SDSC3022: FINANCIAL DATA ANALYTICS FOR INVESTMENTS

Effective Term
Semester A 2024/25

Part I Course Overview

Course Title
Financial Data Analytics for Investments

Subject Code
SDSC - School of Data Science
Course Number
3022

Academic Unit
School of Data Science (DS)

College/School
School of Data Science (DS)

Course Duration
One Semester

Credit Units
3

Level
B1, B2, B3, B4 - Bachelor's Degree

Medium of Instruction
English

Medium of Assessment
English

Prerequisites
MA1503 Linear Algebra with Applications and
MA2506 Probability and Statistics or MA2510 Probability and Statistics

Precursors
Nil

Equivalent Courses
Nil

Exclusive Courses
Nil

Part II Course Details

Abstract

The goal of this course is to build a foundation for analyzing financial investments. We will cover cross-sectional and time-series facts central to modern financial economics such as the size effect, value effect, momentum, and return predictability. We will introduce these facts through the lens of both traditional tools available in financial economics such as predictive regressions and panel regressions, as well as more modern predictive analytics such as dimensionality reduction and other machine learning techniques. We will also equip students with an introductory understanding of the investment management industry, hedge funds, and high-frequency trading. At the end of this course, students should have a solid background in the issues in modern finance as well as the tools in data science used to address them.

Course Intended Learning Outcomes (CILOs)

	CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Articulate the difference between cross-sectional and time-series predictability and their uses in finance.	20	x		
2	Model stock returns using cross-sectional, time-series, and machine learning techniques.	25	x	x	
3	Discuss modern predictive techniques to capture variation in stock-level returns.	30	x	x	
4	Evaluate the attractiveness of investment strategies using various data science approaches.	25	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	Lectures	Students will engage in formal lectures to gain knowledge on issues in finance as well as the various approaches used to address them. We will incorporate both traditional tools and modern predictive analytics in the methodology.	1, 2, 3, 4	3 hours/week

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)
1	Midterm Test	1, 2, 3	30	
2	Homework assignments	3, 4	30	

Continuous Assessment (%)

60

Examination (%)

40

Examination Duration (Hours)

2

Additional Information for ATs

Note: To pass the course, apart from obtaining a minimum of 40% in the overall mark, a student must also obtain a minimum mark of 30% in both continuous assessment and examination components.

Assessment Rubrics (AR)

Assessment Task

Midterm Test

Criterion

The midterm test provides students with anopportunity to reflect what they have learned and covers the topics taught before the midterm.

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not evenreaching marginal levels

Assessment Task

Homework assignments

Criterion

The homework assignments allow the students to practice what is learned from the lectures and assess the degree of their understanding of the subject in the form of short exercises.

Excellent (A+, A, A-)

High

Good (B+, B, B-)
Significant

Fair (C+, C, C-)
Moderate

Marginal (D)
Basic

Failure (F)
Not even reaching marginal levels

Assessment Task
Examination

Criterion
The final examination covers all the topics taught in the course.

Excellent (A+, A, A-)
High

Good (B+, B, B-)
Significant

Fair (C+, C, C-)
Moderate

Marginal (D)
Basic

Failure (F)
Not even reachingmarginal levels

Additional Information for AR
The examination, midterm test, and homework assignments will be marked according to the respective marking schemes. The marking schemes will be designed at the time they are set. The grades will then be awarded according to the marks attained.

Part III Other Information

Keyword Syllabus

- Cross-sectional and time-series predictability
- Cross-sectional stock market anomalies
- Multifactor models
- Return predictability
- Forecast combinations
- Penalized regressions
- Cross sectional and panel regressions
- Dimensionality reduction techniques
- Investment strategies

- Machine learning applications to stock returns
- Hedge funds
- High-frequency trading

Reading List

Compulsory Readings

	Title
1	Asset Pricing: Revised Edition, John H. Cochrane, Princeton University Press
2	The Elements of Statistical Learning, Trevor Hastie, Robert Tibshirani, and Jerome Friedman, Springer

Additional Readings

	Title
1	Online learning material is provided via University computer network.