

INSTITUTE OF MATHEMATICS
College of Science
University of the Philippines Diliman

Math 166 Course Syllabus

A. Course Catalogue Description

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| Course Number | Math 166 |
| Course Title | Mathematics of Finance |
| Course Description | Bond-Stock market; immunization; forwards and futures; options, including binomial pricing and Black-Scholes pricing; greeks of options; swaps; hedging and investment strategies |
| Prerequisite | Math 162 |
| Course Credit | 3 units |
| Number of Hours | 3 hours/week |

B. Course Content

- I. Course Introduction and Orientation
- II. The Stocks and Bonds Market
 1. Description of Stocks and Bonds
 2. Pricing of Coupon Bonds and Callable Bonds
 3. Pricing of Dividend Stocks (Gordon Growth Model)
 4. Yield Rates and Yield Curves
 5. Duration and Convexity
 6. Immunization (Redington, Full and Cashflow Matching)
- III. Forwards and Futures
 1. Short-selling, short and long positions in financial trading
 2. Outright Purchase, Prepaid Forwards, Forwards and Futures
 3. Pricing prepaid forwards and forwards
 4. Payoffs and Profits
- IV. Derivatives and Options
 1. Derivative of an Underlying Asset
 2. Options, call options and put options
 3. European, American, Bermudan and other Exotic Options
 4. Arbitrage Theorem, Random Walks and Brownian Motion; Call-Put Parity
 5. Binomial Pricing Theorem for European Call Options
 6. Black-Scholes Formula for European Call Options (GBM, SDE)
 7. The Greeks (Theta, Delta, Gamma, Vega and Rho) of BS Option Prices
- V. Swaps, Hedging Strategies, Credit Risk
 1. Swap, swap terms, prepaid swap, notational amount, swap spread, deferred swap, simple commodity swap, interest rate swap
 2. Theoretical values of swaps
 3. Hedging and investment strategies
 4. Diversifiable and non-diversifiable risk
 5. Pay-offs and Profit of Hedging Strategies
 6. Introduction to Credit Risk

For a more detailed syllabus, send an email request to ddapr@math.upd.edu.ph.