# FINANCE 100: Corporate Finance
# Syllabus

## Course Agreement:

This syllabus details the course content, material, and policies. By enrolling in this course, you are explicitly agreeing to abide by the policies set forth below. If you do not agree with any of these policies or do not wish to abide by them, I suggest that you take another course; the policies are non-negotiable.

## Course Description:

The objective of this course is to provide a rigorous introduction to the fundamental principles of financial economics and their application. The organization of the course is based on three main principles:

- **The time value of money:** Here you will learn to value financial assets such as bonds, stocks, futures, and options, and to appraise investment projects and corporate strategies using a rigorous framework.
- **Diversification and risk:** These classes provide a thorough grounding in the trade-off between risk and return given by modern portfolio theory. The tools enable you to assess financial risks as well as business risks.
- **Arbitrage and hedging**. I demonstrate how to hedge stock and commodity market risk, interest rate risk, and foreign exchange risk using futures and options.

## The Learning Experience:

The learning experience takes a number of different forms. Each method of learning is meant to complement the other methods.

- Attending lectures, reading lecture notes and PowerPoint slides.
- Working on problem sets and comparing your answers with the fully worked solutions.
- Deepening your understanding through reading lecture notes, and related chapters in the recommended textbooks.
- Consistently monitoring your own progress and making sure your questions are answered in lecture or office hours.
- Using any of the additional learning materials that have been developed and are available on the course web site.

The purpose of this syllabus is to (1) survey the topics in detail, (2) provide a guide to the resources offered for this course, and (3) explain the criteria for assessment.

## Learning Materials:

A large collection of learning materials has been developed for this course. I wish to emphasize that the materials overlap in content and are intended to appeal to different learning styles. Ultimately you have to decide which materials work best for you and use those resources appropriate for your particular style. You are assessed on the basis of in-class participation and three cumulative quizzes - two of which are in-class, one hour and twenty minute quizzes, and the last of which is an out of class, two hour quiz. It is *your* responsibility to learn this material, perform in these tests, and monitor your progress during the course.

- **Lectures:** The course consists of nine topics. The purpose of these topics is to explain the main concepts and focus on the analytically challenging parts of the material. Though I do discuss institutional details in class, most of this information may be acquired by reading the course texts, notes and accessing the available links on the course website.
- **Lecture notes on the web:** These notes have been specifically designed for this course and are available on the course website. I recommend that you read them *before* you come to class. All the material in the lecture notes is required and you are responsible for learning it unless it is explicitly indicated as supplementary material or otherwise stated in lecture.
- **PowerPoint slides:** These slides have been specifically designed to accompany the lectures. As a suggestion, you may want to print them out and bring them to each lecture to ease note taking. Generally, not all slides are used in class. Material covered on the slides that has not been covered in the lectures or lecture notes is not part of the syllabus.
- **Textbooks:** There are two textbooks to which I will refer:
    - Jonathan Berk and Peter DeMarzo, *Corporate Finance*, Addison-Wessley. I will refer to this text as "BD" below.
    - Richard A. Brealey, Stewart C. Myers, and Franklin Allen, *Principles of Corporate Finance*, McGraw-Hill, Eighth Edition. I will refer to this text as "BMA" below.

  Both texts are excellent but quite different in their pedagogy. I will leave it to you to choose between them based on your preferences. I have detailed readings for both texts below.

- **Practice problem sets and solutions:** Numerous problems and their solutions are published on the web. It is important that you try the problems *before* you see the solution, otherwise the quiz will be the first time you have to solve a problem without any additional help. These problem sets are not assigned or evaluated, and you can do as many or as few as you wish. I also suggest trying the problems in the texts if you are looking for additional practice.

## Grading and Assessment:

Your grade for the course will be based on three cumulative quizzes and class participation. The course grade is determined as follows:

Grade = 0.10 * participation + 0.25 * quiz 1 + 0.25 * quiz 2 + 0.40 * quiz 3

To account for possible differences in difficulty across the quizzes, I may choose to mean-adjust or standardize the quiz scores when computing your final grade. After computing your course grade, students from all of my sections will be ranked and assigned a letter grade based on the following approximate distribution:

- 25% -- A

- 35% -- B
- 30% -- C
- 10% -- D and F

- *Missed Quizzes*: There is no valid excuse for missing an quiz other than a medical emergency, evidence of which must be provided and will subsequently be checked. The make-up quiz will take place on Friday at 10 AM, the week *after* the missed quiz. **This is the only make-up option and it is not debateable.**
- *Quiz Rules*: The quizzes are closed book and closed note. You may bring writing utensils and a calculator (no laptops) to each of the quizzes, nothing else may be on the desktop or visible. Sufficient writing space will be provided on each quiz. Attached to the back of each quiz will be "notation and formula sheets" to minimize the amount of memorization required for the texts. These sheets are available for most topics on the corresponding topic page.
- *Quiz Regrades*: I will not discuss the grading of the quizzes at any time; however, I am always happy to discuss the content of the quizzes to ensure your understanding of the material. The regrade policy for the course is quite simple. You have one week from the date on which the quiz is handed back to submit a written appeal. The appeal must be handed to the receptionist in the finance department on the second floor of SHDH. Please ask them to leave it in my mailbox. After receiving your written regrade request, I will gladly regrade your entire quiz to remedy the specific error that you have detected, as well as any other errors that may have been made. As a result, the re-graded score may increase, remain the same, or decrease. Importantly, **this is not a free option, nor is it an opportunity to debate the merits of my grading scheme**. Consequently, regrade requests that do not identify a clear error on our part are entirely unacceptable. For example, asking for more points because you "believe" that you deserve more credit is unacceptable. Similarly, just because "your friend" got more points than you for a similar answer is also unacceptable. If you would like this latter issue resolved simply send your friend to see me and I will adjust their score. To enforce this policy, any regrade requests that I deem inappropriate will have 10 points deducted from their score. Further, there are no subsequent appeals of the grading.

Ultimately, I only assign the grade that you earn.

## Attendance:

Attendance is strongly encouraged but not monitored. I leave the judgment on how you wish to use the various learning materials to you. However, tutors, office hours and help sessions should never be used in order to make up for missed classes, they are intended to complement them, not to replace them. Given tight space constraints it is important that you always attend the classes for the section to which you are assigned. If an emergency arises and you cannot attend class, I may be able to make an exception and allow you to attend the class for another section for one session. This must be cleared with me beforehand by email. Finally, while attendance is not required you are responsible for all material covered in class, as well as any announcements pertaining to the class, that may not be included in other materials.

## Academic Integrity:

Cheating in any form is completely unacceptable. If there is any doubt as to whether or not your actions constitute cheating, please contact me. By enrolling in this course, you are explicitly agreeing to abide by the Student Code of Conduct.

## Topics:

The topics that are covered in this course are discussed in detail below. Each section contains an overview of the main topics, states the learning objectives of that lecture, and relates it to the course material.

## Topic 0: Discounting

During this topic we will cover the intuition and basic mechanics associated the time value of money: discounting, annuitites, perpetuties, etc.

**Readings:**

Lecture 0 notes

BD Chapters 4 and 5

BMA Chapters 1 through 3.

## Topic 1: Bond Valuation

**Overview:**

Debt securities (e.g., loans, bonds, or fixed-interest securities) provide a creditor relationship with the firm. After a brief overview of some of the institutional details of bonds, this class focuses on valuing these securities in a world of certainty. Debt securities can be valued as the present value of coupon payments and the face value of the instrument as a direct application of the financial mathematics techniques developed in Class 0.

**Objectives:**

After completing this class, you should be able to:

- Value a straight bond and a zero-coupon bond using present discounted value techniques.
- Understand the relationship between interest rates and bond prices.
- Understand the bond reporting conventions and determine the actual price of a bond from the reported figures.
- Determine the yield to maturity for a straight bond.
- Understand the relationships between zero coupon bonds and coupon bonds.

- Analyze bond price dynamics and predict how bond prices respond to changes in interest rates.
- Explain why coupon bonds and zero coupon bonds react differently to changes in interest rates.
- Explain the relationship between real and nominal interest rates.
- Explain and apply the concept of a forward rate

**Preparation:**

Lecture Notes.

**Recommended reading:**

BD: Chapters 8 and 24.

Brealey, Myers, and Allen (8th Ed.): BMA: Chapter 14, Section 14.3; Chapter 25, Sections 25.1-25.5; Chapter 23, Sections 23.1-23.4.

or

Brealey and Myers (6th Ed.): Chapter 14, Section 4 (pages 393-398); Chapter 23, Sections 1-3; Chapter 24, Sections 1-3.

or

Brealey and Myers (7th Ed.): Chapter 14, Section 3; Chapter 24, Sections 1-3; Chapter 25, Sections 1-6.

## Topic 2: Valuation of Stocks

**Overview:**

This class provides an overview of **equity securities** (stocks or shares). These securities provide an ownership interest in the firm. This class focuses on valuing the securities in a world of certainty. Equity securities can be valued as the present value of the future dividend stream. The analysis is extended to evaluating investment proposals with a focus on determining which cash flows are relevant in deciding whether a particular proposal should be undertaken.

**Objectives:**

After completing this class, you should be able to:

- Understand basic transactions involving stocks.
- Demonstrate why stocks can always be valued as the present value of future dividends.
- Determine the value of a stock that pays a constant dividend.
- Determine the value of a stock that pays a dividend that grows at a constant rate.
- Use the dividend growth model to infer the expected return on equity if you know the expected growth rate of a company.
- Use the dividend growth model to infer the expected growth rate of future dividends for a company where you know the expected rate of return on equity.
- Value a company using appropriate P/E-multiples and understand the limitations of this

methodology.
- Show how the value of a company can be decomposed into the value of growth options and value of a constant earnings stream.

**Preparation:**

Lecture Notes.

**Recommended Reading:**

BD: Chapters 9 and 23.

BMA: Chapter 14, Section 14.2; Chapter 4.

or

Brealey and Myers (6th and 7th Ed.): Chapter 14, Section 2; Chapter 4.

**Further Reading:**

Grinblatt and Titman: Chapter 3; Chapter 11, Section 3.

Brealey and Myers (6th and 7th Ed.): Chapter 15.

## Topic 3: Portfolio Analysis and Diversification

**Overview:**

This class provides an overview of individual asset allocation. It is shown that individuals can reduce the risk of their portfolios without sacrificing any expected return simply by spreading their wealth over a number of assets in an appropriate way. This technique of diversification is explained in some detail in terms of a simple two-asset example in order to build intuition. The analysis is then extended to the *N*-asset case, followed by some discussion of practical issues and a comprehensive worked example. Since the concepts build on the basic principles of statistics and utility theory, these areas are briefly reviewed. However, I will assume some familiarity with concepts like mean, variance, covariance, standard deviation, and correlation. You can use Grinblatt and Titman, Chapter 4 (Sections 1-6) as preparation for this. I encourage you to review this material from your statistics classes.

**Objectives:**

After completing this class, you should be able to:

- Explain the concept of risk aversion.
- Distinguish between risk averse, risk neutral and risk loving investors and describe their behavior.
- Compute the expected return of a portfolio.
- Compute the variance and standard deviation of the return of a portfolio.
- Compute the covariance and correlation of the returns of two assets.
- Find the composition of the minimum-variance two-asset portfolio.

- Explain the concept of diversification.
- Explain how to construct a diversified portfolio in practice.
- Explain the concept of an efficient frontier and the mean-variance frontier.
- Analyze portfolios with a risk free asset.

**Preparation:**

Lecture Notes.

**Recommended Reading:**

BD: Chapter 10, Sections 10.1 through 10.6; Chapter 11, Sections 11.1 through 11.4

BMA: Chapter 7 (you can skip Section 4 -- we will encounter the terminology used in this section in our next class); Chapter 8, Section 8.1.

or

Brealey and Myers (6th and 7th Ed.): Chapter 7, sections 1-3 (we will encounter the terminology used in section 4 in our next class); Chapter 8, Section 1.

**Further Reading:**

Grinblatt and Titman: Chapter 4, Sections 1-9, Chapter 5, Sections 1-2.

## Topic 4: Asset Pricing Models

**Overview:**

This class extends the material of Class 3 in deriving the Capital Asset Pricing Model (CAPM). This model is widely used in capital budgeting exercises in practice and is one of the cornerstones of modern finance. The primary use of the CAPM is in determining the appropriate discount rate to use in computing Net Present Values (NPVs). This class highlights the difference between systematic risk (which is priced or rewarded by the market) and diversifiable risk (which is not priced).

**Objectives:**

After completing this class, you should be able to:

- Show that, in large diversified portfolios, an individual asset's contribution to the risk of the portfolio is its covariance with the returns of the existing portfolio and that individual variances are irrelevant.
- Explain why, when a riskless asset is introduced, all investors will hold the market portfolio and the riskless asset in some proportion.
- Understand why the return/risk tradeoff has to be the same for all assets in equilibrium.
- Understand and use the Capital Market Line where appropriate.
- Understand and use the Security Market Line or CAPM where appropriate.
- Understand the difference between systematic and diversifiable risk.

- Use the CAPM in a capital budgeting exercise.

**Preparation:**

Lecture Notes.

**Recommended Reading:**

BD: Chapter 11, Sections 11.5 and 11.6; Chapter 12

BMA: Chapter 7, Section 7.4; Chapter 8, Sections 8.2-8.3

or

Brealey and Myers (6th Ed.): Chapter 8, Sections 2-3; Chapter 7, Section 4.

or

Brealey and Myers (7th Ed.): Chapter 8, Sections 1-3; Chapter 7, Section 4.

**Further Reading:**

Brealey and Myers (6th Ed.): Chapter 8, Sections 4-5.

or

Brealey and Myers (7th Ed.): Chapter 8, Sections 4

Grinblatt and Titman: Chapter 5, Sections 3-9 and Section 11.

## Topic 5: Capital Structure and the Weighted Average Cost of Capital

**Overview:**

This class considers the financing decision of the firm. What mix of debt (loans/bonds) and equity (shares) should the firm use to raise funds to finance its investments? The seminal Modigliani and Miller propositions, with and without corporate taxes, are reviewed. The main theme of the class is to evaluate a new investment opportunity for the firm where the appropriate discount rate is unknown. This discount rate could be computed directly from the CAPM if the appropriate beta was known, however in this class we consider the case where the beta of the new project is unknown. In many cases, the beta of another company that is made up primarily of assets like the new project is available. However, adjustments must be made to reflect how differences in capital structure affect beta risk. The procedure for doing this is illustrated via a comprehensive example.

**Objectives:**

After completing this class, you should be able to:

- Show why in a world with perfect capital markets capital structure is irrelevant.
- Compute the firm's Weighted Average Cost of Capital (WACC).
- Explain why in a world with perfect capital markets the required return on a project is independent of the firm's capital structure.
- Compute the required return demanded by equity-holders.
- Evaluate investment decisions where the project is financed in a different proportion of debt and equity than is the existing firm and has a different risk.
- Lever and unlever *beta*s to reflect differences in capital structures.
- Compute appropriate required returns for projects in industries different from the existing assets of the firm.

**Preparation:**

Lecture notes.

**Recommended Reading:**

BD: Chapters 14 through 16

BMA: Chapter 17

or

Brealey and Myers (6th and 7th Ed.): Chapter 17 (except Appendix).

**Further Reading:**

Grinblatt and Titman: Chapter 10, Sections 1-3 and first part of Section 4 (pp. 372-373).

## Topic 6: Investment Decisions and Capital Budgeting

**Overview:**

This class provides an overview of capital budgeting - determining which investments a firm should undertake. The **net present value (NPV)** rule, which is widely used in practice, is developed and illustrated with several examples. A number of alternative evaluation techniques including **internal rate of return** and **payback period** are also illustrated, highlighting potential problems with their use. The NPV technique is illustrated in the context of choosing between mutually exclusive projects and projects with different lives.

**Objectives:**

After completing this class, you should be able to:

- Compute the net present value of an investment proposal.
- Explain why the NPV rule leads to optimal decisions.
- Compute the internal rate of return of an investment proposal.
- Explain the limitations of the IRR as an investment appraisal criterion.

- Compute the payback period of an investment proposal.
- Determine whether a particular investment proposal should be undertaken.
- Determine which (if any) of a set of investment proposals should be undertaken when the firm is capital constrained.
- Determine which (if either) of two mutually exclusive investment proposals with different lives should be undertaken.
- Compute the appropriate cash flows to use in the NPV analysis.

**Preparation:**

Lecture notes.

**Recommended Reading:**

BD: Chapter 3, Section 3.3; Chapter 6, Sections 6.1 through 6.3; Chapter 18, Sections 18.1 through 18.3

BMA: Chapter 5; Chapter 6.

or

Brealey and Myers (6th Ed.): Chapter 5, Sections 1-6; Chapter 6.

or

Brealey and Myers (7th Ed.): Chapters 5 and 6.

**Further Reading:**

Grinblatt and Titman: Chapter 9.

## Topic 7: Forward and Futures Contracts

**Overview:**

This class provides an overview of **forward** and **futures** contracts. Forwards and futures belong to the class of securities known as **derivatives** since their value is derived from the value of some other security. The price of a foreign exchange forward contract, for example, depends on the price of the underlying currency and the price of a pork belly futures contract depends on the price of pork bellies. Derivatives trade both on exchanges (where contracts are standardized) and over-the-counter (where the contract specification can be customized). The focus of this class is on (1) definitions and contract specifications of the major exchange-traded derivatives, (2) the mechanics of buying, selling, exercising, and settling forward and futures contracts, (3) derivative trading strategies including hedging, and (4) the relationships between derivatives, the underlying security, and riskless bonds.

**Objectives:**

After completing this class, you should be able to:

- Determine the payoffs of forward and futures contracts.
- Determine the possible payoffs of portfolios of futures, forwards, and the underlying asset.
- Understand the mechanics of buying, selling, exercising, and settling forward and futures contracts.
- Explain the use of margin accounts and the procedure of "marking to market".
- Examine market prices to find arbitrage opportunities in futures and forward markets.
- Use standard valuation techniques to determine the price of forward and futures contracts.
- Construct optimal hedges for hedging exchange rate risk, commodity price risk, stock market risk and interest rate risk using forwards and futures contracts.
- Explain the concept of basis risk.

**Preparation:**

Lecture Notes.

**Further Reading:**

BD: Chapter 30, Sections 30.2-30.4

BMA: Chapter 27, Section 27.3.

or

Brealey and Myers (6th Ed.): Chapter 26, Sections 2-3.

or

Brealey and Myers (7th Ed.): Chapter 27, Sections 1-3.

Grinblatt and Titman: Chapter 7; Chapter 20, Sections 1-4; Chapter 21.

## Topic 8: Option Contracts

**Overview:**

This class provides an overview of **option** contracts. As for forwards and futures, options belong to the class of securities known as **derivatives** since their value is derived from the value of some other security. The price of a stock option, for example, depends on the price of the underlying stock and the price of a foreign currency option depends on the price of the underlying currency. Options trade both on exchanges (where contracts are standardized) and over-the-counter (where the contract specification can be customized). The focus of this class is on (1) definitions and contract specifications of the major exchange-traded options, (2) the mechanics of buying, selling, exercising, and settling option contracts, (3) option trading strategies including hedging, and (4) the relationships between options, the underlying security, and riskless bonds. In particular, it is possible to form combinations of derivatives and the underlying security that are riskless, providing a means of valuing options.

**Objectives:**

After completing this class, you should be able to:

- Determine the possible payoffs of option contracts.
- Construct payoff diagrams for call and put options and portfolios of options, stocks and bonds.
- Understand the mechanics of buying, selling and exercising option contracts.
- Understand some of the applications of option contracts.
- Determine whether the put-call parity relationship is violated for some given options.
- Use the Black Scholes formula to determine the price of options.
- Understand the directional effects of relevant variables on the value of options.
- Explain how debt and equity can be understood as options on the firm.

**Preparation:**

Lecture Notes.

**Recommended Reading:**

BD: Chapter 20; Chapter 21, Section 21.2

BMA: Chapter 20 Sections 20.1 and 20.2.

or

Brealey and Myers (6th and 7th Ed.): Chapter 20, Section 1, Section 2.

**Further Reading:**

Grinblatt and Titman: Chapter 8, Sections 1-3.