

# UNIVERSITY OF MICHIGAN BUSINESS SCHOOL

## FINANCE 608 CAPITAL MARKETS AND INVESTMENT STRATEGIES

Syllabus: Fall 2004

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### COURSE MATERIALS:

Required: *Modern Investment Management: An Equilibrium Approach*, by Bob Litterman and the Quantitative Resources Group at Goldman Sachs

Recommended: Class notes at <https://ctools.umich.edu/portal>

### COURSE DESCRIPTION:

This course focuses on the management of financial assets, with an emphasis on equity securities. Net assets under management of mutual funds alone exceeded \$7.6 trillion as of the end of the first quarter of 2004.<sup>1</sup> Some of these funds are passively managed, mimicking indices and charging relatively low fees. Others are actively managed, attempting to produce returns that outperform a benchmark without incurring additional risk. Because financial markets are so liquid and competitive, earning these additional returns is a challenging task.

In this course, we use the insights of modern financial theory to guide managers in the selection of portfolios. This is the approach pursued by Goldman Sachs in its portfolio management, and is discussed in the course textbook, *Investment Management: An Equilibrium Approach*. This text and the equilibrium approach provide a guide to the application of 50 years of portfolio theory. The focus of the course will be in the selection of portfolios of various asset classes with the goal of minimizing the risk of the position

<sup>1</sup> Source: <http://www.ici.org>

while ensuring the highest possible return. We will also discuss practical issues in the implementation of these plans and the management of the risks inherent in the portfolio allocations.

### COURSE ADMINISTRATION, POLICY, AND PEDAGOGY

The emphasis in this class will be on the application of concepts from financial theory to investment management problems. These applications involve the use of computing resources and financial market data. Since the applications are easier to understand if the student can implement them herself, I encourage students to bring their laptops to class.

The class is relatively quantitative. In particular, we will employ tools from statistics, linear algebra, and calculus. You should be familiar with all of these tools already; a brief review will take place in the first and second class meetings.

Because the majority of the class is applied, I will emphasize homework and projects rather than exams. I also strongly believe that participation contributes to the classroom environment, and will factor it into my final evaluation of your performance.

The specific grading policy follows:

Homework	50%
Final Project	35%
Attendance and Participation	15%

The homework and project will be completed in groups of five students. In order to alleviate the "free rider" problem, peer evaluations will make up 20% of each homework/project grade.

The final grade will be assigned according to the policy of the business school:

Low Pass	<=5%
Pass	<=25%
Good	<=40%
Excellent	<=35%

I will adhere strictly to this policy by ranking students based on their scores and applying the above percentile cutoffs to the ranking. I will attempt to provide you feedback after each assignment so that you know your standing.

## COURSE OUTLINE:

<b>Module</b>	I (9/8, 9/13)
<b>Topic</b>	Introduction, Mathematical and Statistical Review <i>Rates of return</i> <i>Mean and standard deviation (volatility)</i> <i>Volatility of combinations of variables, covariance, and correlation</i> <i>Probability distributions</i>
<b>Readings</b>	Chapters 1-2
<b>Assignments</b>	Assignment 1, Due 9/17 5:00 p.m.
<b>Module</b>	II (9/15, 9/20)
<b>Topic</b>	Portfolio Optimization and Measuring Risk <i>Portfolio mean and standard deviation</i> <i>Optimizing an unconstrained portfolio</i> <i>Optimizing a constrained portfolio</i> <i>Why do the results look so weird?</i> <i>Issues in mean and variance estimation</i> <i>Alternative criteria - VaR, ETL, and Tracking Error</i>
<b>Readings</b>	Chapter 3
<b>Assignments</b>	Assignment 2, Due 9/24 5:00 p.m.
<b>Modules</b>	III (9/22, 9/27)
<b>Topic</b>	Equilibrium Expected Returns and Strategic Asset Allocation <i>The CAPM idea and formula</i> <i>What is the market?</i> <i>Implementation of the CAPM</i> <i>Estimating alphas and betas</i> <i>Constructing a strategic asset allocation</i>
<b>Readings</b>	Chapters 4-5
<b>Assignments</b>	Assignment 3, Due 10/1 5:00 p.m.

<b>Modules</b>	IV (9/29, 10/4)
<b>Topic</b>	Implementing Proprietary Information, View Portfolios, and Optimal Active Risk <i>Non-equilibrium expected returns</i> <i>Non-equilibrium expected returns and standard portfolio optimization</i> <i>View portfolios</i> <i>Active risk</i> <i>How much active risk should I take?</i>
<b>Readings</b>	Chapters 7 and 12
<b>Assignments</b>	Assignment 4, Due 10/8 5:00 p.m.

<b>Modules</b>	V (10/6, 10/11)
<b>Topic</b>	Risk Budgeting <i>What is a risk budget?</i> <i>Developing the optimal active risk budget</i> <i>Risk monitoring</i> <i>Performance measurement</i> <i>Return attribution</i>
<b>Readings</b>	Chapters 13-14, 17 and 19
<b>Assignments</b>	Assignment 5, Due 10/15 5:00 p.m.

<b>Modules</b>	VI (10/6, 10/11)
<b>Topic</b>	Factor Models <i>Factor exposures and returns</i> <i>Types of factors</i> <i>Practical estimation of exposures and factors</i> <i>Using factor models to measure and identify risk</i>
<b>Readings</b>	Chapter 20
<b>Assignments</b>	Final Project, Due 10/22