Financial Informatics

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Summary: This course presents an overview of financial informatics. The course will begin with financial concepts such as markets, institutions and time value of money. This will be followed by an overview of the instruments traded and the information required to support the trading life-cycle. We will discuss the tools, data models and system architectures necessary to satisfy the various business systems. The class will next cover modern portfolio theory, risk management and performance measurement. It will conclude with security concepts and the challenges of security for financial information systems.

Text:

No required textbook.

We will draw on the slides and some supplemental readings I will post on blackboard.

I will have suggestions on useful reference books and will bring some to class for those interested.

Technology:

We will be using Microsoft Excel with several open source add-ins which will require the Microsoft Windows operating system. You will need access to a computer with this software to complete several of the assignments.

Grading:

20% Assignments
10% Quizzes
25% Midterm
25% Final
20% Project

Assignments are due at the beginning of class, no exceptions. This allows me to review the assignment with the class immediately.

Quizes and Exams are a mixture of multiple choice/true-false and short answer/worked math problem. On any short answer or math problem there is the possibility of partial credit, please take advantage of this opportunity.

Spreadsheet and programming assignments may be submitted via email. Other assignments may be submitted using email or on paper at the beginning of class. If submitted electronically, I will print out some portion of your work and hand it back to you with comments, otherwise I will just mark-up your paper.

The project is a brief individual oral presentation to the class on a topic related to the class. Most students use some powerpoint slides, but there is no requirement to do so.

Lecture Topics

1. **Introduction to Financial Information Systems**
   Readings: Casas, 2008; Yingsaeree, et al, 2010.
   Review of Syllabus and selected topics
   Review of Probability, Numerical Programming
   Introduction to Financial Terminology
   Using Microsoft Excel

2. **Algorithms and Tools**
   Readings: McKinley and Levine.
   Interpolation/Splines
   Linear, Log linear ad Cubic

3. **Algorithms and Tools**
   Root finding/ Solvers
   Using Excel solver

4. **Time Value of Money, Interest, Term Structure of Interest Rates**
   Readings: Investopedia Advanced Bonds.
   Present Value/Future Value
   Cashflow Conventions
   Quiz 1(30 minutes)
   Assignment 1(Bonds/Yield Curves) Handed Out

5. **Financial Objects and Products (Bonds)**
   Bonds/YTM/Duration
   Term Structure of Interest Rates/Yield Curves

6. **Financial Objects and Products (Equity)**
   Dividend Discount Model
   Commodity Forwards

7. **Mid Term**
   Commodity Futures
   Mid Term Exam (90 minutes)

8. **Futures and Options**
   Equity and Index Futures
   Options introduced.

9. **Options**
   Black Scholes
   Binomial Model

10. **Trading Systems**
    Identifying Financial Objects/Symbology
    Market/Reference Data/Corporate Actions
    Life Cycle of a Trade
    Clearing and Settlement

Quiz 2 (30 Minutes)
Assignment 2 (Equities, Bonds, Futures, Forwards and Options)

11. **Collateral and Position keeping systems**
    Collateral system
    Position keeping and Reconcile Custody and Prime Broker positions.
    Over all data and systems architecture.

12. **Risk and Performance Systems**
    VaR calculations
    Benchmarks
    Performance Attribution.

13. **Risk Management**
    Types of Risk in Financial Systems
    Risk Management Cycle
    Risk Management/Sensitivities
    Risk and Hedging

14. **Presentations**
    Project Presentations – each student (12-15 minutes)
    Review

15. 5/09/2018 **– Final Exam**
    (120 Minutes)

If Time permits we will do following topics:
– **Performance Assessment**
Performance Measurement and Reporting
Return based style analysis
Benchmark selection and analysis
– **Security**
Security Threats
Security Mechanisms
Reliable Algorithms and Protocols
End to End security for Financial Systems