

ISYE 4311 CAPITAL INVESTMENT ANALYSIS

Required depth course for Economic and Financial Systems concentration

Credit: 3-0-3

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Prerequisite(s): ISyE 3025, ISyE 3133 and ISyE3232

Reference Text and Course Handout

Corporate Finance, 2nd edition by J. Berk and P. DMarzo. Pearson, 2011.

Capital Investment Analysis by S.T. Hackman, 2013.

Catalog Description

Students learn core concepts and techniques for economic decision analysis of complex capital investment problems that involve dimensions of time, uncertainty and strategy.

Course Description

Students learn core concepts and techniques for capital investment analysis, as well as the basic terminology, fundamental economic ideas and practical issues relevant to corporate finance, financial management and financial engineering.

Topical Outline

The topical outline is shown in the table below. The table has 2 columns. The first column lists the topics to be covered. The second column lists the number of weeks these topics will be covered.

Topics	Weeks
Basic Valuation: Cash Flow Equivalence. Perpetuities and Annuities. Interest Rates. Fixed Rate Loans. Project Cash Flow Analysis. Equipment Analysis. Project Cash Flow Estimation.	5
Capital Investment Under Uncertainty: Strategy, Options and Information. Discounted Cash Flow Analysis. Analysis of Project Options. Value of Information. Capital Investment Planning.	4
Risk vs Return: CAPM, Cost of Capital and Project Valuation. Optimal Portfolio Choice and CAPM. Arbitrage and the Law of One Price. Cost of Capital and Project Valuation.	4
Capital Investment Under Uncertainty: Valuation via Contingent Claims. Asset Price Dynamics. Financial Options Analysis. Real Options Analysis.	2

Course Outcomes and their relationships to ISyE Program Outcomes

At the end of this course, students will be able to:

1. Value a fixed rate loan and pension plan.
2. Prepare a capital investment cash flow projection.
3. Select equipment alternative.
4. Estimate cost of capital for project valuation.
5. Recognize, analyze and value embedded project options.

6. Value information.
7. Value financial and real options using risk-neutral valuation.

The Mapping from the Course Outcomes to ABET Student Learning Outcomes

The table below shows the relationship between course outcomes and ABET student learning outcomes. The table has 8 columns. The first column lists the course learning outcomes listed above. The next 7 columns list the abbreviated ABET Student Learning Outcomes. The entry of H in a row with specific course learning outcome and column with specific ABET Student Learning Outcomes indicate the importance of attaining this outcome is high and will be assessed.

Course outcome \ Program Outcomes	1. identify, formulate solve engg prob by engg, sci & Math	2. produce solutions consider public health, safety, welfare, global, cultural, social, environ & economic	3 communicate with a range of audience	4 recognize ethical & professional responsibilities, make informed judgement consider resolutions in global, economic, environ and societal context.	5. effective on a team provide leadership, collaborative and inclusive environ, plan tasks & meet objectives	6. develop and conduct experiment, analyze and interpret data & use engineering judgement to draw conclusions.	7. acquire and apply new knowledge using appropriate learning strategies
1. Value a fixed rate loan and pension plan.							
2. Prepare a capital investment cash flow projection.		H					
3. Select equipment alternative.		H					
4. Estimate cost of capital for project valuation.		H					
5. Recognize, analyze and value embedded project options.				H			
6. Value information.							
7. Value financial and real options using risk-neutral valuation.							

Evaluation of the important course outcomes

The course outcomes 4 and 5 will be assessed by direct questions on final exam.