

University of California, Berkeley

DeCal 98/198: **Quantitative Trading** (Spring 2014)

Prerequisites – Strong interest in at least one of these fields:

- Event-Driven and Mathematical Programming
- Machine Learning and Artificial Intelligence
- Technical or Fundamental analysis
- Probability and Statistics
- Behavioral Finance
- Equity Trading

Instructor: Paul Tawfik – QuantDeCal@gmail.com

Class Format: Lecture

Units of Credit: 2

Day and Time: TBD

Location: TBA

Enrollment: Email QuantDeCal@gmail.com with a completed application (below) and attached resume.

Goal:

Educate and guide aspiring Algorithmic Quants to design and implement algorithms that can beat the market.

Description:

The Quantitative Trading DeCal will prepare you for the future. As financial markets become more efficient, connected, globalized and integrated, interdisciplinary skills become more valued in the industry. Quantitative trading is a merge between business, finance, economics, statistics, math, and computer science – training you in how to collaborate with others of complimentary skills to gain an edge in an ever increasingly competitive market.

The lectures and guest speakers will introduce you to the field and explain the main topics, listed below. We welcome all relevant majors to apply. In this class, you will comprise a group of likeminded peers who will research, plan, construct, test, and implement a successful algorithmic trading strategy that will hopefully be able to be used to generate real money. This is entirely doable.

Ultimately, this DeCal should help you get a job – and stand a chance in making it on your own. Quant trading is a field which is already hungry for talent and pays well. Past alumni of this class have gone to Goldman Sachs, Morgan Stanley, JP Morgan, RGM Advisors, Ronin Capital, Cerebellum Capital, Headlands Technologies, and others. They came in very qualified and determined, and found a sense of direction in this DeCal as no class at UC Berkeley is specially designed to address this topic.

Topics:

- Equity Trading
- Industry
- Simulation
- Analysis
- Optimization
- Execution
- Liquidity
- Machine Learning
- Risk Management
- Strategies and Algorithms
- Programming and Hardware
- Market Behavior and Psychology

Homework: Assigned weekly, 12 total. Either short readings or trading strategy assignments. Readings will be provided. Quizzes at the beginning of class on all readings.

Project: Identify and test an alpha signal. Data and trading strategy suggestions will be provided. Project accounts for 30% of the final grade.

Attendance: Attendance sheet will circulate each class. Absence for more than 2 classes will put you at risk of not passing the class, given the complex nature of the curriculum for this class.

Extra Credit: Extra credit may compensate for missed homework and absence. While extra credit opportunities vary, they typically involve research or reading one of the many fascinating articles or studies that exist on quantitative trading.

Grading: P/NP.
Not Pass grade given for failure to complete homework and project and for poor attendance. Extra credit can compensate for missed homework and absence, but will not compensate for missing project.

Class Roadmap:

- Week 1 **Introduction** – Overview of the class, the market, and Quantitative Trading.
- Week 2 **Trading Strategies** – How to create and run your own automated trading strategy.
- Week 3 **Seeking Alpha** – Finding where opportunity to profit exists in various markets including the stock market, forex, and the options market.
- Week 4 **Stocks and Bond Markets** –
Guest Speaker: Jake Freifeld, Founder of Chilmark Hill
- Week 5 **Advanced Strategies** – Factor models, simple artificial intelligence, neural networks, and risk management strategies like the Kelly criterion.
Required Readings: *The little book that beats the market*
- Week 6 **High Frequency Trading** –
Guest Speaker: CEO Matt Andresen of Headlands Technologies
- Week 7 **Testing and Strategy Implementation** – Backward & forward testing of strategies, optimization, avoiding curve-fitting, and strategy analysis.
- Week 8 **Group Projects** – Class discussion and group collaboration.
- Week 9 **Hedge Fund Management** –
Guest Speaker: Blake Marino Woodard, Founder of RLF Capital Management
- Week 10 **Portfolio Management** – Market neutral portfolios, opportunity cost, and how to manage your portfolio in the most profitable manner.
- Week 11 **Data Mining** – Finding alpha through big data analysis.
- Week 12 **Group Projects** – Class discussion and group collaboration.
- Week 13 **Group Presentations**

DeCal 98/198 Quantitative Trading Application Form

This application is how we choose the students who make it into the class. We're interested in your background and why you want to take the class.

Who are you?

1. First Name, Last Name
2. Student ID Number
3. Email Address
4. Phone Number

What are you studying?

1. Undergraduate School, Major, and Graduation Year
2. Current Work Experience
3. Prior Work Experience
4. What unique talent or expertise do you bring to the class?

Why This Class?

1. How did you hear about this course?
2. Why do you want to take this class?

What experience relevant to quantitative trading do you have? Please refer to any of the following that apply.

1. Event-Driven and Mathematical Programming
2. Machine Learning and Artificial Intelligence
3. Technical or Fundamental analysis
4. Probability and Statistics
5. Behavioral Finance
6. Equity Trading

Why You?

If there was one spot left in the class and we were choosing between you and another applicant, tell us why we should select you to take this class. 😊