

# ISOM 3350 – FinTech and Cryptoventures

## Course Syllabus

Spring Semester 2022

L1: Tue & Thurs 1:30 – 2:50pm (LSK 1007/online)

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**Office Hours:** By appointment

**Meeting Time and Location:** TBD

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### Course Prerequisite :

- ISOM 2010 – Introduction to Information Systems; and
- 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, big data alpha models, algorithm trading, blockchain, cryptocurrencies, smart contracts and contract-oriented programming, markets for smart contracts, NFT 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 blockchain technology and cryptocurrencies
- Acquire knowledge of 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 in 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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**Course Evaluation:**

Class Participation	5%
Assignments	10%
Group Project	15%
Exam 1	20%
Exam 2	20%
Exam 3	30%
Total	<b>100%</b>

- **Class Participation (5%):** There are two aspects of your class participation. First, students are expected to participate in class activities (e.g., in-class programming exercises, self-tests, reading assignments) and attend the invited speakers’ sessions if any. In-class participation, such as raising and responding to questions (zoom chatroom messages included), is highly encouraged; not only does it enriches your learning, but it also contributes to a more interactive environment for all. Note: Class participation does not include after-class email correspondences.
- **Assignments (10%):** There can be two types of assignments: programming and

reports. Assignments will be graded according to accuracy and analyses.

- **Group Project (15%):** For group proposals/reports, grades will be assigned according to your idea, execution and writing of the paper.
- **Exam 1 (20%) and Exam 2 (20%):** 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 Exam 1 or 2** for an emergency, you can have the Exam 3 grade counts for both the missed midterm and the Exam 3. 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!
- **Exam 3 (30%)** is the overall check for the semester and thus might be a cumulative exam.

### Tentative Course Schedule:

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

	<b>Topic</b>
1	Blockchain Technology I: Cryptographic Hash Function
2	Blockchain Technology II: Public-key Cryptography and Digital Signature
3	Blockchain Technology III: Block Building, Mining and PoW
4	Cryptocurrency I: Transactions and Wallets
5	Cryptocurrency II: 51 percent attack and Protocols <b>Programming Assignment and Demo 1: Block Mining in Python</b>
	<b>Exam I (Feb-24th)</b>
6	Smart Contract I: Basics
7	Smart Contract II: Solidity Essentials
8	Solidity Dive <b>Programming Assignment and Demo 2: Launching Your ICO</b>
9	NFT <b>Programming Assignment and Demo 3: Launching Your NFT</b>
	<b>Exam II (Mar-31th)</b>
10	Measuring Portfolio Performance
11	Technical Analysis
12	Big Data in Finance: Factor Model 1: Risks and Premiums
13	Big Data in Finance: Factor Model 2: Factor models
14	Big Data in Finance: Factor Model 3: Text Mining
15	Big Data in Finance: Factor Model 3: <b>Back-Testing</b>

	<b>Programming Assignment and Demo 4: Portfolios and Performances</b>
16	Group Project
	<b>Exam 3 (May-10th)</b>