26_M2_NI_FENG_S1_CCO_FIN_7036 : QUANTITATIVE PORTFOLIO MANAGEMENT

DEGREE	Programme Grande Ecole EDHEC / Diplôme Supérieur en Finance des Marchés et des Entreprises	**ACADEMIC YEAR**	2025-2026
PROGRAMME	EDHEC	**PERIOD**	Semester 1
STUDY LEVEL	MASTER 2	**STUDENT HOURS**	24
TRACK	Finance	**ECTS**	4
SUB-TRACK	MSc in Financial Engineering	**CAMPUS**	NICE
EXPERTISE			
COURSE COORDINATOR	Raman UPPAL		

COURSE OBJECTIVES

The objective of this course is to study cutting-edge methods to construct optimal equity portfolios that perform well out of sample. The course provides a solid foundation of the theory of portfolio choice and the knowledge required to implement this theory. A key component of the course is learning how to use Python to work with various data sets to implement optimal portfolios using the theoretical models we will study in class. The course requires you to do four coding assignments in small groups and submit Jupyter notebooks with your work. The motto of the course is "getting it done." Thus, you are free to use any resource available on the internet, including code written by other people and resources such as ChatGPT. But note that the final exam will be a closed-book exam.

LEARNING OUTCOMES

After having taken this course, participants will be able to/are expected to know or understand (knowledge-based outcomes):

- **LO1**: How to use Python to obtain data from various sources, such as Yahoo!Finance.
- **LO2**: How to construct mean-variance efficient portfolios using Python in the presence of short-sale constraints, position limits, LASSO and elastic-net constraints, and transaction costs.

More specifically, participants should be able to (skill- and competency-based outcomes):

- **LO3**: How to evaluate the performance of mean-variance efficient portfolios while adjusting the means, variances, and covariances of asset returns for estimation error using Python.
- **LO4**: How to construct mean-variance efficient portfolios when deviations of returns from their means have a linear factor structure, and how to evaluate the performance of these portfolios using Python.

INTEGRATION OF SUSTANAIBLE DEVELOPMENT GOALS

The course is addresses sustainability issue(s) through one or several sessions
Number of dedicated hours: 3
The following SDGs are introduced in the course:

Main SDGs:

- ☐ Good Health and Well-Being (SDG 3)
- ☒ Decent Work and Economic Growth (SDG 8)
- ☒ Industry, Innovation and Infrastructure (SDG 9)
- ☒ Reduced Inequalities (SDG 10)
- ☐ Responsible Consumption and Production (SDG 12)
- ☐ Climate Action (SDG 13)
- ☐ Peace, Justice and Strong Institutions (SDG 16)

Additionnel SDGs:

- ☐ *No Poverty (SDG 1)*
- ☐ *Zero Hunger (SDG 2)*
- ☐ *Quality Education (SDG 4)*
- ☐ *Gender Equality (SDG 5)*
- ☐ *Clean Water and Sanitation (SDG 6)*
- ☐ *Affordable and Clean Energy (SDG 7)*
- ☐ *Sustainable Cities and Communities (SDG 11)*
- ☐ *Life below Water (SDG 14)*
- ☐ *Life on Land (SDG 15)*
- ☐ *Partnerships for the Goals (SDG 17)*

PREREQUISITES

You should have a basic knowledge of: (1) calculus and linear algebra; (2) finance and, in particular, Markowitz portfolio optimization; (3) financial econometrics, in particular, regression analysis and hypothesis testing; and (4) a basic understanding of Python. Most importantly, you should be willing to work extremely hard -- both understanding the theory and putting it into practice will stretch you.

COURSE CONTENT

The course will cover the following topics: (1) using Python to obtain financial data on stock prices, firm characteristics, and macroeconomic variables; (2)~performance measurement after adjusting for transaction costs and accounting for p-hacking and multiple-testing biases; (3) design of mean-variance optimal portfolios ignoring estimation error but accounting for constraints on short-sales, position limits including LASSO and elastic-net constraints, limits on leverage, transaction costs, and higher moments; (4) mean-variance optimal portfolios accounting for estimation error; (5) factor-based portfolios; (6) volatility-timing of factors to improve portfolio performance; (7) principal-component-based portfolios; and (8)~beyond factor-based portfolios. The course will not cover details of machine learning methods or asset classes other than equities.

MAIN TEACHING & LEARNING METHODS

Lectures	Group work	Report	Choose a method

ASSESSMENT METHODS

	EVALUATION TYPE	% OF THE GRADE	FORMAT (Organised and invigilated by)	DURATION	LEARNING OBJECTIVES EVALUATED
1	Group continuous assessment	30%	Assignment (Professor)	180 minutes	ALL LO ☒
2	Final exam	70%	Exam outside class (Hub)	120 minutes	ALL LO ☒

RESIT SESSION: A resit session will be organised for students who do not pass the course. The format of the resit session will be communicated later by the HUB.

REQUIRED READING

There is no textbook for the course. Instead, each week the required readings will consist of a few papers from the practitioner and academic literature.