

Python Programming in Finance

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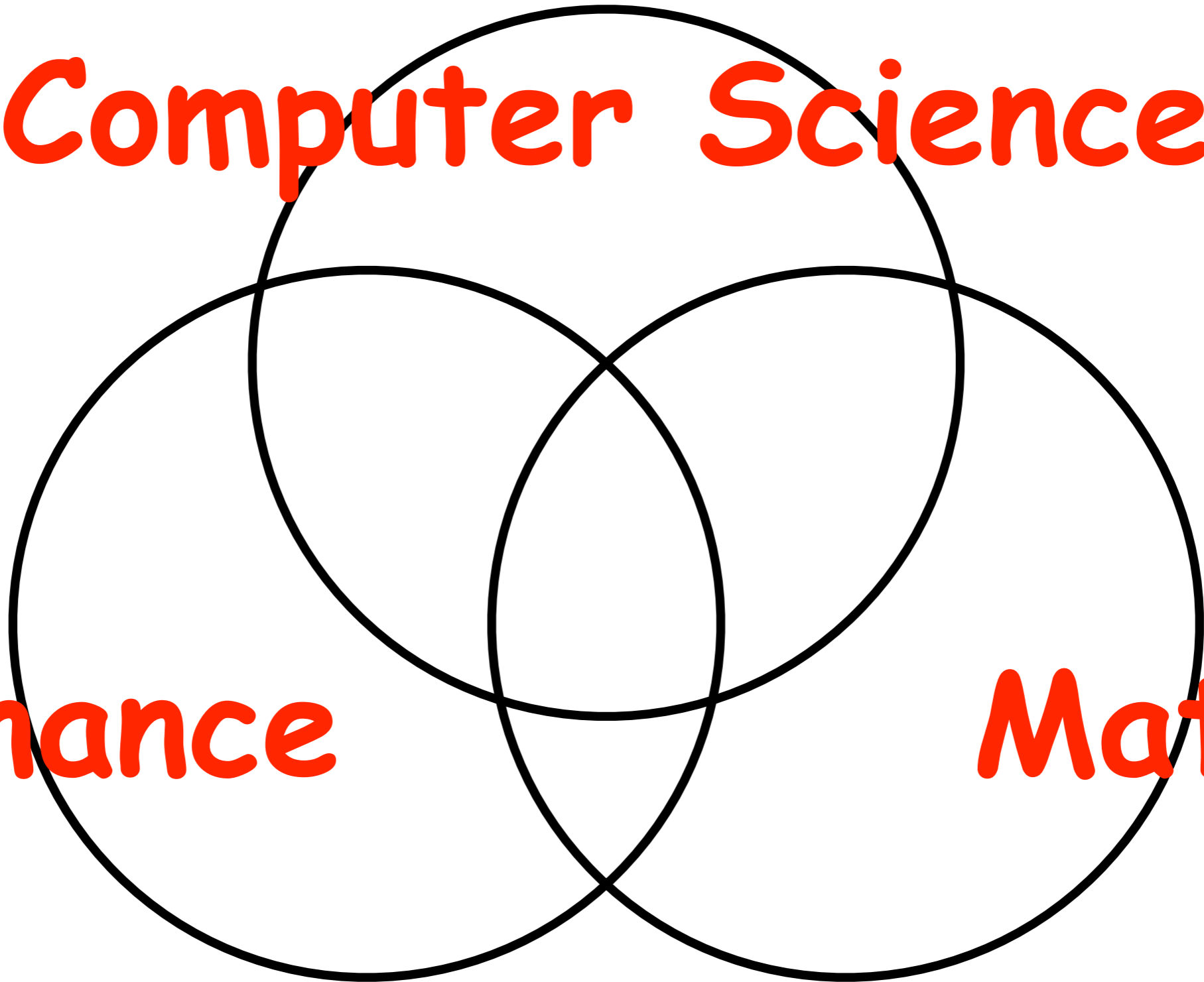
CSIE @ NTU

Syllabus

Computer Science

Finance

Math



Topics

- Python programming
- Data acquisition, visualization, strategy development & backtesting
- Selected math tools

- Modern portfolio theory
- Financial time series analysis
- Pricing theory
- Risk management
- Machine learning

P & **Q** Quant

Physical World

Q: Risk-Neutral

	P	Q
Goal	Forecasting	Pricing/Hedging
Universe	Real-World Probability Measure	Risk-Neutral Probability Measure
Process	Discrete Time Series	Continuous-Time Martingales
Math Tools	Statistics	Ito's Calculus
Business	Buy Side	Sell Side

Financial Risk Manager (FRM)

READINGS FOR FOUNDATIONS OF RISK MANAGEMENT

For 2021, the entirety of the Foundations of Risk Management curated readings has been replaced with GARP's proprietary *Foundations of Risk Management* book. The contents of this book are as follows:

- Chapter 1. The Building Blocks of Risk Management
- Chapter 2. How Do Firms Manage Financial Risk?
- Chapter 3. The Governance of Risk Management
- Chapter 4. Credit Risk Transfer Mechanisms
- Chapter 5. Modern Portfolio Theory (MPT) and the Capital Asset Pricing Model (CAPM)
- Chapter 6. The Arbitrage Pricing Theory and Multifactor Models of Risk and Return
- Chapter 7. Principles for Effective Data Aggregation and Risk Reporting
- Chapter 8. Enterprise Risk Management and Future Trends
- Chapter 9. Learning from Financial Disasters
- Chapter 10. Anatomy of the Great Financial Crisis
- Chapter 11. GARP Code of Conduct*

READINGS FOR QUANTITATIVE ANALYSIS

For 2021, the entirety of the Quantitative Analysis curated readings has been replaced with GARP's proprietary *Quantitative Analysis* book. The contents of this book are as follows:

- Chapter 1. Fundamentals of Probability
- Chapter 2. Random Variables
- Chapter 3. Common Univariate Random Variables
- Chapter 4. Multivariate Random Variables
- Chapter 5. Sample Moments
- Chapter 6. Hypothesis Testing
- Chapter 7. Linear Regression
- Chapter 8. Regression with Multiple Explanatory Variables
- Chapter 9. Regression Diagnostics
- Chapter 10. Stationary Time Series
- Chapter 11. Nonstationary Time Series
- Chapter 12. Measuring Returns, Volatility, and Correlation
- Chapter 13. Simulation and Bootstrapping

READINGS FOR FINANCIAL MARKETS AND PRODUCTS

For 2021, the entirety of the Financial Markets and Products curated readings has been replaced with GARP's proprietary *Financial Markets and Products* book. The contents of this book are as follows:

- Chapter 1. Banks
- Chapter 2. Insurance Companies and Pension Plans
- Chapter 3. Fund Management
- Chapter 4. Introduction to Derivatives
- Chapter 5. Exchanges and OTC Markets
- Chapter 6. Central Clearing
- Chapter 7. Futures Markets
- Chapter 8. Using Futures for Hedging
- Chapter 9. Foreign Exchange Markets
- Chapter 10. Pricing Financial Forwards and Futures
- Chapter 11. Commodity Forwards and Futures
- Chapter 12. Options Markets
- Chapter 13. Properties of Options
- Chapter 14. Trading Strategies

- Chapter 15. Exotic Options
- Chapter 16. Properties of Interest Rates
- Chapter 17. Corporate Bonds
- Chapter 18. Mortgages and Mortgage-Backed Securities
- Chapter 19. Interest Rate Futures
- Chapter 20. Swaps

READINGS FOR VALUATION AND RISK MODELS

For 2021, the entirety of the Valuation and Risk Models curated readings has been replaced with GARP's proprietary *Valuation and Risk Models* book. The contents of this book are as follows:

- Chapter 1. Measures of Financial Risk
- Chapter 2. Calculating and Applying VaR
- Chapter 3. Measuring and Monitoring Volatility
- Chapter 4. External and Internal Credit Ratings
- Chapter 5. Country Risk: Determinants, Measures, and Implications
- Chapter 6. Measuring Credit Risk
- Chapter 7. Operational Risk
- Chapter 8. Stress Testing
- Chapter 9. Pricing Conventions, Discounting, and Arbitrage
- Chapter 10. Interest Rates
- Chapter 11. Bond Yields and Return Calculations

- Chapter 12. Applying Duration, Convexity, and DV01
- Chapter 13. Modeling Non-Parallel Term Structure Shifts and Hedging
- Chapter 14. Binomial Trees
- Chapter 15. The Black-Scholes-Merton Model
- Chapter 16. Option Sensitivity Measures: The “Greeks”