## Course Description

This quantitative course presents advanced material relevant for portfolio managers, extending the material covered in Business 35000 (Investments). Topics include the money management industry (mutual funds, pension funds, hedge funds, ETFs), modern techniques for optimal portfolio selection, liquidity and transaction costs, properties of asset returns, and investment strategies designed to exploit apparent violations of market efficiency. A substantial part of the course is spent discussing case studies and academic research.

## Prerequisites

Business 35000 and 41100. Students who replace Business 41100 by 41000 should expect to work harder. Students are expected to be comfortable with applications of statistics and multiple regression analysis. In every aspect of the course, students must adhere to the Booth Honor Code and the Booth Standards of Scholarship. For example, any plagiarism or using any class material from previous years would violate the Honor Code.

## Teaching Assistant & Review Sessions

The teaching assistant for this course is Laszlo Jakab, an advanced Ph.D. student in Finance. Laszlo will hold weekly review sessions on Wednesdays, first at 4:45-6:00pm at Harper C03 and then at 7:00-8:15pm at Gleacher 408. The only exception is May 25 when the Gleacher session will be at 7:15-8:30pm. Laszlo will hold no weekend review sessions but I plan to stay for brief Q&A sessions right after my Saturday classes at noon. In addition,
we will record Laszlo’s review sessions and post the video links on Chalk. In his sessions, Laszlo will go over some relevant calculations as well as answer your questions. The review sessions are the best place to ask Laszlo questions; he will have only limited time to answer questions by email (laszlo.jakab@chicagobooth.edu). The review sessions will begin in Week 1 (before our first class!). In Week 1, Laszlo will go over the basics of the MATLAB software that I recommend for the assignments. Unless you are a MATLAB expert, I recommend that you attend one of the Week-1 review sessions.

**Course Web Page**

I have set up the course Web page on Chalk: http://chalk.uchicago.edu. To access the website, you need the University’s CNetID and password.

**Grading**

Your course grade will reflect your performance on the assignments, the final exam, and class participation, with the weights determined as follows:

<table>
<thead>
<tr>
<th>Category</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Final exam</td>
<td>50%</td>
</tr>
<tr>
<td>Assignments</td>
<td>40%</td>
</tr>
<tr>
<td>Class participation</td>
<td>10%</td>
</tr>
</tbody>
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As discussed below, there are 10 assignments in this course. All assignments will be graded. At the end, I will drop your weakest assignment and compute your assignments score based on your 9 best assignments. Assignment 10 cannot be dropped.

The exam will be closed-book, but you may bring one 8.5” by 11” sheet of paper with anything written on both sides. Calculators are permitted, smartphones are not.

For both the exam and the weekly assignments, only regrade requests pointing to obvious grading errors (such as adding up scores incorrectly) will be considered.

I automatically assign a provisional grade of D to those graduating students whose course performance to date indicates a high likelihood of an eventual passing grade.

**Assignments**

There are 10 weekly assignments. The first assignment is due in Week 1 when we meet for the first time. Most assignments include three parts:

A. One or two case studies, which are to be discussed in the following class
B. Data analysis, which applies the material discussed in the previous class
C. Exam-like questions that involve concepts or calculations
For the part that involves data analysis, you can use any software you like, but I strongly recommend MATLAB. I will often provide you with MATLAB hints to help you along the way. MATLAB is used in several other advanced finance courses at Booth, and it has been installed on many PCs in both Harper and Gleacher.

You can work on the assignments in groups of at most four (4) people. Each group should submit only one assignment, clearly listing the names of all group members on the cover page. All group members will earn the same grade on the assignment.

Each assignment must be turned in electronically via Chalk. (Only the first-class assignment can be turned in as a hardcopy, though Chalk is preferred.) Some instructions:

1. You must upload your solutions no later than 1:15pm on the day the assignment is due. No late assignments will be accepted.

2. Upload your solutions in the “Assignments” section on Chalk where the assignments are located. Use a commonly used format such as Adobe Acrobat (pdf—preferred) or Word (doc). Avoid macros.

3. No need to upload your MATLAB code (but do explain how you obtained your results).

4. Only one person per group should upload the group’s solutions. The file name should be lastname1 – lastname2 – lastname3 – lastname4.pdf (or .doc), with “lastname 1” belonging to the student uploading the solutions and the other last names belonging to the rest of the group.

After the assignment has been graded, all students will see their grades, but only “lastname1” will be able to download the graded assignment that contains feedback. “lastname1” should then distribute the feedback to the rest of the group.

Readings

All class materials, including case studies and recent research papers, will be posted on the course website on Chalk. In addition, I am going to distribute my class notes every week.

Course Outline

Week 1 (April 1-2, 2016)

• PROPERTIES OF RETURNS
  – Distribution of returns
  – Multiperiod returns
  – Shortfall probability
  – Simulations

Week 2 (April 8-9, 2016)

• RETURN PREDICTABILITY
  – *CASE*: The Risk of Stocks in the Long Run: The Barnstable College Endowment
  – *CASE*: The Vanguard Group, Inc. in 2006 and Target Retirement Funds
  – The cost of insuring against a shortfall
  – Forecasting market returns
  – Market timing

Week 3 (April 15-16, 2016)

• PORTFOLIO OPTIMIZATION
  – *CASE*: Harvard Management Company and Inflation-Protected Bonds
  – Portfolio mathematics
  – Mean-variance analysis
  – Portfolio constraints
  – Bayesian techniques

Week 4 (April 22-23, 2016)

• MARKET ANOMALIES
  – *CASE*: The Dimensional Fund Advisors
  – *CASE*: Grantham, Mayo, Van Otterloo & Co.
  – The value effect
  – The size effect
  – The momentum effect
Week 5 (April 29-30, 2016)
- LIQUIDITY
  - *CASE:* Yale University Investments Office: February 2011
  - Transaction costs
  - The effect of liquidity on asset prices
  - Liquidity risk

Week 6 (May 6-7, 2016)
- MONEY MANAGEMENT INDUSTRY; PASSIVE INVESTING
  - *CASE:* S&P Indices and the Indexing Business in 2012
  - Institutional investors
  - Active vs. passive management
  - Indexing
  - ETFs

Week 7 (May 13-14, 2016)
- ACTIVE MUTUAL FUNDS
  - Evaluating fund performance
  - The performance-flow relation
  - Performance persistence
  - Market timing
  - Window dressing

Week 8 (May 20-21, 2016)
- PENSION FUNDS
  - *CASE:* Pension Policy at the Boots Company PLC
  - The pension fund system
  - Defined-contribution plans
  - Defined-benefit plans
Week 9 (May 27-28, 2016)

• HEDGE FUNDS
  – CASE: The hedge fund industry
  – CASE: AQR’s DELTA strategy
  – Hedge fund compensation
  – Funds of funds
  – Hedge fund performance

Week 10 (June 3-4, 2016)

• HEDGE FUND INVESTMENT STRATEGIES
  – CASE: Long-Term Capital Management
  – CASE: The Quant Meltdown in August 2007
  – Strategies and their risks

Week 11 (June 10-11, 2016): FINAL EXAM

NOTE on final exams / graduation: The final exam is scheduled for Friday June 10 and Saturday June 11 at the same time as regular classes: Friday 1:30pm for section 01, Friday 6:00pm for section 81, and Saturday 9:00am for section 85. If you are graduating this year (congratulations!), taking the exam on Saturday morning will not prevent you from attending the Booth convocation ceremony on Saturday late afternoon. In case you also want to attend the University-wide ceremony on Saturday morning, let me know a week or two in advance and I will let you take the exam on Friday.

NOTE on attendance: I teach three sections of this class. You are expected to attend the section you are registered for. It is OK to attend a different section once or twice if necessary without notifying me, but not on a regular basis. You must take the exam in the section you are registered for unless you obtain my prior approval by email. I grant such approvals only if you have a very good reason. Back-to-back exams are not a good reason.

NOTE on early internship start dates: If your out-of-town summer internship is scheduled to start before our final exam, I am open to the possibility of having you take the exam remotely under the appropriate supervision. Please coordinate with the MBA program office.