

FB6783: APPLICATIONS OF ADVANCED DERIVATIVES AND AI IN FINANCE

New Syllabus Proposal

Effective Term

Semester B 2025/26

Part I Course Overview

Course Title

Applications of Advanced Derivatives and AI in Finance

Subject Code

FB - College of Business (FB)

Course Number

6783

Academic Unit

College of Business (CB)

College/School

College of Business (CB)

Course Duration

One Semester

Credit Units

2

Level

P5, P6 - Postgraduate Degree

Medium of Instruction

English

Medium of Assessment

English

Prerequisites

Nil

Precursors

Nil

Equivalent Courses

Nil

Exclusive Courses

Nil

Part II Course Details

Abstract

This course introduces students to the practical applications of advanced derivative instruments and artificial intelligence (AI) in modern finance. With a strong industry focus, it explores how derivatives are applied in structuring and risk management, while AI-driven technologies (including machine learning and multi-agent systems) are increasingly used to support investment research, portfolio construction, and automated decision workflows. Students will gain insight into the intersection of traditional quantitative finance and emerging AI applications, supported by real-world case studies and hands-on exercises.

Course Intended Learning Outcomes (CILOs)

CILOs		Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Explain the structure and real-world uses of derivative products such as Exotic Options, Convertible Bonds and Structured Products	30	x		
2	Identify and evaluate practical AI applications in financial research, workflow automation and portfolio construction.	30	x	x	
3	Apply tools like Python or LLMs to implement basic financial models and automated workflows using AI.	20		x	x
4	Communicate key takeaways from AI-assisted financial research in a clear and structured format for academic or professional audiences.	20		x	x

A1: Attitude

Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

A2: Ability

Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to real-life problems.

A3: Accomplishments

Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

Learning and Teaching Activities (LTAs)

LTAs		Brief Description	CILO No.	Hours/week (if applicable)
1	Lecture	Conceptual and industry-focused discussions on derivatives and AI frameworks	1, 2	27 hours
2	Laboratory	Practical exercises using AI tools (Python, ChatGPT API, sentiment analysis tools).	3	5 hours

3	Group project	Students develop a mini-prototype or strategy involving an AI-enhanced financial solution	2, 3, 4	5 hours
4	Presentations	Showcase and critique of final projects to simulate industry	4	5 hours

Assessment Tasks / Activities (ATs)

ATs		CILO No.	Weighting (%)	Remarks ("-" for nil entry)	Allow Use of GenAI?
1	Participation / Interaction	1, 2, 3, 4	10	-	Yes
2	Assignments	1, 2, 3, 4	30	-	Yes
3	Group projects	2, 3, 4	30	-	Yes
4	Final Presentation	1, 2, 3, 4	20	-	Yes
5	Individual Reflection Report	1, 2, 3, 4	10	-	Yes

Continuous Assessment (%)

100

Assessment Rubrics (AR)**Assessment Task**

1. Participation / Interaction (Applicable to students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion

Active learning efforts shown through class discussion, questions, etc.

Excellent

(A+, A, A-) High evidence of active participation in class discussion, questions, etc.

Good

(B+, B, B-) Significant evidence of active participation in class discussion, questions, etc.

Fair

(C+, C, C-) Moderate evidence of active participation in class discussion, questions, etc.

Marginal

(D) Basic evidence of active participation in class discussion, questions, etc.

Failure

(F) Little evidence of active participation in class discussion, questions, etc.

Assessment Task

2. Assignments (Applicable to students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion

Performance in the submitted homework assignments

Excellent

(A+, A, A-) Strong evidence of understanding the key concepts and definitions of the learned subject

Good

(B+, B, B-) Evidence of understanding the key concepts and definitions of the learned subject

Fair

(C+, C, C-) Certain evidence of understanding the key concepts and definitions of the learned subject

Marginal

(D) Certain familiarity with the subject matter to enable the student to progress further

Failure

(F) Little evidence of familiarity with the subject matter

Assessment Task

3. Group projects (Applicable to students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion

Performance in collaboration and contribution to the data analysis project

Excellent

(A+, A, A-) Students perform excellently in contributing knowledge to the project and deal with issues in collaboration

Good

(B+, B, B-) Students perform well in contributing knowledge to the project and deal with issues in collaboration

Fair

(C+, C, C-) Students perform reasonably well in contributing knowledge to the project and deal with issues in collaboration

Marginal

(D) Students fairly perform in contributing knowledge to the project and deal with issues in collaboration

Failure

(F) Students perform badly in contributing knowledge to the project and deal with issues in collaboration

Assessment Task

4. In-class Quiz (Applicable to students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion

Performance in answering questions

Excellent

(A+, A, A-) Students perform excellently in the test and provide very good answers to test questions.

Good

(B+, B, B-) Students perform well in the test and provide good answers to test questions.

Fair

(C+, C, C-) Students perform reasonably well in the test and provide some good answers to test questions.

Marginal

(D) Students fairly perform in the test and provide some acceptable answers to test questions.

Failure

(F) Students perform badly in the test and cannot provide acceptable answers to test questions.

Assessment Task

5. Individual Case Study (Applicable to students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion

Performance in the submitted case study that analyse the use of data analytics in business applications

Excellent

(A+, A, A-) Strong evidence of capacity to analyse and synthesize; superior grasp of subject matter; evidence of extensive knowledge base

Good

(B+, B, B-) Some evidence of critical capacity and analytic ability; reasonable understanding of issues in practice

Fair

(C+, C, C-) Evidence on understanding of the subject; Some understanding of issues in practice

Marginal

(D) Some evidence on understanding of subject; limited understanding of issues in practice

Failure

(F) Little evidence of familiarity with the subject matter; no understanding of issues in practice

Assessment Task

1. Participation / Interaction (Applicable to students admitted from Semester A 2022/23 to Summer Term 2024)

Criterion

Active learning efforts shown through class discussion, questions, etc.

Excellent

(A+, A, A-) High evidence of active participation in class discussion, questions, etc.

Good

(B+, B) Significant evidence of active participation in class discussion, questions, etc.

Marginal

(B-, C+, C) Moderate evidence of active participation in class discussion, questions, etc.

Failure

(F) Little evidence of active participation in class discussion, questions, etc.

Assessment Task

2. Assignments (Applicable to students admitted from Semester A 2022/23 to Summer Term 2024)

Criterion

Performance in the submitted homework assignments

Excellent

(A+, A, A-) Strong evidence of understanding the key concepts and definitions of the learned subject

Good

(B+, B) Evidence of understanding the key concepts and definitions of the learned subject

Marginal

(B-, C+, C) Certain evidence of understanding the key concepts and definitions of the learned subject

Failure

(F) Little evidence of familiarity with the subject matter

Assessment Task

3. Group projects (Applicable to students admitted from Semester A 2022/23 to Summer Term 2024)

Criterion

Performance in collaboration and contribution to the data analysis project

Excellent

(A+, A, A-) Students perform excellently in contributing knowledge to the project and deal with issues in collaboration

Good

(B+, B) Students perform well in contributing knowledge to the project and deal with issues in collaboration

Marginal

(B-, C+, C) Students perform reasonably well in contributing knowledge to the project and deal with issues in collaboration

Failure

(F) Students perform badly in contributing knowledge to the project and deal with issues in collaboration

Assessment Task

4. In-class Quiz (Applicable to students admitted from Semester A 2022/23 to Summer Term 2024)

Criterion

Performance in answering questions

Excellent

(A+, A, A-) Students perform excellently in the test and provide very good answers to test questions.

Good

(B+, B) Students perform well in the test and provide good answers to test questions.

Marginal

(B-, C+, C) Students perform reasonably well in the test and provide some good answers to test questions.

Failure

(F) Students perform badly in the test and cannot provide acceptable answers to test questions.

Assessment Task

5. Individual Case Study (Applicable to students admitted from Semester A 2022/23 to Summer Term 2024)

Criterion

Performance in the submitted case study that analyse the use of data analytics in business applications

Excellent

(A+, A, A-) Strong evidence of capacity to analyse and synthesize; superior grasp of subject matter; evidence of extensive knowledge base

Good

(B+, B) Some evidence of critical capacity and analytic ability; reasonable understanding of issues in practice

Marginal

(B-, C+, C) Evidence on understanding of the subject; Some understanding of issues in practice

Failure

(F) Little evidence of familiarity with the subject matter; no understanding of issues in practice

Part III Other Information

Keyword Syllabus

- Introduction to Derivatives: Options, swaps, structured notes, convertible bonds
- Real-World Use Cases: Credit derivatives, asset swaps, and hedging strategies
- AI in Finance: Supervised learning, NLP, LLMs, multi-agent systems
- Use of AI tools: Python, Replit, Dify.ai, ChatGPT, Bloomberg API
- Portfolio construction using AI agents
- Automation of research workflows
- Prompt engineering and decision systems

Reading List**Compulsory Readings**

Title	
1	Nil

Additional Readings

Title	
1	Hull, J. C. "Options, Futures, and Other Derivatives," Pearson