COURSE DESCRIPTION

This course focuses on learning various aspects of conceiving, designing and implementing institutional grade equity trading strategies. The initial part of the course will focus on agency trading/best execution. The remainder of the course will focus on Alpha generating strategies. Additionally, the objective of the course is to “do” finance, building on seminal work in the field such as Capital Asset Pricing Model (CAPM), Arbitrage Pricing Theory (APT), Risk Parity and Modern Portfolio Theory (MPT) among several other core concepts.

COURSE MATERIALS

Recommended Texts:

Although the course does not have a text book, the students may choose to purchase the following book(s) for reference:

a) Algorithmic Trading and DMA: An introduction to direct access trading strategies, Barry Johnson, 4Myeloma Press.

b) The instructor will provide links during the course to various other sources and academic papers

LEARNING GOALS AND OBJECTIVES

The objective of the course is to prepare students for a career in quantitative trading on both buy and sell side by augmenting their skill sets acquired from Graduate level studies in Finance and related fields. Often times, implementing equity strategies requires a clinical approach dependent on creativity and collaboration between researchers. This course will therefore be split up between learning theory and applying various approaches to generate alpha and to achieve best execution. By the end of the course, the students are expected to be not only familiar with certain strategies that are commonly employed in the industry but also be able to conceptualize new strategies by utilizing various tools favored by practitioners.
The course will focus on:

a) Creativity and Idea generation.
b) Implementation
c) Communication of Ideas
d) Team work.

It is assumed that the students have acquired certain skills necessary to design, implement and manage such strategies. An undergraduate level training in Statistics, mathematics and/or computer science is sufficient for doing well in the class. The class will be structured as a hedge fund with teams focused on building these strategies. The instructor will build these teams just as a hedge fund manager will allocate mandates to groups within a fund. This will require that a team has essential skills necessary to undertake such quantitative mandates.

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**What to Expect?** The course is designed to be non-traditional in the sense that the majority of time will be spent on class discussions on trading approaches involving the instructor and the teams. The teams will also be peer reviewed for their work/proposals. The purpose is to develop practical skills that replicate working in a quantitative trading or investing environment. The instructor will encourage students to present creative ideas that are based on lectures delivered by the Instructor or through assigned/suggested readings. We will look at several strategies during the course and determine how these approaches can be used as a source to generate new strategies that have the potential to generate alpha, execute optimally and higher risk adjusted return. Your success in the course will be identified by your creativity and contribution to the team to develop new strategies and generate ideas throughout the course. The instructor will be available to discuss various ideas acting as a sounding board and/or a research director that groups generate and present for peer review, and provided an opportunity to improve ideas. Once the initial introductory lectures are completed, a portion of the class time will be spent on discussing strategies in groups. Thereafter, the work will be discussed for peer review and instructor evaluation. The students can take that feedback and deliver their strategies as a core concept in the next class as homework assignments. The students will develop a final strategy based on their homework strategies and will present their work through a presentation and a detailed back test and proposal for funding. At the end of the course, the student is expected to have significant idea about typical strategies employed by investment firm and be able to work on such ideas at an investment firm. Please note this is not a course where you will learn programming or advanced concepts in decision science and therefore will not be tested on those.

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**Data:** The class will use data provided by two large databases that are used by academics. WRDS (Wharton Research Data Services) CRSP Database, and another database, which will be announced at the beginning of the class for the Fundamental (Accounting) data. The students will mostly work on daily price data although they are free to use data for other time intervals to develop strategies that are dependent on using multiple time horizons.

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**Peer Review:** The students in the class will be awarded $1 million dollars virtual cash to “manage” at the beginning of the class. The students will be responsible to make an allocation from this money at the end of each class for all the Assignments presented by their peers. They will distribute the money to a strategy presented by a Group up to 50% of the overall capital at any given point in time. The students will ask questions of their peers before investing. The group that will end up with most cash allocation by the end
of the class is guaranteed to get grade bonus, e.g., If the group has a score, it will receive an elevation to the next grade level automatically for any of the final or midterm exams.

**Technology/ Development Environment:** Data analyses and mining are essential aspects of this class. Students may have to use a powerful computer to generate results. The students may bring their work on a laptop computer to discuss, and their results and plans can be submitted electronically to the instructor. They may have to show their strategies in the class which can be on a platform of their choice.

The students are not obligated to use a particular development environment for this course, and therefore can use any environment such as C++, R, Matlab, SPSS, Excel etc. for the work but their submission of homework and final presentation will not be in the form of code but the results they have derived from running their code. This is done to ensure that code related issues do not affect submission of the work done by the teams. The presentations will be in PowerPoint along with the Results Summary of the projects and any information related to the research.

**Groups:** The class will run as if it is a Hedge Fund with a mandate to manage capital. At the beginning of the course, the instructor will conduct in-class interviews with the students and create Strategy Groups. Each Strategy Groups will have students with diverse skills sets. The size of the Group will be determined by the total enrolment for the class but will be limited to a maximum of four. During the semester, the Group members will be required to sit next to each other as classes will require considerable within-group interaction.

Groups will be formed on the first day of the course. The students taking this course are expected to have diversified skill sets and academic backgrounds. The goal will be to ensure that the roles are well defined from the very beginning, and the groups will provide the instructor the specific role they expect a particular member to perform such as Presentation, Development etc. The instructor may match the students for their expertise to ensure that their Group has good skills necessary for building and presenting strategies. Once a Group has been created, the composition will be retained for the duration of the semester.

Each group member is expected to be consulted in the same manner as if working for an investment fund. In an extreme situation, where a group member has consistently violated the role set out from the beginning, the Group member maybe reassigned with the instructor’s approval. If a group member does not contribute to the group at all, the instructor may ask the group member to work independently.

**Data Confidentiality:** The students for this course will be working with the data from a third party that the University has acquired at a considerable cost. The parties also require that their data is protected from unauthorized use. Students will sign “WRDS Terms of Use” copy by downloading it from the website or as provided by the instructor. The students will sign the copy and agree to abide by the usage of the data as authorized under the “WRDS Terms of Use”. In an event, the student does not agree to the “WRDS Terms of Use”, the student will have to drop the class. The students will not share the data with anyone who is not a part of the Quantitative Equity Trading Strategies course.
**Fairness:** The student body is expected to be very diverse for this class. We all need to be particularly sensitive and respectful of this diversity and ensure that excellent working environment is maintained characterized by professionalism and respect.

**Use of Cell Phone:** Cell phones need to be silent during the class. I will also not permit texting, emailing and use of social media during the class. Students are therefore expected to put away their cell phone with the start of the class. The students may use their laptops or other such devices during the class.

**Contacting the Instructor:** The students are welcomed to email the instructors but generally it is harder to answer technical questions via email, so the students may ask such questions before/after class or during office hours. If the students are unable to make the office hours posted on the course outline, they may coordinate a time for meeting the instructors in his office. It is highly recommend the students send an email prior to the office meeting indicating the topics they would like to cover so the Instructor is prepared for going over the material. Students are also welcome to discuss career objectives and ask questions related to their personal growth in the field.

**Appeals:** Appeals must be in writing and include an explanation as to why the original grade was incorrect. In general, the entire document will be checked for grading errors, and correcting any errors could raise or lower the overall score.

**Academic Misconduct:** It is my sincere hope that no student in this class submits work that is not his or her own. If I determine that any assignment was not written solely by the student whose name appears on the assignment, the student will be reported to the Academic Integrity Review Committee which recommends appropriate sanctions to the Office of Student Conduct. There will be no exception to this rule. Please visit the following website for more information on the University’s Code of Academic Integrity and possible sanctions; http://academicintegrity.rutgers.edu/academic-integrity-at-rutgers.

**Student Grievances:** Student concerns regarding this course should be first discussed with me, the faculty member teaching this course. If we can’t resolve the complaint, you may contact the Chair of the Finance and Economics Department.

**Absences and Late Assignments:** If any student is unable to attend the class, the instructor expects that he is informed earlier. Late Assignments will not be accepted for credit, except for the most serious documented reasons.

**Assignments/ Homework:** The class will focus on Assignments which will be small group presentations at each class covering following aspects:

a) Weekly Issues from Quantitative Industry – one page summary + group talk.

b) Outline of Investment/ Trading Strategy – one page summary + group talk.

c) Allocation of Virtual Cash. – group interview + allocation submission

**Course Evaluation/ Grading:** Final grade will be assessed based on following formula:
Assignments/ Homework 30%
Tentative Course Schedule

09/06/2013
i. Introduction, Class Interview, Strategy Group formation. 
iii. Thoughts on Strategy Development Process. 

09/13/2014
i. Best Execution. How to execute optimally in the markets. 
ii. Market Impact, Adverse Selection, Implementation Shortfall 
iii. VWAP, TWAP and several execution algorithms. 
iv. Issues of Special Interest: HFT Controversy, Michael Lewis Book “Flashboys”

09/20/2014
i. Best Execution 11 
ii. Student Assignment on Best Execution 
iii. Issues of Special Interest: Market Fragmentation, Reg NMS.

09/27/2014
i. Trend Following 
ii. Student Assignment on Best Execution 
iii. Issues of Special Interest: Front Running, Market Manipulation.

10/04/2014
i. Relative Value/ Stat Arbitrage 
ii. Student Assignments on Trend Following 
iii. Issues of Special Interest: Evolution of market structure from specialists to electronic market makers.

10/11/2014
i. Market Anomalies 
ii. Student Assignments on Relative Value 
iii. Issues of Special Interest: Speed, Time and Price Discovery.

10/18/2014
i. Market Anomalies 11 
ii. Risk Management for Quantitative Strategies 
iii. Student Assignments on Market Anomalies 
iv. Issues of Special Interest: How does a market maker operate?

10/25/2014
a) MIDTERM PROJECT: Project due on Best execution “How to move mountains in the markets?”. The project will be based on presenting a strategy on executing a portfolio in a
market, the instructor will provide a standard portfolio that the students will then present an execution plan. The Project will be presented in groups.

b) MIDTERM EXAM:

11/01/2014
i. Multifactor Models & Optimization
ii. Student Assignments on Market Anomalies 11
iii. Issues of Special Interest: Long Term Capital Management Debacle.

11/08/2014
i. Group Project/ Final Strategy Project
ii. Student Assignments on Multifactor Models/ Risk Management

11/15/2014
i. Group Project/Development Trading Strategies for Project
ii. Issues of Special Interest: Profiles of successful Quant hedge funds.

11/22/2014
Thanksgiving

11/29/2014
i. Group Project/Development Trading Strategies for Project
ii. Issues of Special Interest: Facebook IPO disaster, exchanges.

12/6/2014
i. Group Project/Development Trading Strategies for Project
ii. Issues of Special Interest: Tools for the Industry.

12/13/2014
**FINAL: Project on “How to Generate Good Risk Adjusted Alpha in the markets”? The Project will be submitted in groups along with a presentation.**

A specialist from the industry will be present to referee the final presentations. Top three presentations may be sponsored to present before an allocation committee of a real hedge fund or money management firm. The final projects may be graded in consultation/presence of an industry referee.