1. General Information

Course Subject	FINA
Course Number	2390
Course Title	Financial Programming and Databases
Academic Years	2024-2025
Grading Method	Letter

2. Instructors

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Subclasses: 1A

4. Course Description

Course Description	This course provides undergraduate students with a foundation in managing and analyzing financial data sets. Data analysis is a very important skill for students to master. The first part of the course focuses on building skills – data manipulation using programming languages. The second part introduces various financial databases. Through practice on real-world financial data sets, students will learn methods used to warehouse and retrieve data for statistical computing. The course then turns to analytical methods with a focus on demonstrating these methods on data from various contexts in finance. Methods covered include manipulation of time series and panel data, statistical modelling and inference, simple textual analysis, classification and alternative data sets, etc. Problem sets and projects will be the primary mode of learning.
Prerequisites	ECON1280 or Analysis of economic data or IIMT1640 or Probability and statistics for business or STAT1602 or Business statistics or STAT1603 Introductory statistics Prior programming experience is recommended but not required.
Free Elective	Yes

5. Course Objectives

1. Develop skills in database design, management, and access as would be expected of a first-year investment analyst.

2. Gain proficiency in programming and performing basic data cleaning, custodianship and data manipulation.

3. Gain a working understanding of different analytical methods used in finance and where the methods would be appropriate.

4. Gain fluency for at least one analytical method of the student's choosing through course projects.

6. Faculty Learning Goals

Goal 1: Acquisition and internalization of knowledge of the programme discipline

Goal 2: Application and integration of knowledge

Goal 3: Inculcating professionalism

Goal 4: Developing global outlook

Goal 5: Mastering communication skills

Goal 6: Cultivating leadership

7. Course Learning Outcomes

Course Teaching and Learning Activities	Aligned Faculty Learning Goals					
	1	2	3	4	5	6
CLO1. Students will learn to store and access data efficiently using modern database storage methods, for example, loading input data and exporting output data.	✔	✔				
CLO2. Students will gain an overview of analytical methods used in finance and their typical application, and demonstrate understanding of how to apply the methods through highly-supervised programming assignments.	✔	✔	✔		✔	
CLO3. Demonstrate strong fluency in one analytical method of their own choice through course projects by presenting codes completely written by themselves.	✔	✔	✔			✔
CLO4. Creatively apply methods or data to solve specific industry problems, for example, using functions or packages that are not taught in the class.			✔			✔
CLO5. Communicate ideas with the instructor, tutor, and peer classmates.					✔	

8. Course Teaching and Learning Activities

Course Teaching and Learning Activities #	Expected Study Hours	Study Load (% of study)
T&L1. Lecture	36	30
T&L2. Tutorial	12	10
T&L3. Problem Set	72	60
	Total: 120	Total: 100

9. Assessment Methods

Assessment Methods	Description	Weight %	Aligned Course Learning Outcomes
A1. Completion of three assignments	Students will have three assignments involving programming problems. Each step will enforce a particular skill. Students will be then given a choice of an open-ended problem using example data and be asked to solve the problem. Some projects are	45%	1,2,3,4

9. Assessment Methods

	individual-based, and some allow teamwork. The projects will be graded based on the effectiveness (whether correct output can be generated) and the algorithm (whether the computation is fast).		
A2. General engagement and participation		5%	5
A3. Final Exam		50%	

Assessment Rubrics

A1. Completion of three assignments	For projects, the main driver of assessment will be accuracy with respect to the answers on which the assignments are based. An "A" quality course assignment looks professional, and any discrepancies can be explained carefully. A "B" course assignment is mostly correct, but gaps in understanding remain. A "C" course assignment shows obvious gaps in understanding.
	For the final course project, the assessment will be based on the quality of execution and originality of the investment idea. An A course project will demonstrate a thorough understanding of course methods, careful consideration of pitfalls to analysis, and some element of originality. The work will be well communicated and easy to understand.
A+,A,A-	
B+,B,B-	
C+,C,C-	
D+,D	
F	

10. Course Grade Descriptors

A+,A,A-	The student would can competitively apply analytical methods used in the course independently.
B+,B,B-	The student appears to be able to apply analytical methods, but requires guidance.
C+,C,C-	The student has a conceptual understanding of methods applied in the course, but could not be expected to apply all methods used in the course.
D+,D	The student has shown effort, but a limited understanding of course content.
F	The student has not demonstrated effort to understand course content.

11. Course Content and Tentative Teaching Schedule

Topic/ Session	Content
1	Week 1: Introduction of the course, Python distributions, IDE, and basic elements of Python
2	Week 2: Functions and structured types (tuple, list, strings, dictionaries, set)
3	Week 3: Testing, debugging, exceptions, and classes
4	Week 4: NumPy basics

11. Course Content and Tentative Teaching Schedule

5	Week 5: Introduction to Pandas
6	Week 6: Data loading, storage, file formats, and introduction to SQL
7	Week 7: Data cleaning and wrangling
8	Week 8: Plotting, data aggregation, and group operations
9	Week 9: Time-series and advanced Pandas
10	Week 10: Data analysis examples
11	Week 11: Advanced topics I
12	Week 12: Advanced topics II and revision

12. Required/Recommended Readings & Online Materials

Reading	https://wesmckinney.com/book/
Textbook	1. Introduction to Computation and Programming Using Python, third edition: With Application to Computational Modeling and Understanding Data 2. Python for Data Analysis, third edition

13. Means / Processes for Student feedback on Course

	Conducting mid-term survey in additional to SETL around the end of the semester
✔	Online response via Moodle site
	Others

14. Course Policy

The code of ethics and attendance policy will be applied.

15. Additional Course Information

Programming will be kept in Python.

I may prescribe self-learning materials to supplement students' learning. Most of this will be optional. The late assignment policy will be to accommodate students who provide reasonable notice about competing obligations.