

15.415.2x Foundations of Modern Finance II

Faculty Member(s):	Prof. Leonid Kogan, Prof. Jiang Wang
Length:	12 Weeks
Related Course(s) at MIT:	15.415
Prerequisites:	15.415.1x (required); Calculus (required), Linear Algebra (required), Probability and Statistics (suggested)

This course provides a rigorous and comprehensive introduction to the fundamentals of modern finance and their applications to business challenges in valuation, investments, and corporate financial decisions under a unified framework. Following on 15.415.1x, this course focuses on three topics:

1. Valuation of derivative securities;
2. Portfolio theory and the Capital Asset Pricing Model (CAPM); and
3. Corporate financial decisions, including risk and discount rates, real options, capital structure, credit risk, interaction between investment and financing decisions, payout and risk management.

This class shares most of the content with the second half of MIT's Master of Finance course 15.415.

Approximate total time of lecture videos: 16 hours, including recitation videos.

Grading: 10% graded problem sets, 90% proctored final exam.

Course Materials

- **Recommended Textbook:** Brealey, Myers, and Allen, *Principles of Corporate Finance* (13e), Irwin/McGraw Hill. (BMA)
- **Recommended Textbook:** Bodie, Kane, and Marcus, *Investments* (11e), Irwin/McGraw Hill. (BKM)

Course Structure

This course consists of:

- A course introductory lecture (Week 0);
- 10 Lectures, 10 Problem Sets, 10 Recitations demonstrating how to solve problems similar to those contained in the problem sets (Weeks 11–20); and
- 1 proctored Final Exam (Week 21).

WEEK, INSTRUCTOR	TOPIC
Week 0 Prof. Egor Matveyev	Course Introduction and How to Take this Course
Week 11 Prof. Leonid Kogan	Forwards and Futures <ul style="list-style-type: none"> ▪ Introduction to forwards and futures ▪ Arbitrage pricing relations ▪ Forward interest rates ▪ Swaps Problem Set 11
Week 12 Prof. Leonid Kogan	Options I <ul style="list-style-type: none"> ▪ Introduction to options ▪ Basic properties of options ▪ Arbitrage pricing relations ▪ Binomial model of option pricing Problem Set 12
Week 13 Prof. Leonid Kogan	Options II <ul style="list-style-type: none"> ▪ Risk-neutral pricing ▪ Exotic options, American options ▪ Black-Scholes-Merton model Problem Set 13
Week 14 Prof. Leonid Kogan	Portfolio Theory <ul style="list-style-type: none"> ▪ Portfolio optimization ▪ Mean-variance efficient portfolios ▪ Capital Market Line and leverage Problem Set 14
Week 15 Prof. Leonid Kogan	Capital Asset Pricing Model (CAPM) <ul style="list-style-type: none"> ▪ CAPM and linear risk/return trade-offs ▪ Applications of the CAPM ▪ Empirical tests of CAPM, asset pricing anomalies Problem Set 15
Week 16 Prof. Jiang Wang	Capital Budgeting II and Real Options <ul style="list-style-type: none"> ▪ Capital budgeting and discount rates ▪ Risk and horizon

	<ul style="list-style-type: none"> ▪ Introduction to real options ▪ Identifying and valuing real options Problem Set 16
Week 17 Prof. Jiang Wang	Financing/Capital Structure I <ul style="list-style-type: none"> ▪ Financing decisions and capital structure ▪ Modigliani-Miller theorems ▪ Weighted Average Cost of Capital (WACC) ▪ Business risk vs. financial risk ▪ Corporate debt and default risk ▪ Default premium and risk premium Problem Set 17
Week 18 Prof. Jiang Wang	Financing/Capital Structure II <ul style="list-style-type: none"> ▪ Impact of taxes on financing ▪ Financial distress ▪ Cost of financial distress ▪ Trade-off theory of capital structure ▪ Information asymmetry and agency costs ▪ Impact of personal taxes Problem Set 18
Week 19 Prof. Jiang Wang	Interaction between Investing and Financing <ul style="list-style-type: none"> ▪ Leverage with tax shield ▪ Adjusted Present Value (APV) ▪ Weighted Average Cost of Capital (WACC) with tax shield Problem Set 19
Week 20 Prof. Jiang Wang	Payout and Risk Management <ul style="list-style-type: none"> ▪ Payout overview ▪ Modigliani-Miller irrelevance theorem of payout policy ▪ Impact of taxes, information asymmetry and agency costs ▪ Corporate risk management ▪ When risk management matters ▪ Hedging mechanics for different risks Problem Set 20
Week 21	Final Exam