ISOM 3350 – FinTech and Cryptoventures
Course Syllabus

Instructor: Professor Yanzhen Chen
Contact: imyanzhen@ust.hk
Office Hours: By appointment

Teaching Assistant: CHAN Wing Yan (Linda)
Contact: imwychan@ust.hk
Office: LSK 4048

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	22%
Exam 2	22%
Exam 3	26%
Total	**100%**

- **Class Participation (5%):** There are <u>two</u> 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. Providing answers to questions in the Canvas discussion section is another effective approach. This not only enhances your own learning experience but also fosters a more collaborative and interactive for everyone involved. Note: <u>Class participation does **NOT** include **private** discussions, e.g., after-class email correspondence.</u>
Note. We **DO NOT take attendance**. Only the quality of participation matters.

- **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 (22%) and Exam 2 (22%):** 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 medical emergency, you can have the Exam 3 grade counts for both the missed midterm and 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 (26%)* is the overall check for the semester and thus might be a cumulative exam.
Tentative Exam Dates: Feb-24, Apr-2 and May-8. All exams are in class.

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.

	Topic
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 **Programming Assignment and Demo 1: Block Mining in Python**
6	Smart Contract I: Basics
7	Smart Contract II: Solidity Essentials
8	Solidity Dive **Programming Assignment and Demo 2: Launching Your ICO**
9	NFT **Programming Assignment and Demo 3: Launching Your NFT**
10	Measuring Portfolio Performance
11	Big Data in Finance: Factor Model 1: Risks and Premiums
12	Big Data in Finance: Factor Model 2: Factor models
13	Big Data in Finance: Factor Model 3: Text Mining
14	Big Data in Finance: Factor Model 3: **Back-Testing** **Programming Assignment and Demo 4: Portfolios and Performances**
15	Big Data in Finance: Factor Model 1: Risks and Premiums
16	Group Project