Sample syllabus

Introduction to FinTech using Excel

(xxx, xxx*:* xxx, *Fall 2025)*

Instructor:	[your name]
Contact Information:	[your email], Tel: xxx-xxxx
Lecture:	In-person or online
Office hours:	TBA
Prerequisites:	At least one finance course
Textbook	Introduction to FinTech [In an R-asssted Learning Environment] Publisher: Springer (expected Jun 2025)
Computational Tool Excel	Like taking our traditional finance courses, the computational tool for this course is Excel. Thus, most finance, accounting, and other business school students will feel confident since they know Excel well; it has frequently been used in their traditional finance courses. For example, students can use Excel's "Random Number Generations" to generate distributed ledgers. They can use Excel to code and decode a given phrase for encryption by applying the letter-shifting scheme. For basic blockchain concepts, students can use Excel to form their blockchains using only numbers, numbers and, letters, and ASCII. The Excel mod() function could be used to verify whether a given pair of (x, y) values is on the Elliptic Curve (used for Cryptography). However, Excel has insufficient hands-on experience. This is why this course will be taught in an R-assisted Learning environment [will be discussed more during the first leture]
Background language	R, which is open-source statistical and computational software. Appendix A on how to install it

R knowledge	No prior knowledge related to R is required. Literately, just two lines
	`source('http://datayyy.com/i2ft/week1.txt') # for week 1`
	`install.packags('qrcode')  # R package`

Why is R used as a background language?	Excel is insufficient since hands-on experience is vital to understanding many FinTech concepts. For example, Excel could not handle big numbers of x, y, and p (prime numbers). When discussing public and private keys, it is a good idea for students to generate them themselves. In addition, readers and students would understand those concepts better after using a private key to develop a public key. Another example is the application of the Merkle Tree to combine 100 transactions into a block by generating and merging their hashes. Students who can develop a QR code for a website or public key will appreciate this method better. To help students do those operations easily, we have generated nearly 100 hidden functions written in R. All functions are self-explanatory, i.e., typing a function's name will show its usage and a few examples. In the following sections, we will explain how the combination of Excel and R will help students immensely in understanding FinTech.
Capacity	Since hands-on is so important, the maximum number of students is 20.
Websites:	Book-related website 1: Springer (added soon) 2: https://datayyy.com/i2ft/ Excel-related website: http://datayyy.com/excel

	GitHub repository: https://github.com/paulyxy/Introduction-to-FinTech-using-Excel
QR codes	  
Course Description:	In this course, students will learn many basic concepts related to FinTech, such as blockchains, cryptocurrency, cryptography, ledger and distributed ledger, unsupervised learning, and supervised learning. For the first week, students reviewed Excel functions, such as left(), right(), mod(), vlookup(), and solver. After that, students learn to use Excel to build simple blockchains with numbers only, letters plus numbers, and ASCII. A few hidden functions can be used to generate public and private keys. The accounting concepts of ledger and distributed ledger will be discussed. After a simple introduction to cryptography, students learn how to use Excel to code and decode messages. After introducing the concepts of public and private keys, students learn to use our hidden functions to generate public and private keys and use a public key to key a message and a private key to decode. Cryptocurrency and its platform will be discussed together. Blockchain applications with Monte Carlo Simulations.
Four objectives:	1) review Excel functions such as left(), right(), substitute(), mod(), vlookup() 2) Excel can be used to generate simple blockchains, run linear regressions, etc. 3) Using hidden functions to generate public/private keys and encode and decode messages 4) Understand some platforms such as Ganache (for cryptocurrency), Remix (for smart contracts)
Academic Integrity:	Students are expected to know and understand college policies about the Academic Integrity Code. Violations of academic integrity will be prosecuted fully. Please note that you are responsible for reporting any instances where other students have violated these policies. Failure to do so will result in penalties as well. If you have any questions about this policy, please see the instructor.
Attendance Policy:	Attending classes regularly is required. Before-class preparation and in-class participation are an integral part of this course. Students are strongly encouraged to participate in class discussions and ask questions. They are also encouraged to discuss current events relevant to this course or their own experiences. Homework problems are regularly assigned.
Course Level Learning Goals:	Apply both R and SAS to various real-world situations. In other words, students are expected to combine the data analytical skills they have learned with their domain knowledge. The objective is to finish a big meaningful project by the end of this course.
College, Program, and Major Learning Goals:	This course is designed to help students achieve one or more College Core, Business Program, and/or Major-level learning goals and objectives. You can see the specific College, Program, or Major-level

	learning goals and objectives associated with the course from this page on the College website: http://bit.ly/bcoreLG.
Grade Evaluation:	HW (10) 30% Mid-Term 20% Final Exam 20% Group project 10% Group presentation 10% Class participation 10% ---------- Total 100%
Teaching Methods:	Each class will consist of two parts: lecture (including homework discussion) and hands-on.
Group project	Each group can have up to three members. A topic should be closely associated with this course. The maximum number of pages of your report is 15 with 12-point font. Please discuss with me your topic before you start to work on it. Three parts are essential: 1) theory and background of the topic, 2) Excel file 3) final data set (plus the codes to process the data, the source of raw data) Note: please do not send me your raw data. Note: a list of potential topics for the group projects will be available after the mid-term.
Course Schedule:	Below is the detailed schedule. I reserve the right to change the course schedule throughout the semester. Changes will be announced in class or via email.
Academic Calendar	(to be added soon)

Term Project: Each group can have up to three members. A topic should be closely associated with this course. The maximum number of pages of your report is 15 with 12-point font. Please discuss your topic with me before you start to work on it. Some basic criteria are listed below. Real-world topics are especially encouraged. Three parts are essential:

1) Theory and background of the topic,
2) Excel is used to finish many in-class exercises
3) Hidden functions can be used to conduct more advanced analyses.

References

Satoshi Nakamoto, 2008, Bitcoin: A Peer-to-Peer Electronic Cash System, https://bitcoin.org/bitcoin.pdf

Appendix A: Steps for R installation

Step 1: go to http://r-project.org
Step 2: Click "CRAN" on the left
Step 3: Choose a server nearby
Step 4: Choose the appropriate type, such as Windows, Mac
Step 5: Download "Base"

Tentative schedule

Week	Date	Topics	HW
1		A short survey, self-introduction, syllabus discussion, syllabus, course structure, Chapter 1: Introduction and Excel Basics Excel functions: left(), right(), count(), counta(), len(),	
		Chapter 1: Excel functions: mod(), vlookup(), concatenate(), concat(), isnumber(), istext(), name a cell, name a data set (matrix, column, row), hide and unhide, solver	
2		Chapter 2: Blockchain 1: Numbers Four-stage approach: 1) numbers, 2) number and letters, 3) ASCII, and 4) Sha256.	
		Chapter 2: Blockchain 1: Alphanumeric Cases Decimal vs. hexadecimal systems : mod(x,16),	#1
3		Chapter 3: ASCII (American Standard Code for Information Interchange) for Blockchains, use Excel to generate blockchain applying ASCII	
		Chapter 3: Concept of Hash and Sha256 Use the website https://passwordsgenerator.net/sha256-hash-generator/ Use our hidden function: .sha256()	#2
4		Chapter 4: Ledger and distributed ledger Accounting concept of ledgers, examples, our hidden functions: .fakeLedger()	
		Chapter 4: Concepts of Distributed Ledger Our hidden functions: .distributedLedger()	#3
5		Chapter 5: Cryptography 1: and public/private keys Concepts of encryption	
		Chapter 5: Generate public/private keys using our hidden function .ppkeys() Encrypt a message with a public key Decrypt a coded message with a private key	#4
6		Chapter 6: Advanced Cryptography (optional chapter) Prime numbers, our hidden functions: .prime() and .isPrime()	
		Chapter 6: Advanced cryptography Elliptic Curve, trapfunction, .eccPlot(), .oneECC(), .P_plus_Q()	#5
7		Chapter 7: Cryptocurrency and Ganache Bitcoin, XRP, etc.	
		Chapter 7: Cryptocurrency and Ganache Platform: Ganache, hidden functions:	#6
8		Review for mid-term	
		midterm	

Continued

9		Chapter 8: crypto markets, risk, and tradeoff Hedging, speculation, and arbitrage	
		Chapter 8: crypto markets, risk, and tradeoff Sharpe, Treynor, and Sortino ratio	#7
10		Chapter 9: Blockchain Applications with Monte Carlo Simulations	
		Chapter 9: Blockchain Applications with Monte Carlo Simulations	#8
11		Chapter 10: Unsupervised Learning Concepts and Excel applications	
		Chapter 10: Unsupervised Learning Our hidden functions, confusion matrix	#9
12		Chapter 11: Supervised Learning: classification Concept of kNN and using Excel to classify	
		Chapter 11: Supervised Learning: classification etc Our hidden functions	#10
13		Chapter 12: supervised Learning: regressions Linear regression, collinearity, VIF concept CAPM (Capital Asset Pricing Model), Fama-French 3-factor model	
		Chapter 12: supervised Learning: regressions Linear for non-linear variables, dummy variables, Logit model	#11
14		Chapter 13: Neural Network and deep learning Using Excel for simple Neural Networks	
		Chapter 13: Neural Network and deep learning	
15		Chapter 14: Smart Contracts (optional) Solidity language, Remix Platform	
		Review before the final exam	