UNIVERSITEIT VAN AMSTERDAM

Faculty of Economics and Business
Amsterdam Business School
Finance Group
Plantage Muidergracht 12
1018 TV Amsterdam

Course outline for QFAT:
Quantitative Finance and Algorithmic Trading (6314M0359Y)

Amount of EC's: 5
Year: 2022
Semester: 2
Period: 1

Instructors:
Dr. Simon Rottke (Coordinator)

February 2022

1. Introduction

The goal of this course is to get to know, understand and acquire the ability to design quantitative, data-driven, research-based investment strategies. The big-picture theoretical framework behind it will be market efficiency, i.e., how efficient are markets in the real world, within the spectrum of behavioral and rational asset pricing models. The course emphasizes practical relevance and at the same time is deeply rooted within the most recent theoretical and empirical developments in the academic literature on asset pricing and asset management. The main emphasis will be on strategies that build on big data, and that use algorithms to process that data. In class and through hands-on tutorials the trading strategies are illustrated using real data and students learn to backtest in order to evaluate strategies.

2. Content

- Introduction
  - Market Efficiency
  - The Role of Active Investment
  - Performance Measurement
- Modeling and Evaluating Data-Driven Strategies
  - Finding and Backtesting Strategies
  - Portfolio Construction and Risk Management
  - Trading and Financing a Strategy
- Equity Strategies
  - Equity Valuation
  - Algorithmic Investing
  - Discretionary Investing
  - Dedicated Short-Bias
- Macro Strategies
  - Asset Allocation
  - Managed Futures Investing
  - Global Macro Investing

3. Prior knowledge

Basic knowledge in Finance, particularly principles of Investments and Asset Pricing. Basic knowledge in programming (Python recommended).

4. Course format

Overview Study Load

Lectures	12 x 2 hours	24 hours
Tutorials	6 x 2 hours	12 hours
Exam		2 hours
Self-study		102 hours
Total: 5 EC* (5 x 28 hours)		**140 hours**

* Note: 1 EC equals 28 hours of study activity.

5. Literature, Online Resources

- **Textbook:** Pedersen, L.H. (2015). Efficiently Inefficient – How Smart Money Invests and Market Prices Are Determined. Princeton University Press, ISBN 978-0691166193 (c. €32). Pp. 1-348.
- **Research Articles:** accessible online via Canvas
- **Slides, exercises, and assignment**: accessible online via Canvas

6. Schedule

Lectures

There will be a mix of **lecture videos**, **knowledge clips** and **live lectures**. The indicated live lecture time is tentative, and may be shorter in some weeks, depending on how much material will be pre-recorded.
The plan of topics is also tentative and dependent on progress in class.

Live Lecture Time: Thursdays, 9:30-10:30
Live Lecture Place: REC M3.02 (Hybrid Learning Theater)

Wk.	Date	Place	Topic	Book Chapter(s)
1	Thursday, February 10	REC M3.02	Introduction	1, 2
2	Thursday, February 17	REC M3.02	Implementation of Strategies	3, 4, 5
3	Thursday, February 24	REC M3.02	Equity Part 1	6, 8
4	Thursday, March 3	REC M3.02	Equity Part 2	7, 9
5	Thursday, March 10	REC M3.02	Macro Part 1	10, 12
6	Thursday, March 17	REC M3.02	Macro Part 2	11

Tutorials

Whether tutorials will take place in-person has not yet been decided. We will announce this as soon as possible. There will most likely be an option to participate online.

There are 6 tutorial groups scheduled as follows (for details see https://rooster.uva.nl):

Feb 8/9; Feb 15/16; Feb 22/23; Mar 1/2; Mar 8/9; Mar 15/16
• Mon, 9:00-11:00 in REC C1.06 or on Zoom • Mon, 11:00-13:00 in REC C1.06 or on Zoom • Mon, 13:00-15:00 in REC C1.06 or on Zoom • Tue, 9:00-11:00 in REC C1.06 or on Zoom • Tue, 11:00-13:00 in REC C1.06 or on Zoom • Tue, 17:00-19:00 in REC C1.06 or on Zoom

Assignment Deadlines and Exam Dates

Date	What	Where
Sunday, March 13 at 23:59	Group project due	Upload slides and code on Canvas
Friday, March 18 at 23:59	Out-of-sample results Group project due	Upload slides on Canvas
Friday, April 1 from 13:00-15:00	Final exam	IWO 4.04C
Friday, June 10 from 13:00-15:00	Resit exam	t.b.d.

7. Organizational matters

- **All questions must be posted in the Canvas forum, rather than by email!** Posting it in the forum will help others, who might have the same question. Private email conversations give unfair advantages to one student.
- In addition, we strongly encourage you to answer questions of other students in the forum. Do not be afraid of making a mistake! If you make a mistake in your answer, that can actually be helpful, because – quite likely – someone else would make the same mistake, and this gives everyone the chance to learn from this mistake. By working out the right answer in such active discussions, none of you will make those mistakes in the exam. Therefore, it is a win-win for everyone.
- It is highly recommended to work in groups – not just for the assignments but also for general studying purposes.

8. Assessment

The final grade is based on the following element(s):

Group Assignment	15%
Group Project	15%
Final Exam	70%

Group Assignment/Project policies

- The assignment/project are to be solved in groups of 6-7 students

- Sign up for a group on Canvas under *People -> Groups*
- Clearly name all the students with their student numbers in your group on the front page of each assignment – late additions of names are not accepted
- All students in one group must come from the same tutorial group
- Groups must stay the same for both the assignment and the project
- Your presentation slides need to be uploaded on Canvas

Group Assignment

- Each group randomly gets assigned 1 out of the 6 assignments (A, B, C, D, E, F) to present
- You will prepare a slide deck with the solutions
- You will present the solutions in class
- Each presentation is 20-25 minutes
- Afterwards there will be a 5 minute Q&A where the group will answer questions from the other students
- Assignments A, B, C will be presented on February 28/March 1
- Assignments D, E, F will be presented on March 7/8
- The presentation will be graded
- Everyone needs to understand *each* of the 6 assignments, to prepare for the exam

Group Project

- Each group will design their own trading strategy
- You will be given a dataset to work with
- The trading strategy will be presented to the investment committee (the rest of the class) on March 14/15
- Afterwards, you will need to re-run your code with a second dataset (will be distributed by March 16) and upload the results on Canvas on March 18
- The presentation will be graded
- Out-of-sample results will be discussed on March 21/22
- Details will be communicated on Canvas

Final Exam: The final exam (as well as the resit exam) are both 2 hours long, closed book, and consist of a mix of multiple choice and open questions. The exam tends to be overall quantitative in nature. (Naturally, there are no Excel- or Python-related questions on the exam.) More information on the exam will be given towards the end of the course. A **sample exam** will be provided towards the end of the course.

In order to pass the course:

- The grade of the final exam needs to be at least a 5.0, **and**
- The average of the exam and assignment/project grades has to be at least 5.5 (which is automatically rounded to 6.0 as a final course grade).

There are only half-point steps for final course grades (so 7.0 and 7.5 but not 7.8) and grade averages will be rounded using the usual rules (so a 7.25 rounds up to 7.5 while a 7.24 rounds down to 7.0). Because a 5.5 cannot be given as final course grades, a 5.5 and higher is rounded up to 6.0 and a 5.49 or lower rounds to 5.0.

Exam inspection: After the written examination there will be a possibility for an inspection of the evaluated work after the result has been disclosed. The date for the exam review will be announced together with the exam grades.

Resit Exam: The group assignment/project from the block also counts for the resit attempt. That is, there is no new group assignment/project for the resit exam given. Hence, the resit exam counts 70% while the earlier group assignment/project continues to count 30%.

9. Feedback, Questions

We very much appreciate frank feedback and constructive ideas that will help to improve the course. If you have any feedback, questions or comments regarding the course or course material, see one of us before or after the class or the tutorials or write us an email (see address below).

10. Contact Details

Dr. Simon Rottke

E-mail: qfat-feb@uva.nl

11. Miscellaneous information

Digital dissemination
All class material – including particularly any graded assignments or exams with and without their solutions – is covered by a copyright. It is therefore prohibited to distribute any material without prior explicit permission of the instructor outside this course in any digital or any other format. This restriction includes anonymous posting on any open or closed third-party online forums or websites, which constitutes a punishable offense. (Please note that even anonymous posts can often be traced back.) University guidelines also prohibit non-authorized voice and video recordings. It is explicitly forbidden to download or record the video material – it can only be streamed from Canvas!

Participation in course and exam
To participate in the courses and the exam the student has to be enrolled via the Student Information System (SIS). A student who is enrolled for a course will be automatically enrolled to the lectures, the examinations of the course, including the midterm examination, the final examination and the resit. Contact the ESC via the digital contact form on the website or call (020) 525 4133 when you have problems registering for the course. Note that the course coordinator does not have access to the enrollment system and cannot help in such matters.

Course evaluation
The Faculty of Economics and Business values the monitoring of the quality of its educational programs highly. One of the ways in which this is realized is by collecting information regarding the student satisfaction through course evaluations. Therefore, every course is evaluated annually. We very much encourage you to participate in the course evaluation and value your feedback very highly.

Fraud and plagiarism
Fraud and plagiarism are defined as any act or omission on the part of the student which makes an accurate assessment of his/her knowledge, insight and skills partially or wholly impossible. For more information read Appendix F of the Teaching and Examination Regulations handbook or check the website http://student.uva.nl/eco/az/content/board-of-examiners/fraud-and-plagiarism/fraud-and-plagiarism.html.

Complaints, objections and appeals
Several procedures are open to students who want to lodge a complaint. These procedures are published in English and Dutch at the websites for students of the FEB and the UvA.