DSC5121 HANDS ON WITH BUSINESS ANALYTICS: ANALYTICS EDGE IN FINANCE
AY2016-2017 Semester 2

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Course Description

The goal of this course is to expose students to the art of data analytics, with emphasis on applications to algorithmic and systematic trading in finance. We will explore various topics aiming at understanding finance, economic forecasting and systems development as well as gaining insights in decisions making through data analytics.

Learning Outcomes

The course will introduce students to various topics, providing an overview of financial instruments and modelling techniques. We will look at various styles of trading the markets and stress the methodologies needed to build robust models for trading. With hands-on experience, the students will attempt to build two to three systematic trading models that will be tested during the course of the term. Below are some of the topics that will be covered in the course:

- Financial data sets and the processing of information for decision making using a systematic approach.
- In-sample and out-sample techniques. The dangers of data mining.
- Risk management, capital allocation, transaction costs and liquidity.
- Leading economic indicators and how to use them to forecast market movements.
- A macro-based approach to modelling vs a technical analysis approach.
- Monetary policy and its impact in financial markets.
- Styles of trading: value and growth, momentum and trend, carry, volatility.

Readings

In addition to the various references to be introduced during the classes, the main reference textbooks adopted for the course are:

(1) "Expected Returns. An Investor's Guide to Harvesting Market Rewards" by Antti Ilmanen.

(2) "Systematic Trading" by Robert Carver.

(3) "Mastering Foreign Exchange & Currency Options" by Francesca Taylor.

(4) "Python for Data Analysis" by Wes McKinney.

Python is the adopted software for the course. Students are required to use Python as this is the form in which the assignments will be submitted for grading.

Prerequisites

Although we will review the techniques and tools applied, covering the theoretical background in detail is not in the scope of this course. In order to be successful and make the most out of this course, students are expected to have at least basic understating and previous hands-on experience with:

- data science basics (descriptive analytics, predictive analytics, etc);
- basic understanding in financial instruments (equities, bonds, FX and options);
- knowledge of Python.

Those who are not sufficiently experienced in these areas but still wish to attend the course will need to catch up beforehand. As well as studying the recommended references and browsing the literature, students are encouraged to explore past classes of the following online courses offered by edX, Coursera and other sites:

- Programming with Python for data science (Microsoft Professional Programme)
  https://www.edx.org/course/programming-python-data-science-microsoft-dat210x-1#!

  Data Analysis in Python with Pandas (Wes McKinney)
  https://www.youtube.com/watch?v=w26x-z-BdWQ

- The Analytics Edge (MITx: 15.071x)
  https://courses.edx.org/courses/MITx/15.071x/1T2014/info

Preclusions

Nil

Assessment

There will be two group assignments (groups of 3-5 students) and one individual assignment. The final grade will be distributed as follows:

Component	Weight
Group assignments	60% (2x 30%)
In-class presentations of group assignments	10% (2x 5%)
Individual assignment	30%
Total	**100%**

Given the diverse backgrounds and past experiences students come from, it is appropriate that the topic of their respective individual assignments is of their own choice. Basic rules and expectations for the individual assignment will be disclosed at the beginning of the course. Students are encouraged to consult the instructor for guidance on his or her choice. Exceptional as well as relevant participation in class gives an individual bonus of up to 10 out of 100 in total grading points.