintech sectors seek graduates who possess dual expertise in mathematics and finance, making this program highly relevant.

Supporting Diverse Career Paths

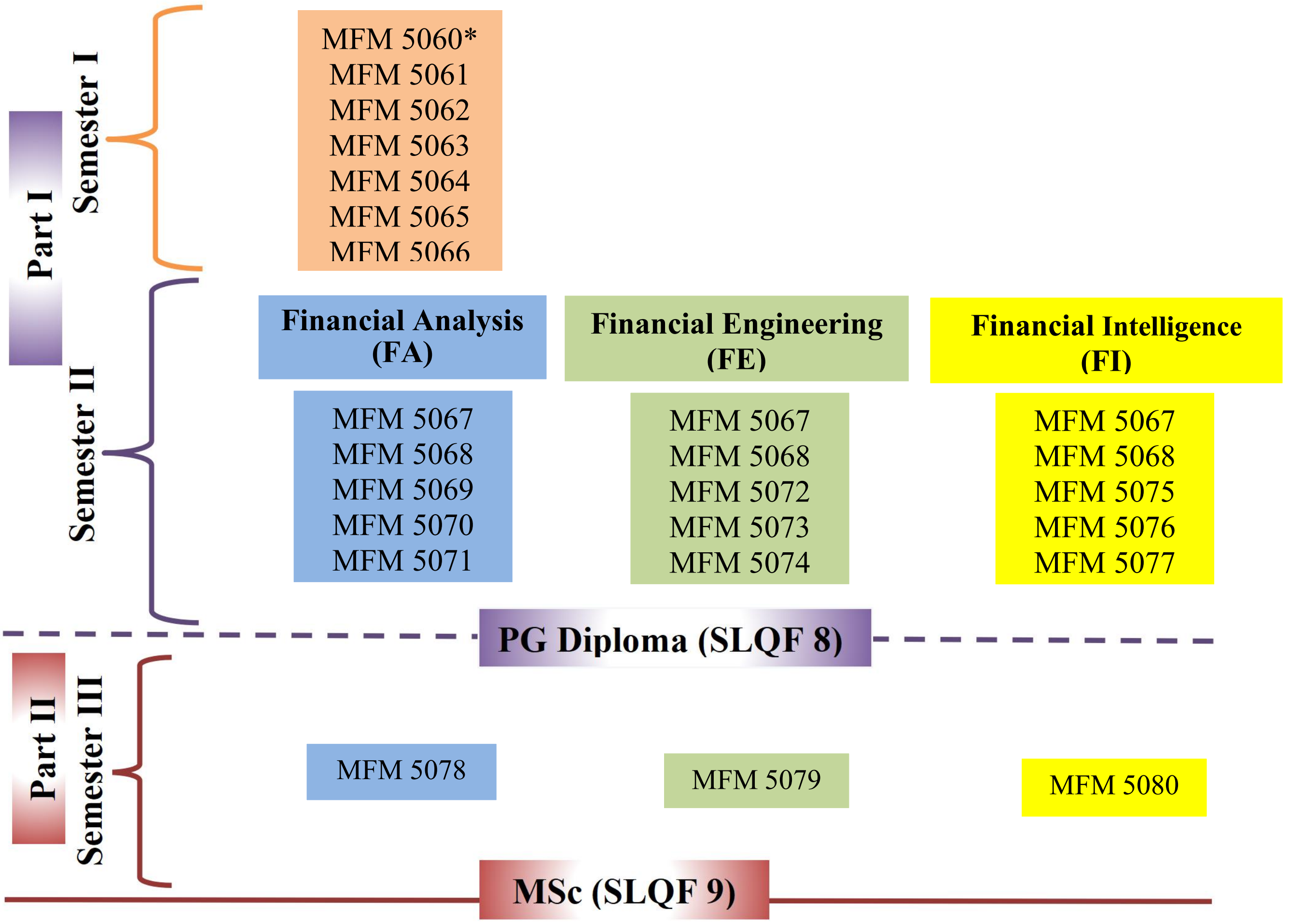
The three specialized tracks allow students to align their academic focus with specific career goals:

- **Financial Analysts** gain expertise in data-driven decision-making, financial modeling, and performance evaluation.
- **Financial Engineers** learn to construct and manage derivative products, structured finance instruments, and risk mitigation strategies.
- **Financial Intelligence** specialists are trained to apply AI, big data analytics, and behavioral models to improve market predictions and decision-making.

03. OBJECTIVE

Effectively disseminate updated knowledge and experiences to the financial industry to uphill the industry by filling the gaps in the local and global demand.

04. OVERVIEW OF THE PROGRAMME



MFM 5060*	Ethics, Professional Practices and Consultancy in Finance
MFM 5061	Economics for Finance
MFM 5062	Financial Statement Analysis
MFM 5063	Quantitative Methods with Python
MFM 5064	Investment Analysis
MFM 5065	Financial Derivative Analysis
MFM 5066	Equity Market Analysis and Corporate Strategies
MFM 5067	Fixed Income Analytics
MFM 5068	Portfolio Optimization
MFM 5069	Quantitative Finance
MFM 5070	Behavioral Finance
MFM 5071	Computational Financial Analytics
MFM 5072	Financial Econometrics
MFM 5073	Financial Simulations
MFM 5074	Financial Engineering Models
MFM 5075	Financial Machine Learning
MFM 5076	Financial Artificial Intelligence
MFM 5077	Financial Intelligence Models
MFM 5078	Financial Analysis Project
MFM 5079	Financial Engineering Project
MFM 5080	Financial Intelligence Project

05. CAREER PATH

5.1 Financial Analysis

Investment Analyst

Analyzes asset classes (stocks, bonds, commodities) and provides recommendations for buy/sell decisions.

Equity/Fixed Income Analyst

Evaluates company fundamentals or macroeconomic data to guide investment decisions.

Risk Analyst

Assesses market, credit, or operational risk using statistical and financial tools.

Portfolio Manager Assistant

Supports asset allocation decisions, monitors portfolio performance, and advises on re-balancing.

Corporate Finance Analyst

Works on budgeting, forecasting, and capital structure optimization in corporations or advisory firms.

5.2 Financial Engineering

Derivatives Trader

Trades options, futures, and other derivatives using quantitative strategies.

Financial Engineer

Designs new financial products and optimizes investment strategies using advanced math models.

Structured Finance Analyst

Structures and evaluates complex instruments such as mortgage-backed securities.

Risk Modeler

Develops risk models for market, credit, and operational risk exposure.

Quantitative Analyst (Quant)

Develops and implements pricing models for derivatives and structured products.

5.3 Financial Intelligence

Algorithmic Trader

Designs and tests automated trading strategies based on AI models and market data.

Fintech Product Analyst

Develops and refines financial technology platforms using intelligent systems.

AI Financial Strategist

Applies artificial intelligence to portfolio construction, credit scoring, fraud detection, and financial forecasting.

Financial Data Analytics

Uses statistical learning and machine learning to derive actionable insights from large financial datasets.

Quantitative Developer

Builds tools and systems to support algorithmic trading and model implementation.

06. ELIGIBILITY CRITERIA

A Bachelor of Science with Pure Mathematics or Applied Mathematics or Statistics or Finance as a subject,

OR

Bachelor of Science in Engineering from a recognized university,

OR

Chartered Financial Analyst (CFA) Qualified,

OR

Any other equivalent professional qualification acceptable to the senate of the University of Colombo.

07. PAYMENT STRUCTURE

Course Fees

For Local Students :

First Installment (On Registration)	Second Installment (Before Semester I Examinations)	Total (LKR)
LKR 300,000	LKR 150,000	450,000
***LKR 50,000 discount for one-time payment on registration**		400,000

For International Students : USD 4,000
For Sri Lankans coming from a foreign territory 30% discount from USD 4,000

** Course fees are non-refundable.*

Application Fee:

For Local Applicants
: LKR 4,000
For International and Sri Lankan Applicants coming from foreign territory
: USD 25
For International Students : USD 4,000
For Sri Lankans coming from a foreign territory 30% discount from USD 4,000

Additional Fee for the Examination Out of the University Premises

The students who register as a student who live in Sri Lanka have the option to do the examinations out of the University premises with prior approval and by paying an amount of Rs. 50,000 per semester.

Additional Fee for the Extended Period

The students who are unable to complete the degree within 2 years can extended up to the maximum period allowed to complete the degree (05 years) from the date of the first registration with prior approval and by paying an amount of Rs. 50,000 per year.

08.PROGRAMME INTENDED LEARNING OUTCOMES (PLOs)

The completion of MSc in Financial Mathematics Degree holders should be able to:

PLO I: demonstrate knowledge and proficiency in the terminologies, theories, concepts, practices and skills specific to the field of finance, financial instruments, financial markets and financial product development.

PLO II: display critical awareness of current local/global financial issues/environments.

PLO III: observe and interpret financial markets to uncover potential opportunities and construct financial portfolios.

PLO IV: apply best practices in financial product development / analysis to make plans, organize projects, monitor outcomes and provide financial leadership.

PLO V: apply the Standards of Practice and Codes of Conduct of Financial Practitioners to address ethical challenges within the business environment and demonstrate intellectual maturity in a global setting.

PLO VI: practice professionalism and uphold ethical standards and improve/update skills required for employment and life-long learning.

PLO VII: effectively communicate & disseminate knowledge, information and ideas to specialist and a wider society.

PLO VIII: perform independently as well as interdependently.

PLO IX: demonstrate self-direction and originality in tackling and solving problems and be able to plan and implement tasks at professional levels.

09.PROGRAM STRUCTURE

Modules of Part I

Course Code	Course Title	Details	Notional hours	FA	FE	FI
Semester I						
MFM 5060*	Ethics, Professional Practices and Consultancy in Finance	60 L, 4C	200	X	X	X
MFM 5061	Economics for Finance	20L,20P, 2C	100	X	X	X
MFM 5062	Financial Statement Analysis	20L,20P, 2C	100	X	X	X
MFM 5063	Quantitative Methods with Python	20L,20P, 2C	100	X	X	X
MFM 5064	Investment Analysis	30L,30P, 3C	150	X	X	X
MFM 5065	Financial Derivative Analysis	30L,30P, 3C	150	X	X	X
MFM 5066	Equity Market Analysis and Corporate Strategies	20L,20P, 2C	100	X	X	X
Semester II						
MFM 5067	Fixed Income Analytics	20L,20P, 2C	100	X	X	X
MFM 5068	Portfolio Optimization	20L,20P, 2C	100	X	X	X
MFM 5069	Quantitative Finance	30L, 30P,3C	150	X		
MFM 5070	Behavioral Finance	20L, 20P, 2C	100	X		
MFM 5071	Computational Financial Analytics	60P, 2C	100	X		
MFM 5072	Financial Econometrics	30L,30P, 3C	150		X	
MFM 5073	Financial Simulations	60P, 2C	100		X	
MFM 5074	Financial Engineering Models	60P, 2C	100		X	
MFM 5075	Financial Machine Learning	30L,30P,3C	150			X
MFM 5076	Financial Artificial Intelligence	20L,20P,2C	100			X
MFM 5077	Financial Intelligence Models	60P,2C	100			X
	Total Notional Hours (PG Diploma) – SLQF Level 8			1250	1250	1250
	Total Credits (PG Diploma) - SLQF Level 8			25C	25C	25C

Modules of Part II

Course Code	Course Title	Details	Notional hours	FA	FE	FI
Semester III						
MFM 5078	Financial Analysis Project	150P, 5C	500	X		
MFM 5079	Financial Engineering Project	150P, 5C	500		X	
MFM 5080	Financial Intelligence Project	150P, 5C	500			X
	Total Notional Hours (MSc) - SLQF Level 9			1750	1750	1750
	Total Credits (MSc) – SLQF Level 9			30C	30C	30C

Non-GPA compulsory Enhancement Course
For the MSc in Financial Mathematics degree program, in addition to the requirements of the degree awarding, a student is required to obtain a grade of S or better for MFM 5060 in order to complete the requirements for the degree.

10. MODE OF DELIVERY

Delivery of Lectures

The lectures are conducted via Zoom. The Zoom links for lectures and any other meetings and presentations are provided to the students.

Learning Management System (LMS)

URL: https://sci.cmb.ac.lk/lms/

All the students get access to the MSc LMS. The students are enrolled to the relevant courses in the LMS in each semester. All the lecture materials are uploaded into the LMS. The quizzes and examinations are conducted via LMS.

Student Information System (SIS)

URI: https://sims.cmb.ac.lk/sci/login

Registration for the Course Units
Students can register for courses through the SIS.

Registration for the Examination
Exam registration is available in the MSc SIS.
Students will be able to_register/ cancel the exam courses until the deadline has expired.
Students can view the details until the exam event is closed by the coordinator.

Provisional Result
Students will be able to see their results (Grade only) in the MSc SIS when the coordinator releases the provisional result for the courses.
The system generates auto-emails to registered students when releasing results for the exam course.

Final Result
Students will be able to see their results (Grade) with GPA in the MSc SIS when the Exam branch releases the final result and enables the GPA.

For more information
Please contact through the email <itsc@sci.cmb.ac.lk>, If you have an issue with logging into the LMS
Please contact your MSc Coordinator, Faculty of Science, If you have an issue in exam registrations, provisional results or your details are wrong in the system if have not accessed it to update them.
More: https://sims.cmb.ac.lk/sci/login

11. COMPLIANCE

The SLQF level of MSc in Financial Mathematics degree is Level 9.

The SLQF level of Post Graduate Diploma in Financial Mathematics is Level 8.

12. DEGREE AWARDING CRITERIA

Registration

Date of Registration

A person who has been selected as a postgraduate student shall be required to register for the current academic year to follow the particular MSc programme. The date of registration shall be specified by the faculty.

Maintenance of Registration

Registration should be maintained in order to obtain the MSc degree by paying the specified fees.

If a student continue the MSc more than the specified period a payment in addition to the total course fee will be charged to maintain the registration.

Postponement of Registration

A student who desires to postpone his/her registration should do so in writing to the Dean, Faculty of Science, giving reasons for and duration of postponement. Each such request shall be considered by the faculty on the recommendation by the Higher Degrees Committee (HDC) and the relevant Department.

Cancellation of Registration

A registration may be canceled by the faculty on the recommendation by the HDC and the relevant Department for inadequate academic progress, violation of rules and regulations of the University, failure to pay prescribed fees by the due dates, or any other reasons as decided by the Faculty.

Leave of Absence

Leave of absence may be granted on medical grounds or any other valid reasons acceptable to the faculty.

Examinations

General Instructions

The end semester final examinations are conducted at the university premises based on the LMS.

The students are required to do the examination registration via Student Information System (SIS) as explain above.

The minimum grade a student should achieve to pass a paper/mini project/research component is B-.

Examination Out of the University Premises

The students who register as a student who live abroad are allowed to do the examinations out of the University premises.
The students who register as a student who live in Sri Lanka have the option to do the examinations out of the University premises with prior approval and by paying an amount of Rs. 50,000 per semester.

Repeat Examinations

If a candidate fails (Grade below B-), the examination he/she shall repeat the entire examination or the required part at the next first available opportunity. Candidates are allowed to repeat an examination paper only once.

The Important Instructions for the Students Who do the Examinations Out of the University Premises

The students are required to join the zoom session by two devices and present in it and switch on the video of both devices throughout the examination. The student and the surrounding should be visible via the camara of one of the devices and the computer screen where the student is doing the examination should be visible via the camera of the other device.

The students should join the zoom session at a minimum of 20 minutes prior to the examination time.

Those who join the zoom session after 15 minutes of the exam; won't be allowed to attempt the examination.

The students should rename themselves by their index number as soon as they join the Zoom session (eg: 2024FM01).

The password to the exam will be provided during the zoom session. Note that sharing this password using any mode will be regarded as an examination offense.

Microphones should be muted and switched on if it is requested by the supervisor/ invigilators. Make sure that the visibility (webcam) and audibility of Zoom are working properly for this purpose.

Communication with other candidates is strictly prohibited.

It is not allowed to wear headphones, headsets, earphones, ear buds etc.

Breaks are not allowed during the exam for any reason.

If you leave your computer during your exam, the supervisor/ invigilators will end your sessin and you will be unable to continue the exam.

No one is permitted in your work area (in the place/ room you are attempting the exam) for any reason.

You cannot speak or cover your mouth.

Your face and surroundings should be clearly visible during the examination.

Students are strongly advised to take all necessary precautionary measures to handle issues such as power failure, connectivity etc.

Scheme of Evaluation

The Grade Point Average (GPA) shall be computed using grades assigned for all papers in Part I and for Part II. The minimum grade a student should achieve to pass a paper/mini project/research component is B-.

Grade Points

The Grade Points will be assigned using the following table.

Marks Range	Grade	Grade Point
85 – 100	A+	4.00
70 – 84	A	4.00
65 – 69	A-	3.70
60 – 64	B+	3.30
55 – 59	B	3.00
50 – 54	B-	2.70
45 – 49	C+	2.30
40 – 44	C	2.00
35 – 39	C-	1.70
30 – 34	D+	1.00
25 – 29	D	1.00
00 – 24	E	0.00

GPA Calculation

If the Grade Point Average (GPA) of a student is required for any purpose, it shall be calculated using the following equation:

Where, = number of credit units and = grade points for the i^{th} courses
The GPA is rounded to the second decimal place.
Any student who has not appeared for the evaluation of a course may be assigned a GPA of 0.00 Value for such for the purpose of calculating his/her GPA.

Award of Degree

Award of Degree of Master of Science

A student who obtains a GPA of **3.00** or above for Part II may be eligible for the award of the Degree of Master of Science, provided the student fulfills other requirements as prescribed.

No student shall be entitled to the award of the Degree of Master of Science unless he/she has satisfied all the prescribed requirements and he/she has supplicated for the award of the Masters Degree at the relevant Convocation of the University of Colombo.

Award of Postgraduate Diploma

Students who obtain a GPA of **2.70** or above for Part I may be eligible for the award of the Postgraduate Diploma, where applicable, and upon request, provided the student fulfills other requirements as prescribed.

13. AWARDS AND MEDELS

Merit List

A student shall be eligible for the award of a Merit Pass in the MSc programme if

- ✓ the student successfully completed Part I and Part II within the minimum stipulated time period related to initial registration date and intake.

AND

- ✓ the student obtains an overall GPA of 3.30 or above (B+ Grade) for Parts I and Part II taken together.

AND

- ✓ the student has not repeated any course unit.

AND

- ✓ the student obtains a minimum GPV of 2.70 (B- Grade) in all courses followed in the programme.

Gold Medal for the Best Student MSc in Financial Mathematics

The Gold Medal is awarded at the annual postgraduate convocation to the student who should have,

- ✓ successfully completed the Part I and Part II and qualified for the award of the MSc in Financial Mathematics within the minimum stipulated time period related to initial registration date and intake.
- ✓ obtain the highest aggregate GPA in the batch.
- ✓ have a minimum GPA of 3.30 for Part I of the MSc at the first attempt.
- ✓ have a minimum GPA of 3.30 for Part II of the MSc.

In the case of a tie in GPA, the Weighted Average Mark shall be considered. In the case of a tie in the Weighted Average Mark, the award shall be shared.

14. CURRICULUM

Details of the Modules – Semester I

Course Code	MFM 5060			
Course Name	Ethics, Professional Practices and Consultancy in Finance			
Credit Value	4			
Core/ Optional	Compulsory Enhancement course			
Prerequisites	None			
Hourly Breakdown	Lectures	Practical	Independent Learning	Notional Hours
	60 H	-	140 H	200 H
Course Aim	To equip students with practical knowledge, professional skills, and ethical awareness required to operate effectively in the financial services industry and consultancy environments.			
Intended Learning Outcomes	By the end of the course, students should be able to CLO1: ***demonstrate*** professional conduct in financial consultancy by applying ethical standards, regulatory guidelines, and industry best practices. CLO2: ***identify*** financial, legal, and ethical considerations in consultancy and professional services. CLO3: ***demonstrate*** ethical financial practices in consultancy, including transparency and compliance. CLO4: ***adhere*** to professional codes of conduct, financial regulations, and tax obligations in consultancy. CLO5: ***recognize*** and ***address*** conflicts of interest, fraud risks, and financial misconduct in consultancy.			
Course Content	Professional Standards of Practice: Key Principles: Integrity, competence, diligence, respect, ethical leadership. Standards of Professional Conduct (7 Standards): Standard I: Professionalism (misconduct, insider trading), Standard II: Integrity of Capital Markets (market manipulation, MNPI), Standard III: Duties to Clients (loyalty, fair dealing). Ethical Practices in Finance: Ethical Decision-Making Frameworks, 5-Step Process: Identify conflicts, evaluate alternatives, act, Global Ethical Challenges, ESG misrepresentation, crypto fraud, cross-border regulatory gaps. Asset Manager Code of Professional Conduct: Principles, Loyalty to clients, transparency, risk management. Presentation of Performance Results (GIPS), Global Investment Performance Standards (GIPS), Why GIPS? Fair representation, comparability. Workshop: Calculate compliant composite returns (Python).			
Teaching/ Learning Methods	Workshops, Seminars, Individual Discussions, Group Discussions, Case Studies, Presentations, VLE, Group Activities, Independent Learning Activities, Industry Visits, Invited Talks			
Method/s of Evaluation	Continuous Assessment 100%	End Semester Examination -		
	Case Studies (CLO 1,2,3,4,5) Seminars (CLO 1,2,3,4,5) Presentations (CLO 1,2,3,4,5) Summary Reports (CLO 1,2,3,4,5) Case Review Reports (CLO 3,4,5)	Theory -	Practical -	Others -
Recommended Reading	1. Standards of Practice Handbook (2024), CFA Institute, 12th edition. 2. Ethics in Practice: Ethics in Investment Management Casebook (2019), CFA Institute, 2nd edition. 3. Hendry J. (2013). Ethics and finance. Cambridge University Press.			

<table>
<tr><td>Course Code</td><td colspan="4">MFM 5061</td></tr>
<tr><td>Course Name</td><td colspan="4">Economics for Finance</td></tr>
<tr><td>Credit Value</td><td colspan="4">2</td></tr>
<tr><td>Core/ Optional</td><td colspan="4">Core</td></tr>
<tr><td>Prerequisites</td><td colspan="4">None</td></tr>
<tr><td rowspan="2">Hourly Breakdown</td><td>Lectures</td><td>Practical</td><td>Independent Learning</td><td>Notional Hours</td></tr>
<tr><td>20 H</td><td>20 H</td><td>60 H</td><td>100 H</td></tr>
<tr><td>Course Aim</td><td colspan="4">To provide students with a strong foundation in economic principles and their application to financial markets, institutions, and decision-making. The course explores key macroeconomic and microeconomic concepts relevant to finance</td></tr>
<tr><td>Intended Learning Outcomes</td><td colspan="4">By the end of the course, students should be able to
● CLO1: identify the function of market and prices as allocated mechanisms
● CLO2: apply the concept of equilibrium to both microeconomics and macroeconomics
● CLO3: discuss and analyze the application of marginal analysis
● CLO4: assess the role of the factor market in determining the allocation of resources</td></tr>
<tr><td>Course Content</td><td colspan="4">The theory of individual choice, Contingent commodities, The firm and its goal, industry organization, Production and costs, Demand and supply for factors and equilibrium in the factor market, Business Cycle, Inflation and Deflation, International Trade and Capital Flows, Currency Exchange Rates, Monetary System, Monetary and Fiscal Policy, Economic Growth and Development, Effects of Regulations, Effects of Geopolitics on Economies and Investment Markets, Applications of Economic Indicators in the Investment Process, Economic Analysis and Setting Capital Market Expectations.</td></tr>
<tr><td>Teaching/ Learning Methods</td><td colspan="4">Lectures, Tutorial Discussions, Problem related Discussions (Quizzes, In-class Assessment Discussions), Case Studies, Presentations, VLE, Group Activities, Independent Learning Activities</td></tr>
<tr><td rowspan="2">Method/s of Evaluation</td><td>Continuous Assessment 20%</td><td colspan="3">End Semester Examination
80 %</td></tr>
<tr><td>Quizzes (CLO 1,2,3), In class examination (CLO 1,2,3,4), Case Studies (CLO 1,2,3,4)</td><td>Theory
40%</td><td>Practical
20%</td><td>Presentation / Oral
20%</td></tr>
<tr><td>Recommended Reading</td><td colspan="4">4. Katz ML, Rosen HS (2005), Microeconomics, McGraw-Hill Education
5. Mankiw NG (2010), Macroeconomics, Worth Publishers, NY.</td></tr>
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<table>
<tr><td>Course Code</td><td colspan="4">MFM 5062</td></tr>
<tr><td>Course Name</td><td colspan="4">Financial Statement Analysis</td></tr>
<tr><td>Credit Value</td><td colspan="4">2</td></tr>
<tr><td>Core/ Optional</td><td colspan="4">Core</td></tr>
<tr><td>Prerequisites</td><td colspan="4">None</td></tr>
<tr><td rowspan="2">Hourly Breakdown</td><td>Lectures</td><td>Practical</td><td>Independent Learning</td><td>Notional Hours</td></tr>
<tr><td>20 H</td><td>20 H</td><td>60 H</td><td>100 H</td></tr>
<tr><td>Course Aim</td><td colspan="4">To equip students with the skills to interpret, analyze, and evaluate financial statements for informed decision-making in investing, lending, and corporate finance. The course covers key techniques for assessing a company’s financial health, profitability, liquidity, solvency, and operational efficiency through balance sheets, income statements, and cash flow statements.</td></tr>
<tr><td>Intended Learning Outcomes</td><td colspan="4">By the end of the course, students should be able to
● CLO1: demonstrate the ability to read and interpret statements and assess a company’s financial position and performance.
● CLO2: use financial ratios for trend analysis and evaluate a firm’s operational results and compare it with industry benchmarks.
● CLO3: synthesize financial analysis findings and judge strategic business decisions, while considering ethical and regulatory frameworks.</td></tr>
<tr><td>Course Content</td><td colspan="4">Financial statements and the components, Financial Reporting tools, Statement analysis, Importance and limitations of financial statement analysis, Uses and user groups, Sources of information, Tools and techniques of financial statement analysis, Financial Ratios and Analysis, Develop Financial Models based on information, different types of statements analysis: Off-Balance-Sheet Assets and Liabilities, Analysis of Off-Balance-Sheet Assets and Liabilities, Analysis of Pensions, Stock Compensation, and Other Employee Benefits, Analysis of Inter-Corporate Investments, Analysis of Business Combinations Financial statement irregularities, Case Studies on analysis in different sectors: Banks, Insurance Companies, Listed sectors in Share markets.</td></tr>
<tr><td>Teaching/ Learning Methods</td><td colspan="4">Lectures, Group Discussions, Practical Sessions, Problem related Discussions (Quizzes, In-class Assessment Discussions), Case Studies, Presentations, VLE, Group Activities, Independent Learning Activities</td></tr>
<tr><td rowspan="2">Method/s of Evaluation</td><td>Continuous Assessment 20%</td><td colspan="3">End Semester Examination 80%</td></tr>
<tr><td>Quizzes (CLO 1,2,3) Case Studies (CLO 1,2,3)</td><td>Theory 30%</td><td>Practical 30%</td><td>Oral 20%</td></tr>
<tr><td>Recommended Reading</td><td colspan="4">1. Temte A, Temte A (2003). Financial Statement Analysis. Chicago: Dearborn Trade, A Kaplan Professional Company.
2. Fridson M, Alvarez F (2011). Financial statement analysis: a practitioner’s guide, fourth edition (4th ed.). Hoboken, N.J: John Wiley & Sons.</td></tr>
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<table>
<tr><td>Course Code</td><td colspan="4">MFM 5063</td></tr>
<tr><td>Course Name</td><td colspan="4">Quantitative Methods with Python</td></tr>
<tr><td>Credit Value</td><td colspan="4">2</td></tr>
<tr><td>Core/ Optional</td><td colspan="4">Core</td></tr>
<tr><td>Prerequisites</td><td colspan="4">None</td></tr>
<tr><td rowspan="2">Hourly Breakdown</td><td>Lectures</td><td>Practical</td><td>Independent Learning</td><td>Notional Hours</td></tr>
<tr><td>20 H</td><td>20 H</td><td>60 H</td><td>100 H</td></tr>
<tr><td>Course Aim</td><td colspan="4">To equip students with essential quantitative techniques and programming skills in Python for data-driven financial analysis and decision-making. The course covers statistical methods and financial modeling, with a strong emphasis on practical implementation using Python.</td></tr>
<tr><td>Intended Learning Outcomes</td><td colspan="4">By the end of the course, students should be able to
CLO1: describe quantitative methods & visualization tools for data analytics and use Python to implement.
CLO2: organize probability distributions and data analytics tools,
apply them for financial data analytics
CLO3: use Python and simulate financial data and probability distributions</td></tr>
<tr><td>Course Content</td><td colspan="4">Review of Statistics, Descriptive Statistics and Data Visualization, , random variables, univariate and multivariate probability distributions-continuous and discrete, expectation-conditional and unconditional, variance, covariance, variance-covariance matrices, correlation, random matrices, sampling and estimation, confidence intervals, F-test, t-Test, Chi-Squared Test, Python basics, descriptive and inferential statistics, data visualization, probability distributions, hypothesis testing, and regression analysis, using libraries like Pandas, NumPy, and SciPy.</td></tr>
<tr><td>Teaching/ Learning Methods</td><td colspan="4">Lectures, Practical Sessions, Problem related Discussions (Quizzes, In-class Assessment Discussions), Case Studies, Presentations, VLE, Group Activities, Independent Learning Activities</td></tr>
<tr><td rowspan="2">Method/s of Evaluation</td><td colspan="2">Continuous Assessment
20 %</td><td colspan="2">End Semester Examination
80%</td></tr>
<tr><td colspan="2">Quizzes (CLO 1,2) practical examination (CLO 2,3),</td><td colspan="2">Theory 20%   Practical 40%   Oral 20%</td></tr>
<tr><td>Recommended Reading</td><td colspan="4">Hans Petter Langtangen (2016), A Primer on Scientific Programming with Python, 5th edition, Springer Nature.
Franke J, Härdle WK, Hafner CM (2004), Statistics of financial markets, Vol. 2, Berlin: Springer.
2. Unpingco J (2016), Python for probability, statistics, and machine learning, Volume 1, Cham, Switzerland: Springer International Publishing.</td></tr>
</table>

<table>
<tr><td>Course Code</td><td colspan="4">MFM 5064</td></tr>
<tr><td>Course Name</td><td colspan="4">Investment Analysis</td></tr>
<tr><td>Credit Value</td><td colspan="4">3</td></tr>
<tr><td>Core/ Optional</td><td colspan="4">Core</td></tr>
<tr><td>Prerequisites</td><td colspan="4">None</td></tr>
<tr><td rowspan="2">Hourly Breakdown</td><td>Lectures</td><td>Practical</td><td>Independent Learning</td><td>Notional Hours</td></tr>
<tr><td>30 H</td><td>30 H</td><td>90 H</td><td>150 H</td></tr>
<tr><td>Course Aim</td><td colspan="4">To provide students with a comprehensive framework for evaluating investment opportunities across various asset classes, including alternative investments. The course integrates theoretical principles with practical tools to analyze risk-return trade-offs, and valuation techniques, enabling informed investment decision-making in dynamic financial markets.</td></tr>
<tr><td>Intended Learning Outcomes</td><td colspan="4">By the end of the course, students should be able to
● CLO1: identify and apply appropriate valuation methods and Compute the time value of the money in different cash-flows
● CLO2: value the different cash flows
● CLO3: apply techniques and price the financial instrument
● CLO4: use techniques and make comparisons among real projects and judge the feasibility of them</td></tr>
<tr><td>Course Content</td><td colspan="4">Time Value concepts and money valuation, The effective rate of interest, the real rate of interest, the force of interest, nominal rates of interest, the rate of discount, Time value of lump sum, series of cash flow, valuing simple projects, principle of investment analysis, Capital Budgeting, NPV, IRR, PI, Discounted Pay Back Period, Loan Repayment methods and financial instrument and their behavioral properties, introduction to fixed income securities, fund analysis, Money weighted rate and Time weighted rate, Case Studies on Alternative investment methods, Real Estate, Real Assets, Private Capital, Alternative investments Portfolio.</td></tr>
<tr><td>Teaching/ Learning Methods</td><td colspan="4">Lectures, Practical Classes, Problem related Discussions (Quizzes, In-class Assessment Discussions), Case Studies, Presentations, Group Assignments, Group Presentations, VLE, Independent Learning Activities</td></tr>
<tr><td rowspan="2">Method/s of Evaluation</td><td>Continuous Assessment
20 %</td><td colspan="3">End Semester Examination
80%</td></tr>
<tr><td>Practical Examinations (CLO 1,2,3), Quizzes (CLO 1,2,3), Case Studies (CLO 1,2,3,4)</td><td>Theory
40%</td><td>Practical
20%</td><td>Oral
20%</td></tr>
<tr><td>Recommended Reading</td><td colspan="4">1. Ross, SA, Westerfield, RW, Jordan, BD, (2002), Fundamentals of Corporate Finance, 8th edition, McGraw-Hill Publishing Company.
2. Kellison, SG, (2008), The Theory on Interest, 6th Edition, Richard D. Irwin Inc.
3. Marek Capinski and Tomasz Zastawniak (2003), Mathematics for Finance, An introduction to Financial Engineering, Springer-Verlag London Limited.</td></tr>
</table>

<table>
<tr><td>Course Code</td><td colspan="4">MFM 5065</td></tr>
<tr><td>Course Name</td><td colspan="4">Financial Derivative Analysis</td></tr>
<tr><td>Credit Value</td><td colspan="4">3</td></tr>
<tr><td>Core/ Optional</td><td colspan="4">Core</td></tr>
<tr><td>Prerequisites</td><td colspan="4">None</td></tr>
<tr><td rowspan="2">Hourly Breakdown</td><td>Lectures</td><td>Practical</td><td>Independent Learning</td><td>Notional Hours</td></tr>
<tr><td>30H</td><td>30 H</td><td>90 H</td><td>150 H</td></tr>
<tr><td>Course Aim</td><td colspan="4">To provide students with a rigorous understanding of financial derivatives, their pricing mechanisms, and their applications in risk management and speculative strategies. The course will examine forward contracts, futures, options, and swaps, equipping students with both theoretical knowledge and practical skills to analyze, price, and utilize these instruments effectively in financial markets.</td></tr>
<tr><td>Intended Learning Outcomes</td><td colspan="4">By the end of the course, students should be able to
• CLO1: interpret financial derivatives and value them
• CLO2: apply appropriate techniques and value the risk levels of the products
• CLO3: design financial products for risk market
• CLO4: build simple portfolio for risk management</td></tr>
<tr><td>Course Content</td><td colspan="4">Introduction to derivatives and markets, complete market, Market risk and credit risks in the use of derivatives. American and European options, Types of Trades, Hedgers, Speculators and arbitrageurs, Hedging with derivatives, Factors affecting option prices, Strategies with options, Boundaries with options, One-step Binomial Models, Risk Neutral valuation, Two-Step Binomial trees, Exotic and path dependent options, Valuation of Swap Contracts, Forward and Future Contracts, Futures and forward pricing, Hedging with futures, Options on stock indices, currencies and futures, evaluation of future options using a binomial tree, Options on stock indices, currencies and futures, Portfolio management of derivatives.</td></tr>
<tr><td>Teaching/ Learning Methods</td><td colspan="4">Lectures, Practical Classes, Problem related Discussions (Quizzes, In-class Assessment Discussions), Case Studies, Presentations, Group Assignments, Group Presentations, VLE, Independent Learning Activities</td></tr>
<tr><td rowspan="2">Method/s of Evaluation:</td><td colspan="2">Continuous Assessment
20 %</td><td colspan="2">End Semester Examination
80%</td></tr>
<tr><td colspan="2">Practical Examinations (CLO 1,2,3), Quizzes (CLO 1,2,3), Case Studies (CLO 1,2,3,4)</td><td>Theory
40%</td><td>Practical
20%
Oral
20%</td></tr>
<tr><td>Recommended Reading</td><td colspan="4">1. Hull John (2008), Options, futures and other derivatives, International 7th Edn, Pearson Prentice Hall.
2. Ross S (2003), Introduction to Mathematical Finance, Cambridge University Press.
3. Marek Capinski, Tomasz Zastawniak (2011), Mathematics for Finance: An Introduction to Financial Engineering, Springer.</td></tr>
</table>

<table>
<tr><td>Course Code</td><td colspan="4">MFM 5066</td></tr>
<tr><td>Course Name</td><td colspan="4">Equity Market Analysis and Corporate Strategies</td></tr>
<tr><td>Credit Value</td><td colspan="4">2</td></tr>
<tr><td>Core/ Optional</td><td colspan="4">Core</td></tr>
<tr><td>Prerequisites</td><td colspan="4">None</td></tr>
<tr><td rowspan="2">Hourly Breakdown</td><td>Lectures</td><td>Practical</td><td>Independent Learning</td><td>Notional Hours</td></tr>
<tr><td>20H</td><td>20 H</td><td>60 H</td><td>100 H</td></tr>
<tr><td>Course Aim</td><td colspan="4">To provide students with an in-depth understanding of equity market dynamics and their interplay with corporate decision-making. The program integrates financial theory with practical analytical tools to evaluate stock performance, assess corporate strategies, and understand how companies create shareholder value in competitive markets.</td></tr>
<tr><td>Intended Learning Outcomes</td><td colspan="4">By the end of the course, students should be able to
● CLO1: interpret equity products and markets.
● CLO2: apply appropriate techniques and value the risk levels of equity products
● CLO3: build equity portfolios
● CLO4: describe and compare corporate issues, their impact and limitations</td></tr>
<tr><td>Course Content</td><td colspan="4">Part I: Introduction to equity securities and markets, nature of equity markets, fundamental equity analysis, valuation models for equity securities, risk analysis of equity securities, Equity portfolio construction and management Part II: Case studies on Corporate Structures and Strategies, Risk factors and their impact, Corporate Financing Decisions and limitations.</td></tr>
<tr><td>Teaching/ Learning Methods</td><td colspan="4">Lectures, Practical Classes, Problem related Discussions (Quizzes, In-class Assessment Discussions), Case Studies, Presentations, Group Assignments, Group Presentations, VLE, Independent Learning Activities, Workshops, Seminars</td></tr>
<tr><td rowspan="2">Method/s of Evaluation</td><td>Continuous Assessment
20 %</td><td colspan="3">End Semester Examination
80%</td></tr>
<tr><td>Quizzes (CLO 1,2), Practical examinations (CLO 3)
Case Studies (CLO 4)</td><td>Theory
30%</td><td>Practical
30%</td><td>Seminar/ viva
20%</td></tr>
<tr><td>Recommended Reading</td><td colspan="4">1. Kent Bake H., Greg Filbeck, Halil Kiymaz (2020), Equity Markets, Valuation, and Analysis, Wiley Finance Series.
2. Robert A. G. Monks, Alexandra Reed Lajoux, Dean LaBaron (2010), Corporate Valuation for Portfolio Investment: Analyzing Assets, Earnings, Cash Flow, Stock Price, Governance, and Special Situations, Wiley Investment Analysis.</td></tr>
</table>

Details of the Modules – Semester II

<table>
<tr><td>Course Code</td><td colspan="4">MFM 5067</td></tr>
<tr><td>Course Name</td><td colspan="4">Fixed Income Analytics</td></tr>
<tr><td>Credit Value</td><td colspan="4">2</td></tr>
<tr><td>Core/ Optional</td><td colspan="4">Core</td></tr>
<tr><td>Prerequisites</td><td colspan="4">MFM 5064, MFM 5065</td></tr>
<tr><td rowspan="2">Hourly Breakdown</td><td>Lectures</td><td>Practical</td><td>Independent Learning</td><td>Notional Hours</td></tr>
<tr><td>20H</td><td>20 H</td><td>60 H</td><td>100 H</td></tr>
<tr><td>Course Aim</td><td colspan="4">To provide students with a comprehensive understanding of fixed income securities, their valuation, risk assessment, and portfolio management techniques. The course covers key concepts such as bond pricing, yield curve analysis, duration, convexity, credit risk, and interest rate modeling.</td></tr>
<tr><td>Intended Learning Outcomes</td><td colspan="4">By the end of the course, students should be able to
● CLO1: interpret fixed income securities and their properties.
● CLO2: apply appropriate techniques and value the fixed income securities
● CLO3: build bond portfolios
● CLO4: compare different bond portfolios and design best strategies</td></tr>
<tr><td>Course Content</td><td colspan="4">Types of bons and bond markets, fundamental analysis of fixed income analysis, Zero coupon bonds and their features, Term Structure of the interest rate, par yield, spot rates, forward rates, yield rate, Yield curve, Pricing the fixed income securities, Bond Dynamics, duration and convexity of the bond, Interest rate and credit risk analysis, Valuing Bonds with Embedded Options, Structured Products, Bond Portfolio Management, Case Studies on Computational methods for bond pricing, risk analysis and construction of bond portfolio.</td></tr>
<tr><td>Teaching/ Learning Methods</td><td colspan="4">Lectures, Practical Classes, Problem related Discussions (Quizzes, In-class Assessment Discussions), Case Studies, Presentations, Group Assignments, Group Presentations, VLE, Independent Learning Activities, Workshops, Seminars</td></tr>
<tr><td rowspan="2">Method/s of Evaluation</td><td colspan="2">Continuous Assessment
20 %</td><td colspan="2">End Semester Examination
80%</td></tr>
<tr><td colspan="2">Quizzes (CLO 1,2),
Practical examinations (CLO 3,4)
Case Studies (CLO 1,2,3,4)</td><td>Theory
30%</td><td>Practical
30%
Seminar / Viva
20%</td></tr>
<tr><td>Recommended Reading</td><td colspan="4">1. Frank J Fabozzi (2005), The Handbook of Fixed Income Securities, McGraw-Hill.
2. Bruce Tuckman, Angel Serrat (2022), Fixed Income Securities: Tools for Today's Markets, Wiley Finance Series.</td></tr>
</table>

<table>
<tr><td>Course Code</td><td colspan="4">MFM 5068</td></tr>
<tr><td>Course Name</td><td colspan="4">Portfolio Optimization</td></tr>
<tr><td>Credit Value</td><td colspan="4">2</td></tr>
<tr><td>Core/ Optional</td><td colspan="4">Core</td></tr>
<tr><td>Prerequisites</td><td colspan="4">MFM 5064, MFM 5065, MFM 5066</td></tr>
<tr><td rowspan="2">Hourly Breakdown</td><td>Lectures</td><td>Practical</td><td>Independent Learning</td><td>Notional Hours</td></tr>
<tr><td>20H</td><td>20 H</td><td>60 H</td><td>100 H</td></tr>
<tr><td>Course Aim</td><td colspan="4">To equip students with the theoretical foundations and practical tools required to construct, analyze, and optimize investment portfolios. The course covers modern portfolio theory (MPT), risk-return trade-offs, asset allocation strategies, and advanced optimization techniques.</td></tr>
<tr><td>Intended Learning Outcomes</td><td colspan="4">By the end of the course, students should be able to
● CLO1: interpret modern portfolio concepts.
● CLO2: apply appropriate techniques and build portfolios.
● CLO3: compare and value the different types of risk factors
● CLO4: build different portfolios and compare optimizations strategies.</td></tr>
<tr><td>Course Content</td><td colspan="4">The Investment Policy Statement, Modern Portfolio Management Concepts, Investment Vehicles (including ETFs and Mutual Funds), Market Efficiency and Passive Investing, Market Indexes, Technical Analysis, Environmental, Social, and Governance (ESG) Investing, Tax Impact of Investment Decisions, Management of Institutional Investor Portfolios, Asset Allocation, Portfolio Construction and Revision, Currency Management, Liability – Driven Investments (including Asset Liability Management and Goal-Based Investing), Risk Management (including environmental risk).</td></tr>
<tr><td>Teaching/ Learning Methods</td><td colspan="4">Lectures, Practical Classes, Problem related Discussions (Quizzes, In-class Assessment Discussions), Case Studies, Presentations, Group Assignments, Group Presentations, VLE, Independent Learning Activities, Workshops, Seminars</td></tr>
<tr><td rowspan="2">Method/s of Evaluation:</td><td>Continuous Assessment
20 %</td><td colspan="3">End Semester Examination
80%</td></tr>
<tr><td>Quizzes (CLO 1,2),
Practical examinations (CLO 3,4)
Case Studies (CLO 1,2,3,4)</td><td>Theory
30%</td><td>Practical
30%</td><td>Seminar/ Viva
20%</td></tr>
<tr><td>Recommended Reading</td><td colspan="4">1. Daniel P. Palomar (2025), Portfolio Optimization: Theory and Application, Cambridge University Press.
2. Dany Cajas (2025), Advanced Portfolio Optimization: A Cutting-edge Quantitative Approach, Springer.</td></tr>
</table>

Financial Analysis Path

<table>
<tr><td>Course Code</td><td colspan="5">MFM 5069</td></tr>
<tr><td>Course Name</td><td colspan="5">Quantitative Finance</td></tr>
<tr><td>Credit Value</td><td colspan="5">3</td></tr>
<tr><td>Core/ Optional</td><td colspan="5">Option</td></tr>
<tr><td>Prerequisites</td><td colspan="5">MFM 5063</td></tr>
<tr><td rowspan="2">Hourly Breakdown</td><td>Lectures</td><td>Practical</td><td colspan="2">Independent Learning</td><td>Notional Hours</td></tr>
<tr><td>30 H</td><td>30 H</td><td colspan="2">90 H</td><td>150 H</td></tr>
<tr><td>Course Aim</td><td colspan="5">To provide quantitative methods which include statistical/machine learning/deep learning methods to model finance and to draw quantitative financial discussions.</td></tr>
<tr><td>Intended Learning Outcomes</td><td colspan="5">By the end of the course, students should be able to
● CLO1: apply time series techniques for pattern recognition
● CLO2: apply appropriate models and analyze financial data
● CLO3: apply machine learning and deep-learning mechanism for modeling financial data
● CLO4: use advance data analytics strategies and make quantitative finance decision</td></tr>
<tr><td>Course Content</td><td colspan="5">Introduction to Financial Time Series: Non-stationarity, volatility clustering, fat tails. Autocorrelation, seasonality, structural breaks. Exploratory Analysis & Visualization, Techniques: Rolling statistics (mean, volatility). Candlestick charts, volume analysis. Correlation analysis (cross-asset, lead-lag). Applications: Identifying trends, regime shifts. Stationarity & Unit Root Tests, Augmented Dickey-Fuller (ADF), KPSS, Phillips-Perron., Differencing, log returns, Box-Cox. Linear Time Series Models, ARIMA/SARIMA (forecasting). VAR (multivariate dependencies)., Applications: Predicting GDP growth, inflation. Volatility Modeling, GARCH (Bollerslev), EGARCH (Nelson), stochastic volatility. Extensions: Multivariate GARCH (DCC, BEKK), Applications: VaR estimation, option pricing. State-Space Models & Kalman Filter, Hidden Markov models (HMMs). Dynamic hedge ratios, pairs trading. High-Frequency Data Analysis, Microstructure noise, order book dynamics. Realized volatility (RV), Introduction to Machine Learning, Introduction to Deep Learning, Machine Learning for Time Series Methods: LSTMs, Transformers (attention mechanisms). Feature engineering (technical indicators).</td></tr>
<tr><td>Teaching/ Learning Methods</td><td colspan="5">Lectures, Practical Sessions, Problem-related Discussions (Quizzes, In-class Assessment Discussions), Case Studies, Presentations, Group discussions, Seminars.</td></tr>
<tr><td rowspan="2">Method/s of Evaluation</td><td>Continuous Assessment
20 %</td><td colspan="4">End Semester Examination
80%</td></tr>
<tr><td>Quizzes (CLO 1,2,3,4), In class examination (CLO 1,2,3,4), Practical examination (CLO 3,4),</td><td>Theory
30%</td><td>Practical
30%</td><td colspan="2">Oral
20%</td></tr>
<tr><td>Recommended Reading</td><td colspan="5">1. Tsay RS (2010), Analysis of Financial Time Series, Hoboken, New Jersey: John Wiley & Sons.
2. Alan J. Izenman (2008), Modern Multivariate Statistical Techniques, Springer.
3. Jay L. Devore and Kenneth N. Berk (2012), Modern Mathematical Statistics with Applications, Springer.</td></tr>
</table>

<table>
<tr><td>Course Code</td><td colspan="4">MFM 5070</td></tr>
<tr><td>Course Name</td><td colspan="4">Behaviral Finance</td></tr>
<tr><td>Credit Value</td><td colspan="4">2</td></tr>
<tr><td>Core/ Optional</td><td colspan="4">Core</td></tr>
<tr><td>Prerequisites</td><td colspan="4">None</td></tr>
<tr><td rowspan="2">Hourly Breakdown</td><td>Lectures</td><td>Practical</td><td>Independent Learning</td><td>Notional Hours</td></tr>
<tr><td>20 H</td><td>20 H</td><td>60 H</td><td>100 H</td></tr>
<tr><td>Course Aim</td><td colspan="4">To explore how psychological factors and cognitive biases influence financial decision-making, market dynamics, and asset pricing. Moving beyond traditional finance theories that assume rational behavior, this course examines real-world deviations caused by human emotions, heuristics, and irrationality.</td></tr>
<tr><td>Intended Learning Outcomes</td><td colspan="4">By the end of the course, students should be able to
● CLO1: analyze how psychological factors affect investor decisions and lead to market
● CLO2: compare traditional finance models with behavioral approaches and apply behavioral insights to investment strategies, including contrarian investing, sentiment analysis, and adaptive asset allocation
● CLO3: assess the role of institutional and retail investor behavior in shaping market trends and corporate financial decisions and develop strategies to mitigate behavioral biases</td></tr>
<tr><td>Course Content</td><td colspan="4">Introduction to Behavioral Finance: How does psychology challenge the "rational investor" assumption? Contrast with traditional finance (EMH, CAPM). Cognitive Biases: Overconfidence, confirmation bias, anchoring. Prospect Theory & Loss Aversion: Loss aversion vs. risk aversion. Framing effects (e.g., "95% survival" vs. "5% mortality"). Heuristics & Market Anomalies: Representativeness (hot-hand fallacy), availability. Anomalies: January effect, momentum vs. reversal. Herding & Bubbles: Dot-com bubble, GameStop short squeeze. Neuro-finance & Emotions: Role of dopamine in trading, "fear index". Behavioral Portfolio Theory: Mental Accounting, Applications: Robo-advisors (nudging behavior). Nudges & Policy: Nudge Theory (Thaler), Default options in retirement plans.</td></tr>
<tr><td>Teaching/ Learning Methods</td><td colspan="4">Lectures, Problem related Discussions (Quizzes, In-class Assessment Discussions), Case Studies, Presentations, Group Discussions. Interactive Sessions, Workshops, Seminars, Industry Visits</td></tr>
<tr><td rowspan="2">Method/s of Evaluation</td><td>Continuous Assessment
20 %</td><td colspan="3">End Semester Examination
80%</td></tr>
<tr><td>Quizzes (CLO 1,2)
Case Studies (1,2,3)</td><td>Theory
30%</td><td>Practical
30%</td><td>Seminar / Viva
20%</td></tr>
<tr><td>Recommended Reading</td><td colspan="4">1. Meir Statman (2019), Behavioral Finance: The Second Generation, CFA Institute Research Foundation.
2. Lucy Ackert, Richard Deaves (2009), Behavioral Finance: Psychology, Decision-Making, and Markets, Cengage Learning.</td></tr>
</table>

<table>
<tr><td>Course Code</td><td colspan="5">MFM 5071</td></tr>
<tr><td>Course Name</td><td colspan="5">Computational Financial Analytics</td></tr>
<tr><td>Credit Value</td><td colspan="5">2</td></tr>
<tr><td>Core/ Optional</td><td colspan="5">Optional</td></tr>
<tr><td>Prerequisites</td><td colspan="5">MFM 5067, MFM 5068, MFM 5069, MFM 5070</td></tr>
<tr><td rowspan="2">Hourly Breakdown</td><td>Lectures</td><td>Practical</td><td colspan="2">Independent Learning</td><td>Notional Hours</td></tr>
<tr><td>-</td><td>60 H</td><td colspan="2">40 H</td><td>100 H</td></tr>
<tr><td>Course Aim</td><td colspan="5">To provide students with advanced computational techniques and quantitative tools to model, analyze, and solve complex financial problems. By integrating programming, data science, and financial theory, the course prepares participants to implement data-driven solutions for trading, risk management, and investment strategies.</td></tr>
<tr><td>Intended Learning Outcomes</td><td colspan="5">By the end of the course, students should be able to
• CLO1: apply quantitative methods and computational techniques to financial data
• CLO2: analyze scenarios and judge the current patterns
• CLO3: prioritize conditions / methods and apply different real cases
• CLO4: value the given situation based on available conditions / limitations
• CLO5: communicate and present findings
• CLO6: write a report</td></tr>
<tr><td>Course Content</td><td colspan="5">Developing computational models covering the following areas:
• Financial Time Series Analysis: Predicting Stock Returns with ARIMA vs. LSTM, Volatility Clustering & GARCH, Dynamic VaR for crypto portfolios.
• Behavioral Finance in Action: Overconfidence in Earnings Forecasts
• Portfolio Management: Black-Litterman for ESG Portfolios, Risk Parity in Crisis Periods
• Fixed Income Securities: Yield Curve Inversion & Recession Signals
• Mortgage-Backed Securities (MBS) & Prepayment Risk: Simulate cash flows under rate shocks.</td></tr>
<tr><td>Teaching/ Learning Methods</td><td colspan="5">Lectures, Practical Sessions, Problem-related Discussions (Quizzes, In-class Assessment Discussions), Case Studies, Presentations, Group Discussions, Group Presentations, Industry visits, Workshops, Seminars</td></tr>
<tr><td rowspan="2">Method/s of Evaluation</td><td colspan="2">Continuous Assessment
20 %</td><td colspan="3">End Semester Examination
80%</td></tr>
<tr><td colspan="2">Quizzes (CLO 1,2,3), Case Studies (CLO 1,2,3,4,5,6)</td><td>Theory
-</td><td>Practical
40%</td><td>Seminar / Oral / Viva
40%</td></tr>
<tr><td>Recommended Reading</td><td colspan="5">1. Michael Doumpos, Constantin Zopounidis (2015), Computational Data Analysis Techniques in Economics and Finance (Studies in Financial Optimization and Risk Management), Nova Science Pub Inc.
2. Chiradeep Chatterjee (2008), Case Studies on Financial Markets, The Institute of Chartered Financial Analysts of India.
3. Tarika Sikarwar (2017), A Handbook of Case Studies in Finance, Cambridge Scholars Publishing.
4. Robert F. Bruner, Kenneth Eades, Michael Schill (2009), Case Studies in Finance, McGraw-Hill Higher Education.</td></tr>
</table>

Financial Engineering Path

Course Code	MFM 5072
Course Name	Financial Econometrics
Credit Value	3
Core/ Optional	Option
Prerequisites	MFM 5063
Hourly Breakdown	Lectures: 30 H; Practical: 30 H; Independent Learning: 90 H; Notional Hours: 150 H
Course Aim	To bridge the gap between theoretical econometric models and their practical applications in finance. Through real-world case studies, students will learn how to apply econometric techniques to analyze financial data, test economic hypotheses, and forecast market behavior.
Intended Learning Outcomes	By the end of the course, students should be able to • CLO1: ***estimate*** linear / non-linear relationships among financial variables and ***derive*** conclusions based on estimated models • CLO2***: model*** and ***forecast*** univariate and multivariate financial time series • CLO3: ***model*** and ***asses*** financial volatility • CLO4: ***design*** machine learning and artificial intelligence models and ***judge*** the financial feasibility
Course Content	Statistical Properties of Financial Returns, Regression analysis and Applications in Finance, Maximum Likelihood Estimation, Univariate Time Series and Applications to Finance, Vector Autoregressive Models and Cointegration, Modelling Volatility – Conditional Heteroscedastic Models, Modelling Volatility and Correlations – Multivariate GARCH Models. Introduction to MachineLearning, Supervised Learning Algorithms, Unsupervised Learning Algorithms, Reinforcement Learning Algorithms. Introduction to Deep Learning. ANN models and applications in Finance, RNN and LSTM with application in Finance.
Teaching/ Learning Methods	Lectures, Practical Sessions, Problem related Discussions (Quizzes, In-class Assessment Discussions), Case Studies, Presentations, Group Discussions, Workshops, Seminars
Method/s of Evaluation	Continuous Assessment 20 %: Quizzes (CLO 1,2,3) Practical examination (CLO 1,2,3,4), Case Studies (CLO 1, 2,3,4) End Semester Examination 80%: Theory 30%; Practical 30%; Seminar / Viva 20%
Recommended Reading	1. Brooks C (2019), Introductory Econometrics for Finance, 4th Edition, Cambridge University Press. 2. Alexander C (2001). Market Models: A Guide to Financial Data Analysis. John, Wiley & Sons. Perry H. Beaumont (2004), Financial Engineering Principles: A Unified Theory for Financial Product Analysis and Valuation, John Wiley & Sons, Inc.

<table>
<tr><td>Course Code</td><td colspan="4">MFM 5073</td></tr>
<tr><td>Course Name</td><td colspan="4">Financial Simulations</td></tr>
<tr><td>Credit Value</td><td colspan="4">2</td></tr>
<tr><td>Core/ Optional</td><td colspan="4">Option</td></tr>
<tr><td>Prerequisites</td><td colspan="4">MFM 5063</td></tr>
<tr><td rowspan="2">Hourly Breakdown</td><td>Lectures</td><td>Practical</td><td>Independent Learning</td><td>Notional Hours</td></tr>
<tr><td>-</td><td>60 H</td><td>40 H</td><td>100 H</td></tr>
<tr><td>Course Aim</td><td colspan="4">To provide students with hands-on experience in designing, implementing, and interpreting financial simulations to model complex financial systems and decision-making scenarios.</td></tr>
<tr><td>Intended Learning Outcomes</td><td colspan="4">By the end of the course, students should be able to
● CLO1: design and Implement Financial Simulations
● CLO2: analyze Risk and Uncertainty in Financial Markets
● CLO3: develop Financial Strategies Using Computational Tools
● CLO4: communicate Simulation Results</td></tr>
<tr><td>Course Content</td><td colspan="4">Introduction to Financial Simulations: Role of simulations in finance (vs. closed-form solutions). Applications: Option pricing, risk management, portfolio optimization. CFA Link: Quantitative Methods (Level II), Risk Management (Level III). Monte Carlo Simulation: Basics: Random sampling, LLN, CLT., Applications: Option pricing (European/American, path-dependent options), VaR/CVaR estimation. Project valuation (real options). Variance reduction (antithetic variates, control variates). Quasi- Monte Carlo (low-discrepancy sequences). Markov Chain Monte Carlo (MCMC): Bayesian inference for financial models. Estimating posterior distributions (e.g., stochastic volatility models). Simulated Annealing (SA): Concept: Global optimization inspired by thermodynamics. Applications: Portfolio optimization (non-convex problems). Calibration of complex models (e.g., Heston). Bootstrapping & Resampling Methods: Non- parametric VaR/ES estimation. Stress testing (historical/filtered bootstrap). Agent-Based Modeling (ABM): Simulating market microstructure, herd behavior. Use Case: Flash crash analysis. Random Cash Flow Analysis Implementation in Python.</td></tr>
<tr><td>Teaching/ Learning Methods</td><td colspan="4">Lectures, Practical Sessions, Problem related Discussions (Quizzes, In- class Assessment Discussions), Case Studies, Presentations, Group Discussions, Workshops, Seminars</td></tr>
<tr><td rowspan="2">Method/s of Evaluation:</td><td colspan="2">Continuous Assessment
20 %</td><td colspan="2">End Semester Examination
80%</td></tr>
<tr><td>Quizzes (CLO 1,2,3), Practical examination (CLO 1,2,3,4)</td><td>Theory
-</td><td>Practical
60%</td><td>Oral
20%</td></tr>
<tr><td>Recommended Reading</td><td colspan="4">1. Dimitris N. Chorafas (1995), Financial Models and Simulation, St. Martin's Press.
2. Shayne Fletcher, Christopher Gardner (2009) , Financial Modelling in Python, Wiley.
3. 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.</td></tr>
</table>

Course Code	MFM 5074			
Course Name	Computational Financial Engineering Models			
Credit Value	2			
Core/ Optional	Optional			
Prerequisites	MFM 5067, MFM 5068, MFM 5072, MFM 5073			
Hourly Breakdown	Lectures	Practical	Independent Learning	Notional Hours
	-	60 H	40 H	100 H
Course Aim	To bridge financial theory and practical applications by exploring real-world case studies in financial engineering. Students will analyze complex financial instruments, structured products, and risk management strategies using quantitative models and computational techniques.			
Intended Learning Outcomes	By the end of the course, students should be able to ● CLO1: ***apply*** quantitative computational methods to real data ● CLO2: ***analyze*** scenarios and ***judge*** the current patterns ● CLO3: ***prioritize*** conditions and methods to ***apply*** different real cases ● CLO4: ***value*** the given situation based on available conditions and limitations ● CLO5: ***communicate*** and ***present*** findings ● CLO6: ***write*** a report			
Course Content	Computational Modeling Framework and Structure: ● Problem (e.g., hedging a complex derivative). ● Data & Tools (market data, numerical methods). ● Solution (model implementation). ● Validation (back testing, stress scenarios). Main topics: Derivatives Pricing & Hedging, Volatility Smile Arbitrage, Risk Management: VaR Breach Analysis, Portfolio Optimization, Algorithmic Trading, Statistical Arbitrage: Pairs Trading, FinTech & Innovation: Blockchain for Derivatives Settlement.			
Teaching/ Learning Methods	Lectures, Practical Sessions, Problem-related Discussions (Quizzes, In-class Assessment Discussions), Case Studies, Presentations, Group Discussions, Seminars, Workshops			
Method/s of Evaluation	Continuous Assessment 20 %	End Semester Examination 80%		
	Quizzes (CLO 1,2,3) , Case Studies (CLO 1,2,3,4,5,6)	Theory -	Practical 40%	Seminar / Viva / Oral 40%
Recommended Reading	1. Michael Doumpos, Constantin Zopounidis (2015), Computational Data Analysis Techniques in Economics and Finance (Studies in Financial Optimization and Risk Management), Nova Science Pub Inc. 2. Chiradeep Chatterjee (2008), Case Studies on Financial Markets, The Institute of Chartered Financial Analysts of India. 3. Tarika Sikarwar (2017), A Handbook of Case Studies in Finance, Cambridge Scholars Publishing. 4. Robert F. Bruner, Kenneth Eades, Michael Schill (2009), Case Studies in Finance, McGraw-Hill Higher Education.			

Financial Intelligence Path

Course Code	MFM 5075			
Course Name	Financial Machine Learning			
Credit Value	3			
Core/ Optional	Optional			
Prerequisites	MFM 5063			
Hourly Breakdown	Lectures	Practical	Independent Learning	Notional Hours
	30 H	30 H	90 H	150 H
Course Aim	To equip students with cutting-edge machine learning (ML) techniques tailored for financial markets, algorithmic trading, risk management, and quantitative investment strategies.			
Intended Learning Outcomes	By the end of the course, students should be able to ● CLO1: ***develop*** and ***implement*** ML Models for Financial Prediction ● CLO2: design and ***apply*** Financial Data for ML Applications ● CLO3: ***apply*** walk-forward testing, cross-validation, and performance metrics and ***judge*** financial stability. ● CLO4: critically ***assess*** Ethical and Regulatory Risks in Financial ML			
Course Content	Introduction to ML in Finance: Role of ML in quantitative finance (vs. traditional econometrics), Quantitative Methods (Time Series, Regression), Ethical considerations (bias, overfitting, regulatory compliance), Supervised Learning for Finance: Linear/Logistic Regression (Asset pricing, credit scoring), Tree-Based Models (Random Forests, XGBoost for stock selection), Support Vector Machines (SVM) (Classification of market regimes), Model Validation (Back testing, cross-validation, CFA's focus on robustness), Unsupervised Learning & Dimensionality Reduction: Clustering (Customer segmentation, asset class grouping), PCA & Factor Analysis (Risk factor modeling), t-SNE/UMAP (Visualizing high-dimensional financial data), Introduction to Deep Learning: Neural Networks, FNN, Time Series & Forecasting, ARIMA/GARCH (Volatility modeling, CFA linkage), RNN, LSTMs/GRUs (Predicting asset returns, high-frequency data), Attention Mechanisms & Transformers (Alternative data analysis), Application implementation in Python.			
Teaching/ Learning Methods	Lectures, Practical Sessions, Problem related discussions (Quizzes, In-class Assessment Discussions), Case Studies, Presentations, Group assignments, Group presentations, Workshops, Seminars, Report writing			
Method/s of Evaluation	Continuous Assessment 20 %	End Semester Examination 80%		
	Practical Examinations (CLO 1,2,3,4), Quizzes (CLO 1,2,3,4), Case Studies (CLO 1,2,3,4)	Theory 20%	Practical 40%	Oral 20%
Recommended Reading	1. Kevin L Priddy, Paul E Keller (2005), Artificial Neural Networks: An Introduction, SPIE Publications. 2. Zbigniew Michalewicz (2009), Genetic Algorithms + Data Structures = Evolution Programs, Springer-Verlag Berlin Heidelberg. 3. Randy L Haupt, Sue Ellen Haupt (2004), Practical Genetic Algorithms, Wiley-Interscience.			

<table>
<tr><td>Course Code</td><td colspan="4">MFM 5076</td></tr>
<tr><td>Course Name</td><td colspan="4">Financial Artificial Intelligence</td></tr>
<tr><td>Credit Value</td><td colspan="4">2</td></tr>
<tr><td>Core/ Optional</td><td colspan="4">Optional</td></tr>
<tr><td>Prerequisites</td><td colspan="4">MFM 5067, MFM 5068, MFM 5029, MFM 5073</td></tr>
<tr><td rowspan="2">Hourly Breakdown</td><td>Lectures</td><td>Practical</td><td>Independent Learning</td><td>Notional Hours</td></tr>
<tr><td>20 H</td><td>20 H</td><td>60 H</td><td>100 H</td></tr>
<tr><td>Course Aim</td><td colspan="4">To bridge the gap between artificial intelligence technologies and financial applications, equipping students with the skills to develop and implement AI-driven solutions for modern financial challenges.</td></tr>
<tr><td>Intended Learning Outcomes</td><td colspan="4">By the end of the course, students should be able to
● CLO1: design and implement AI Solutions for Financial Problems
● CLO2: process and analyze Financial Data Using AI Techniques
● CLO3: assess potential biases, ethical concerns, and regulatory compliance issues in AI-driven financial systems, and implement explainable AI (XAI) methods to ensure transparency and accountability
● CLO4: develop Automated Trading and Portfolio Management Systems
● CLO5: deploy AI Solutions in Compliance with Financial Regulations</td></tr>
<tr><td>Course Content</td><td colspan="4">Reinforcement Learning (RL) in Trading: Markov Decision Processes (MDPs), Q-Learning & Policy Gradients (Optimal trade execution), Multi-Agent RL (Competitive market simulation), Risk Management & ML: VaR/CVaR with ML (Non-parametric approaches), Anomaly Detection (Fraud, flash crashes), Stress Testing & Scenario Analysis (CFA Level III alignment), Portfolio Optimization with ML: Black-Litterman Model Enhancements, Robust Optimization (Handling estimation errors), Hierarchical Risk Parity (HRP) – ML-driven asset allocation, , Alternative Data & NLP: Sentiment Analysis (Earnings calls, news), Topic Modeling (SEC filings, ESG reports), Graph Neural Networks (GNNs) (Credit risk contagion), Explainable AI (XAI) & Model Risk: SHAP/LIME (Interpreting ML models for regulators), Adversarial Attacks (Robustness in trading models).</td></tr>
<tr><td>Teaching/ Learning Methods</td><td colspan="4">Lectures, Practical Sessions, Problem related discussions (Quizzes, In-class Assessment Discussions), Case Studies, Presentations, Group assignments, Group presentations, Workshops, Seminars, Report writing</td></tr>
<tr><td rowspan="2">Method/s of Evaluation</td><td colspan="2">Continuous Assessment
20 %</td><td colspan="2">End of semester examination
80%</td></tr>
<tr><td colspan="2">Practical Examinations (CLO 1,2,3,4,5), Quizzes (CLO 1,2,3,4), Case Studies (CLO 1,2,3,4,5)</td><td colspan="2">Theory
-
Practical
40%
Seminar / Presentation / Oral
40%</td></tr>
<tr><td>Recommended Reading</td><td colspan="4">1. Kevin L Priddy, Paul E Keller (2005), Artificial Neural Networks: An Introduction, SPIE Publications.
2. Zbigniew Michalewicz (2009), Genetic Algorithms + Data Structures = Evolution Programs, Springer-Verlag Berlin Heidelberg.
3. Randy L Haupt, Sue Ellen Haupt (2004), Practical Genetic Algorithms, Wiley-Interscience.</td></tr>
</table>

<table>
<tr><td>Course Code</td><td colspan="4">MFM 5077</td></tr>
<tr><td>Course Name</td><td colspan="4">Financial Intelligence Models</td></tr>
<tr><td>Credit Value</td><td colspan="4">2</td></tr>
<tr><td>Core/ Optional</td><td colspan="4">Optional</td></tr>
<tr><td>Prerequisites</td><td colspan="4">MFM 5067, MFM 5068, MFM 5075, MFM 5076</td></tr>
<tr><td rowspan="2">Hourly Breakdown</td><td>Lectures</td><td>Practical</td><td>Independent Learning</td><td>Notional Hours</td></tr>
<tr><td>-</td><td>60 H</td><td>40 H</td><td>100 H</td></tr>
<tr><td>Course Aim</td><td colspan="4">To provide students with a comprehensive practical framework of financial intelligence through real-world case studies. The course will explore techniques for analyzing financial data, detecting fraud, assessing risks, and making informed decisions in complex financial scenarios.</td></tr>
<tr><td>Intended Learning Outcomes</td><td colspan="4">By the end of the course, students should be able to
CLO1: apply ML and AI methods to financial data
CLO2: analyze scenarios and judge the current patterns
CLO3: prioritize automated conditions and methods and apply different real cases
CLO4: asses the given situation based on available conditions / limitations
CLO5: communicate and present findings
CLO6: write a report</td></tr>
<tr><td>Course Content</td><td colspan="4">Modeling Framework Structure:
Study areas: Portfolio optimization, alpha signals, risk management, or algorithmic trading. Data Preprocessing. "Predicting stock returns using sentiment analysis of earnings calls.", Model Development: Baseline: Traditional finance model (e.g., ARIMA, Markowitz). AI/ML Model: Supervised (XGBoost, Transformers for NLP). Unsupervised (PCA/K-means for clustering). reinforcement Learning (PPO for trading), Validation & Back testing: Metrics: Sharpe/Sortino ratio, AUC-ROC. CFA Compliance: Stress testing, walk-forward validation. Explainability & Ethics: XAI: SHAP/LIME for model transparency. CFA Ethics: Address overfitting, bias, regulatory risks, Deployment & Presentation, Deliverables: GitHub repo (code + documentation)., Demo: prediction demo.</td></tr>
<tr><td>Teaching/ Learning Methods</td><td colspan="4">Lectures, Practical Sessions, Problem related discussions (Quizzes, In-class Assessment Discussions), Case Studies, Presentations, Group assignments, Group presentations, Workshops, Seminars, Report writing</td></tr>
<tr><td rowspan="2">Method/s of Evaluation</td><td colspan="2">Continuous Assessment
20 %</td><td colspan="2">End Semester Examination
80%</td></tr>
<tr><td colspan="2">Quizzes (CLO 1,2,3) , Case Studies (CLO 1,2,3,4,5,6</td><td colspan="2">Theory   Practical   Oral
-   40%   40%</td></tr>
<tr><td>Recommended Reading</td><td colspan="4">Michael Doumpos, Constantin Zopounidis (2015), Computational Data Analysis Techniques in Economics and Finance (Studies in Financial Optimization and Risk Management), Nova Science Pub Inc.
Chiradeep Chatterjee (2008), Case Studies on Financial Markets, The Institute of Chartered Financial Analysts of India.
Tarika Sikarwar (2017), A Handbook of Case Studies in Finance, Cambridge Scholars Publishing.
Robert F Bruner, Kenneth Eades, Michael Schill (2009), Case Studies in Finance, McGraw-Hill Higher Education.</td></tr>
</table>

Details of the Modules for Financial Analysis Path– Semester III

Course Code	MFM 5078			
Course Name	Financial Analysis Project			
Credit Value	5			
Core/ Optional	Core			
Prerequisites	None			
Hourly Breakdown	Lectures	Practical	Independent Learning	Notional Hours
	20 H	30 H	450 H	500 H
Course Aim	This course provides opportunities to utilize gained theoretical/practical knowledge and experiences to analysis financial situations in real settings			
Intended Learning Outcomes	By the end of the course, students should be able to • CLO1: ***design*** the analysis tools to ***quantify*** current behavior • CLO2: ***modify*** existing analyzing tools appropriately • CLO3: ***develop*** simulation models to ***demonstrate*** financial behavior • CLO4: ***collaborate*** with existing financial tools • CLO5: ***write*** reports to ***demonstrate*** analysis tools and their features • CLO6: ***develop*** effective presentations			
Course Content	Individual candidates will be assigned guided study on financial analysis topics. Each student will be required to study/develop/modify analysis tools and simulation technique/s on a given topic related to financial analysis under the guidance of a supervisor and or industrial mentor appointed by the department. After the given six months period of time, candidates are expected to conduct the four seminars (proposal / literature / methodology / basic results) in each six weeks' time based on their studies. The end of the period Students are supposed to submit reports according to given guidelines and make final presentations.			
Teaching/ Learning Methods	Workshops, Individual Discussions, Group Discussions, Presentations, Seminars, Viva, Report Writing			
Method/s of Evaluation:	Continuous Assessment 30%	End Semester Examination 70%		
	Presentations, Discussions, Reports	Report 25%	Final Presentation 20%	Viva 25%
Recommended Reading	1. Harold Bierman Jr (Cornell) (2017), Case Studies for Corporate Finance, World Scientific. 2. Midgley K Burns RG (2015), Case Studies in Business Finance and Financial Analysis, Springer.			

Details of the Modules for Financial Engineering Path – Semester III

Course Code	MFM 5079				
Course Name	Financial Engineering Project				
Credit Value	5				
Core/ Optional	Core				
Prerequisites	None				
Hourly Breakdown	Lectures		Practical	Independent Learning	Notional Hours
	20 H		30 H	450 H	500 H
Course Aim	This course provides opportunities to utilize gained theoretical/practical knowledge and experiences to solve real quantitative finance problems in real environment settings.				
Intended Learning Outcoms	By the end of the course, students should be able to ● CLO1: ***design*** models to ***quantify*** future behavior ● CLO2: ***modify*** existing models appropriately ● CLO3: ***develop*** simulation models to ***demonstrate*** financial behavior ● CLO4: ***collaborate*** with existing models/methods ● CLO5: ***write*** reports to ***demonstrate*** models and their features ● CLO6: ***develop*** effective presentations				
Course Content	Individual candidates will be assigned guided study on quantitative finance topics. Each student will be required to study/develop/modify model/s and simulation technique/s on a given topic related to quantitative finance under the guidance of a supervisor and or industrial mentor appointed by the department. After the given six months period of time, candidates are expected to conduct the four seminars (proposal / literature / methodology / basic results) in each six weeks' time based on their studies. The end of the period students are supposed to submit reports according to guidelines given and make final presentations.				
Teaching/ Learning Methods	Workshops, Individual Discussions, Group Discussions, Presentations, Viva, Report Writing, Seminars,				
Method/s of Evaluation	Continuous Assessment 30%		End Semester Examination 70%		
	Presentations, Discussions, Reports	Report 25%	Final Presentation 20%	Viva 25%	
Recommended Reading	1. Scott P Mason, Robert C. Merton, Andre F. Perold, Peter Tufano (2005), Cases in Financial Engineering: Applied Studies of Financial Innovation, Prentice Hall. 2. Gianluca Fusai, Andrea Roncoroni (2008), Implementing Models in Quantitative Finance: Methods and Cases (Springer Finance), Springer-Verlag Berlin Heidelberg. 3. Wolfgang Härdle, Cathy Yi-Hsuan Chen, Ludger Overbeck (2017), Applied Quantitative Finance, Springer-Verlag Berlin Heidelberg.				

Details of the Modules for Financial Intelligence Path– Semester III

<table>
<tr><td>Course Code</td><td colspan="4">MFM 5080</td></tr>
<tr><td>Course Name</td><td colspan="4">Financial Intelligence Project</td></tr>
<tr><td>Credit Value</td><td colspan="4">5</td></tr>
<tr><td>Core/ Optional</td><td colspan="4">Core</td></tr>
<tr><td>Prerequisites</td><td colspan="4">None</td></tr>
<tr><td rowspan="2">Hourly Breakdown</td><td>Lectures</td><td>Practical</td><td>Independent Learning</td><td>Notional Hours</td></tr>
<tr><td>20 H</td><td>30 H</td><td>450 H</td><td>500 H</td></tr>
<tr><td>Course Aim</td><td colspan="4">This course provides opportunities to utilize gained theoretical/practical knowledge and experiences to solve real quantitative finance problems in real environment settings</td></tr>
<tr><td>Intended Learning Outcomes</td><td colspan="4">By the end of the course, students should be able to
● CLO1: design models to quantify future behavior
● CLO2: modify existing models appropriately
● CLO3: develop simulation models to demonstrate financial behavior
● CLO4: collaborate with existing models/methods
● CLO5: write reports to demonstrate models and their features
● CLO6: develop effective presentations</td></tr>
<tr><td>Course Content</td><td colspan="4">Individual candidates will be assigned guided study on quantitative finance topics. Each student will be required to study/develop/modify model/s and simulation technique/s on a given topic related to quantitative finance under the guidance of a supervisor and or industrial mentor appointed by the department. After the given six months period of time, candidates are expected to conduct the four seminars (proposal / literature / methodology / basic results) in each six weeks' time based on their studies. At the end of the period students are supposed to submit reports according to given guidelines and make final presentations.</td></tr>
<tr><td>Teaching/ Learning Methods</td><td colspan="4">Workshops, Individual Discussions, Group Discussions, Presentations, Viva, Report Writing, Seminars,</td></tr>
<tr><td rowspan="2">Method/s of Evaluation</td><td colspan="2">Continuous Assessment
30%</td><td colspan="2">End Semester Examination
70%</td></tr>
<tr><td colspan="2">Presentations, Discussions, Reports</td><td>Report
25%</td><td>Final Presentation 20%   Viva 25%</td></tr>
<tr><td>Recommended Reading</td><td colspan="4">1. Scott P Mason, Robert C. Merton, Andre F. Perold, Peter Tufano (2005), Cases in Financial Engineering: Applied Studies of Financial Innovation, Prentice Hall.
2. Gianluca Fusai, Andrea Roncoroni (2008), Implementing Models in Quantitative Finance: Methods and Cases (Springer Finance), Springer-Verlag Berlin Heidelberg.
3. Wolfgang Härdle, Cathy Yi-Hsuan Chen, Ludger Overbeck (2017), Applied Quantitative Finance, Springer-Verlag Berlin Heidelberg.</td></tr>
</table>

15. MAP OF SLQF OUTCOMES

Table 1: SLQF Outcomes | Program ILOs (PLO) Vs Courses

SLQF outcomes	Subject / Theoretical Knowledge	Practical Knowledge and Application	Communication	Teamwork and Leadership	Creativity and Problem Solving	Managerial and Entrepreneurship	Information Usage and Management	Networking and Social Skills	Adaptability and Flexibility	Attitudes Values and Professionalism	Vision for Life	Updating Self / Lifelong Learning
Program ILOS	PLO1, PLO2, PLO3, PLO4, PLO9	PLO1, PLO2, PLO3, PLO4, PLO9	PLO7, PLO9	PLO 4, PLO 8, PLO 9	PLO3, PLO 4, PLO 9	PLO4, PLO 7, PLO 9	PLO3, PLO9	PLO4, PLO8, PLO9	PLO3, PLO9	PLO1, PLO2, PLO5, PLO6, PLO9	PLO2, PLO5, PLO6, PLO9	PLO2, PLO5, PLO6, PLO8, PLO9
MFM 5060	**M**	**M**	**H**	**H**	**L**	**H**	**H**	**H**	**M**	**H**	**H**	**H**
MFM 5061	H	H	H	L	H	L	H	H	M	M	L	L
MFM 5062	H	H	H	H	H	H	H	H	M	M	L	L
MFM 5063	H	H	H	H	H	H	H	H	M	M	L	L
MFM 5064	H	H	H	H	H	H	H	H	H	H	M	M
MFM 5065	H	H	H	H	H	H	H	H	H	H	M	M
MFM 5066	H	H	H	H	H	H	H	H	H	H	M	M

MFM 5067	H	H	H	H	H	H	H	H	H	H	M	M
MFM 5068	H	H	H	H	H	H	H	H	H	H	M	M
MFM 5069	H	H	H	H	H	H	H	H	H	H	H	H
MFM 5070	H	H	H	H	H	H	H	H	H	H	H	H
MFM 5071	H	H	H	H	H	H	H	H	H	H	H	H
MFM 5072	H	H	H	H	H	H	H	H	H	H	H	H
MFM 5073	H	H	H	H	H	H	H	H	H	H	H	H
MFM 5074	H	H	H	H	H	H	H	H	H	H	H	H
MFM 5075	H	H	H	H	H	H	H	H	H	H	H	H
MFM 5076	H	H	H	H	H	H	H	H	H	H	H	H
MFM 5077	H	H	H	H	H	H	H	H	H	H	H	H
MFM 5078	H	H	H	H	H	H	H	H	H	H	H	H
MFM 5079	H	H	H	H	H	H	H	H	H	H	H	H
MFM 5080	H	H	H	H	H	H	H	H	H	H	H	H

H	Highly correlated	M	Moderately correlated	L	Correlated

Table 2: Categories of Learning Outcomes (SLQF)

No	Categories of Learning Outcomes	Core Area
		KSAM
1	Subject / Theoretical Knowledge	**K**nowledge
2	Practical Knowledge and Application	
3	Communication	**S**kills
4	Teamwork and Leadership	
5	Creativity and Problem Solving	
6	Managerial and Entrepreneurship	
7	Information Usage and Management	
8	Networking and Social Skills	
9	Adaptability and Flexibility	**A**ttitudes, Values, Professionalism and Vision for life
10	Attitudes, Values and Professionalism	
11	Vision for Life	
12	Updating Self / Lifelong Learning	**M**ind-set and Paradigm

16. KEY CONTACTS

Coordinator MSc in Financial Mathematics

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Administrative Assistant MSc in Financial Mathematics (2024 Batch)

Ms. Dilki Prabhani

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Email: mscfm@sci.cmb.ac.lk

17. INFORMATION FOR STUDENTS

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Email: dean@sci.cmb.ac.lk

Mrs. P K S K Seneviratne
Senor Assistant Registrar
Phone: +94 11-258 6868
Email: sar@sci.cmb.ac.lk

Study Board of MSc n Financial Mathematic

Prof. S.S.N. Perera	Chairperson of Study Board Coordinator of MSc in Financial Mathematics University of Colombo
Dr. R. Jayawardene	Senior Lecturer, Department of Mathematics, University of Colombo
Dr. U.P. Liyanage	Senior Lecturer, Department of Mathematics, University of Colombo
Dr. K.K.W.H. Erandi	Associate Coordinator of MSc in Financial Mathematics Lecturer, Department of Mathematics, University of Colombo
Mr. N. Buddhipala	CFO at Commercial Bank of Ceylon PLC
Mr. A. Alwis	Director at Nagaro

18. REQUEST FORMS

Students can use the following request forms to make requests.

- Student Request Form 1 – MSc/PG Diploma in Financial Mathematics
- Student Request Form 2 – Only for Day-To-Day Activities.
- Rescrutiny Form

Student Request Form – MSc/PG Diploma in Financial Mathematics can be used for general request. Student Request Form – Only for Day-To-Day Activities can be used for request regarding day to day activities.
Rescrutiny Form can be used to request re-corrections after the provincial results are released.

Student Request Form 1 – MSc/PG Diploma in Financial Mathematics

Name of student	Reg. No.	Signature
	Email:	Mobile:
Name of Programme: MSc in Financial Mathematics		Department: Mathematics
Date of Reg.	Reg. No.	Date of Request:

Nature of Request (Tick as appropriate)

	Deferment of registration
	Medical (for examinations) Course: ……………………………………..
	Overseas Leave
	Repeat Examination Course: ……………………………………..
	Fallback option PG Dip.: ……………………………………
	Extension (beyond the permitted period) Period: …………………………………..
	Other

Recommendation of Coordinator	Recommendation of Head
Name of coordinator	Name of Head
Signature: Date:	Signature: Date:

Student Request Form 2 – Only for Day-To-Day Activities

Program: MSc in Financial Mathematics   Batch: ____________

Nature of the Request (Insert 'X' in the relevant box):

- Entire Batch ☐
- Only FA Batch ☐
- Only FE Batch ☐
- Only FI Batch ☐
- Individual ☐

Please Describe the Request:

Name* of the Batch Representative/Student: ____________

Signature* of the Batch Representative/Student   Date

* Please include the name and the signature of the batch representative if it is a batch request. Please include the name and the signature of the student if it is an individual request.

For Office Use

Recommendation of the Coordinator:

Recommendation of the Study Board:

Study Board Number ☐

Annexure 13
Rescrutiny Form

Request for re-scrutiny of making of answer scripts

Index No.			
Academic Year		Semester	

Number and Title of the Course	Present Grade Obtained	Expected Grade	Justification

……………………….. ………………….

Candidate's Signature Date

For office use only

Subject Code	Before Re-scrutiny		After Re-scrutiny		Comments
	Marks	Grade	Marks	Grade	

--------------------------------- --------------------------------- ---------------------
Examiner(s) Signature Date

--------------------------------- --------------------------------- ---------------------
Coordinator Signature Date