

**CS 561 Financial Informatics**  
**Wednesday, 6-8:45PM**  
**SCI-115 (590 Commonwealth Ave)**

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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.

If you'd like a textbook, in the past I have used the following book. It covers only about ½ of the class material and the author's style is to include extraneous historical information, so I have stopped requiring it. It is inexpensive compared to other textbooks.

Introduction to Financial Technology, Roy S. Freedman, Academic Press, 2006.

**ISBN-10:** 0123704782 **ISBN-13:** 978-0123704788

**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 in order 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.**

Quizzes 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 assignments may be submitted via the Blackboard dropbox or email to the instructor. Other assignments may be submitted using the above methods, 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.

### **Cell and laptop policy:**

No cell phone or laptop use is allowed in the class except for justified cases. These include handicapped individuals requiring a computer to take notes or to otherwise assist them in class and students requesting the use of a computer during a paper discussion session to illustrate specific points.

### **Academic Code of Conduct:**

Cheating and plagiarism will not be tolerated in any Metropolitan College course. They will result in no credit for the assignment or examination and may lead to disciplinary actions.

Please take the time to review the Student Academic Conduct Code:

[http://www.bu.edu/met/metropolitan\\_college\\_people/student/resources/conduct/code.html](http://www.bu.edu/met/metropolitan_college_people/student/resources/conduct/code.html).

This should not be understood as a discouragement for discussing the material or your particular approach to a problem with other students in the class. On the contrary – you should share your thoughts, questions and solutions. Naturally, if you choose to work in a group, you will be expected to come up with more than one and highly original solutions rather than the same mistakes.”

## **Weekly Topics**

### **1/23 - 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

### **01/30 – Algorithms and Tools**

**Readings: McKinley and Levine.**

Interpolation/Splines

Linear, Log linear and Cubic

### **02/06 – Algorithms and Tools**

Root finding/ Solvers

Using Excel solver

### **02/13 – 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 (due 2/5)*

### **02/20 - Financial Objects and Products (Bonds)**

Bonds/YTM/Duration

Term Structure of Interest Rates/Yield Curves

### **02/27 - Financial Objects and Products (Equity)**

Dividend Discount Model

Commodity Forwards

### **3/06 – Equity and Index Futures**

Commodity Futures

Index Futures

### **3/13 - No Class – Spring Recess**

### **3/20— Mid Term/Identification and Modeling**

*Mid Term Exam (90 minutes)*

### **3/27 - Options**

Black Scholes

Binomial Model

### **4/03 – Trading Systems**

Identifying Financial Objects/Symbology

Market/Reference Data/Corporate Actions

Life Cycle of a Trade

Financial Networks/Protocols

Clearing and Settlement

Quiz 2 (30 Minutes)

Assignment 2 (Equities, Bonds, Futures, Forwards and Options) (due 4/09)

4/10 - **Modern Portfolio Theory**

Mean Variance Optimization

Market Efficiency and CAPM

4/17 – **Monday classes**

4/24 – **Factor Models**

Factor Models

APT, Fama and French Model

Factor Models in Risk Management

5/1 – **Presentations**

Project Presentations – each student (10 minutes)

Review

5/08 – **Final Exam**

*(120 Minutes)*

If Time permits we will do following topics:

– **Risk Management**

Types of Risk in Financial Systems

Risk Management Cycle

Risk Management/Sensitivities

Risk and Hedging

– **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