

## ACADEMIC YEAR 2017-2018

### Seminar: Algorithmic Trading

Prof. Emilio BARONE

Semester 1<sup>st</sup>

Period: from 16/09/2017 to 25/11/2017 (no class on November 4<sup>th</sup>) see the calendar below  
N.B. Any variation in the calendar will be communicated.

**Classes will be held on Saturday from 10.00-13.00**

Total lectures n. 10

Students are required to attend n. 8 lectures at minimum and to pass the final test in order to have 4 CFU as Other Activities.

Course contents:

In computerized financial markets, algorithmic trading (also known as algo trading, automated trading, black-box trading or robo trading) is the use of applications which allow the automatic entering of buy or sell (market and / or limit) orders. It is the algorithm developed from programmers which decides crucial aspects of orders as timing, price and / or quantity.

Algorithmic trading is growing massively – it's cheaper, faster and better to control than standard trading. It enables financial institutions to 'pre-think' the market, executing complex math in real time, and take the required decisions based on the strategy defined.

The cost alone (estimated at 6 cents per share manual, 1 cent per share algorithmic) is a sufficient driver to power the growth of algo trading. According to some estimates, high frequency trading firms alone account for 73% of all US equity trading volume.

To learn how securities are actually traded in financial markets, we will use trading cases (simulations) based on the Rotman Interactive Trader (RIT) platform.

Finance theory will help us to understand the risk / return tradeoff inherent in particular trading strategies.

Excel applications linked to the real-time data-feeds from the simulated market will guide our decision making and allow us to develop effective trading strategies.

These strategies will also be implemented by developing algorithms written in Visual Basic for Application (VBA).

1st lecture 16/09/2017 aula 211 (tbc):

Getting a grip on trading, market vs. limit orders, bid-ask prices, Rotman Interactive Trader (RIT), selection criteria for the Rotman International Trading Competition (RITC).

2nd lecture 23/09/2017 aula 200 (tbc):

Introduction to VBA macros. Social Outcry (live simulation).

3rd lecture 30/09/2017 INFO 306 (tbc):

Market microstructure: instructions (RTD function, orders from institutional investors).

4th lecture 7/10/2017 INFO 306 (tbc):

Algo trading case: instructions (arbitrages, VBA macros).

5th lecture 14/10/2017 INFO 306 (tbc):

Options trading: instructions (arbitrages, delta-neutral strategies).

6th lecture 21/10/2017 INFO 306 (tbc):

Commodities case: instructions (producers, refiners, traders).

7th lecture 28/10/2017 INFO 306 (tbc):

Market microstructure: competition.

8th lecture 11/11/2017 INFO 306 (tbc):

Options trading: competition.

9th lecture 18/11/2017 INFO 306 (tbc):

Commodities trading: competition.

10th lecture 25/11/2017 INFO 306 (tbc):

Algorithmic trading: competition.

N.B. Please, check the room before each seminar.

Teaching method:

Classes and computer-based practice sessions (room 306) through an experiential learning approach. Videos will be used during classes for educational purposes.

At the end of the seminar, a team of students will be selected to join the LUISS team attending the Rotman International Trading Competition 2017

Suggested reference reading material:

- o Release Files, Rotman School of Management, University of Toronto
  - Case Brief (CB)
  - Trader's Guide (TG)
  - Case Tutorial (CT)
  - Support Sheet (SS)
- o - Algorithmic Trading Case
  - Algorithm 1 (ALGO1) – Arbitrage [CB, CT, SS]
  - Algorithm 2 (ALGO2) – Market Making [CB, CT, SS]
- o - Market Microstructure Case
  - Market Microstructure 1 (MM1) – Order Driven Markets [CB, TG, SS]
  - Market Microstructure 2 (MM2) – Liquidity [CB, TG, CT, SS]
  - Market Microstructure 3 (MM3) – Alternative Trading Venues [CB, TG]
- o - Options Case
  - Options 1 (OP1) – Puts & Calls [CB, TG, SS]
  - Options 2 (OP2) – Hedging [CB, TG, SS]
  - Options 3 (OP4) – Trading Volatility [CB, TG, SS]
- o - Commodities Case
  - Commodities 1 (COM1) – Energy Trading [CB, CT, SS]
- o - RIT VBA Introduction – Tutorial [RIT VBA]
- o MICROSOFT (MS), Visual Basic Developer Center
- o VBA Lessons (VBA-L) 1-2, 5-6, 9, 11-12
- o VBA Tutorials (VBA-T) 1-16, 20-21, 24-26, 29

Final work or test:

Four trading competitions in the last four lectures.