ISOM 3350 FinTech and Cryptoventures
Course Syllabus

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Course Prerequisites/Corequisites:

Prerequisites: ISOM 2500 - Business Statistics.

Course Description:

Recent technology innovations have changed how financial information is disseminated, processed and analyzed. Individual investors and financial institutes who quickly adapt to big data analytics and Cryptofinance will have a leading edge. The goal of the course is to equip students with highly coveted skills in the market. It will also help students understand the hype about cryptocurrencies, and envision a future of blockchain with or without cryptocurrencies.

On a higher level, this course will help students understand disruptive technologies and assess its impacts on future financial services. To this end, we will cover blockchain technology and many ventures that have already begun to capitalize on this innovation.

This undergraduate elective course provides an introduction to FinTech and cryptoventures. Topics include machine learning in financial analytics, Robo-advising, big data alpha models, algorithm trading and high-frequency trading, artificial intelligence, blockchain, cryptocurrencies, smart contracts and contract-oriented programming, markets for smart contracts and applications of blockchain technologies in various finance areas. The class will use Python and R to implement Fintech applications, and Solidity language to demonstrate smart contract development.

After completing this course, students will be able to

- Understand the alternative lending, P2P technologies and assess their impacts on traditional banking and payment industries
- Understand the blockchain technology and cryptocurrencies
- Acquire knowledge on the core and novel sources of FinTech data, data analysis, and visualization
- Acquire knowledge of critical technology strategies and foundational technologies in Fintech
- Gain experience in designing and implementing smart contracts and decentralized applications
- Understand the limits, risks and boarder policy and social implications of FinTech

- Be aware of the latest trends of financial services business models and the key disruption points
- Engage in the process of FinTech innovation

Recommended Textbooks:
(Note: We will depend heavily on class slides, notes, and reading materials, but the following textbooks are recommended.)

Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction
by Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller, Steven Goldfeder, Princeton University Press, ISBN-13: 978-0691171692.

Financial Analytics with R
by Mark Bennett and Dirk Hugen, 2016, ISBN 9781107150751

An Introduction to Statistical Learning: with Applications in R (Springer Texts in Statistics)
by Gareth James , Daniela Witten , Trevor Hastie , Robert Tibshirani, Springer, ISBN-13: 978-1461471370.

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ASSIGNMENTS AND EVALUATION CRITERIA

Grade Weights:

Assignments	20%
Midterm Exam I	25%
Midterm Exam II	25%
Group Project	30%
Total	**100%**

Mid-terms (25%): These are major checkpoints to ensure that you understand the key concepts and analytical tools that we introduce in this course. Review sessions and programming catch-up days will be scheduled to help you prepare for these examinations. ***If you miss one of the midterm exams*** for an emergency, you can have the other exam count for both the missed midterm and the final. That one exam will thus constitute a greater portion of your course grade. This emergency must be approved by the instructor **before the exam date**, and counting one exam twice is not a good idea!
Assignments (20%): There can be two types of assignments: programming and reports. Programming assignments will be graded according to accuracy. For proposal/reports, grades will be assigned according to your idea, execution and writing of the paper.
Group Project (30%): The group project is an empirical data analysis using the tools you have learned throughout the semester. Both economic theories and empirical results are important for this project. **Group member list is due on the Mar-5**.

Tentative Course Outline

The following outline offers a tentative 13-week plan. Deviations and revisions may be made to better facilitate learning.

	Topic
1	Overview of IT-Enabled Financial Innovations
2	Blockchain and Cryptocurrency Technologies • Cryptographic Hash Functions • Digital Signature, Public and Private Keys • Blockchains • Proof of Work • Mining • **Programming Demo: Building Your First Blockchain**
3	Cryptofinance • Transaction Fees • Anonymity • Payments • Bitcoin, Ethereum, Other Altcoins • **Programming Demo: Building Your Own Cryptocurrency**
	Midterm Exam 1
4	Ethereum and Smart Contracts • Ethereum Platform and Smart Contracts • Decentralized Applications • The Lightning Network
5	Programming Catch-up Day and Midterm Exam
6	Enterprise Blockchain Applications And ICO • Initial Coin Offering • Regulation on ICO • Discussion of Current ICO Details • Valuation of ICO • Regulation on Cryptocurrency and ICO
7	Programming with Solidity
8	Measuring Performance and Technical Analysis
9	Seeking Smart Alpha • Asset Pricing Models • Revisit Alpha Model • Financial Big Data • Seeking Alpha Using Big Data
	Midterm Exam II
10	Algorithm Trading Basics • Algorithm Trading Basics • Text mining and social media analysis in Trading
11	Web Scraping and Financial Data Analytics
12	Machine Learning, AI And Deep Learning
13	Performance vs Causality
14	Group Project Discussion