

22:010:686
Summer, 2020
Online

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Blockchain In Accounting

COURSE DESCRIPTION

This course is designed to give an introductory overview to blockchain and related technologies. Students enrolling in this course will learn about the history of blockchain and cyber currency systems. This course also includes an introduction to blockchain functionality, risks and threats, and special concerns. Additionally, this course also provides an introduction to blockchain adjacent technologies such as smart contracts. Finally students will learn about applications for blockchain and related technologies to a variety of different business environments and processes as well as the regulatory considerations of all of these topics.

COURSE MATERIALS

There is no specific textbook to this course. Teaching materials will be drawn from many sources including the Internet, professional articles, academic articles and books. It is expected that if you refer to any of these sources in required assignments that you cite all sources correctly. All the lectures will have a set of slides associated with it and some of them have corresponding videos or papers

LEARNING GOALS AND OBJECTIVES

1. Learn and understand the basic concepts of blockchain systems and their functionality
2. Understand the variety of business applications for blockchain ledger technology.
3. Learn about associated topics and technologies.
4. Gain an understanding of the implications and applications of this enhanced business environment.

SUPPORT SERVICES

If you need accommodation for a *disability*, obtain a Letter of Accommodation from the Office of Disability Services. The Office of Disability Services at Rutgers, The State University of New Jersey, provides student-centered and student-inclusive programming in compliance with the Americans with Disabilities Act of 1990, the Americans with Disabilities Act Amendments of 2008, Section 504 of the Rehabilitation Act of 1973, Section 508 of the Rehabilitation Act of 1998, and the New Jersey Law Against Discrimination. <https://ods.rutgers.edu/>

If you are a military *veteran* or are on active military duty, you can obtain support through the Office of Veteran and Military Programs and Services. <http://veterans.rutgers.edu/>

If you are in need of *mental health* services, please use our readily available services. Rutgers Counseling and Psychological Services – New Brunswick: <http://rhscaps.rutgers.edu/>

If you are in need of *physical health* services, please use our readily available services. Rutgers Health Services – New Brunswick: <http://health.rutgers.edu/>

If you are in need of *legal* services, please use our readily available services: <http://rusls.rutgers.edu/>

If you are in need of additional *academic assistance*, please use our readily available services. Rutgers University-New Brunswick Learning Center: <https://rlc.rutgers.edu/>

ACADEMIC INTEGRITY

I do NOT tolerate cheating. Students are responsible for understanding the RU Academic Integrity Policy (http://academicintegrity.rutgers.edu/files/documents/AI_Policy_2013.pdf). I will strongly enforce this Policy and pursue *all* violations. On all examinations and assignments, students must sign the RU Honor Pledge, which states, “On my honor, I have neither received nor given any unauthorized assistance on this examination or assignment.” [I will screen all written assignments through *Safe Assign* or *Turn it in*, plagiarism detection services that compare the work against a large database of past work.] Don’t let cheating destroy your hard-earned opportunity to learn. See business.rutgers.edu/ai for more details.

GRADING POLICY

The evaluations of your assignments, the course project, and the final exam will be the basis for the course grade. There is no extra credit for this course.

● Assignments	24%
● Course project	38%
● Final exam	38%

Assignments:

There will be four individual assignments throughout the semester. These assignments are designed to examine your ability to implement and understand some of the systems that we have discussed in class. The distribution and due dates are listed in the course schedule below. Each assignment has equal weight in deciding your final assignments grade. You must prepare your answer using a word processor and hand

it in at the start of class. If you submit your answers after the due date and have no valid excuse, you will receive zero score for that assignment.

Course Project:

Each student should complete a course project. A course project details a practical application of any topics learned in this course to a real business case. It is essential to prepare the project as soon as possible. Every student should prepare a one-page proposal for the project, and submit this proposal for evaluation by (6/22). In this proposal, students need to clarify what the outline of the project is. The project is designed to provide each student with a more detailed analysis of an application of blockchain or smart contract technologies. Students should take the approach of examining how companies have adopted blockchain or a related technology into their functionality. This would involve a case study(s) examining how a particular business(es) have integrated blockchain and the impacts (good or bad) that they have had on the business. Finally, the class project should be prepared in the form of a project report as well as PowerPoint slides, and presented on the assigned date. The presentations will be evaluated based on the content, organization, presentation and originality.

Final Exam

The final exam will be an open-book, open-internet exam and last for three hours. All students are expected to take the final exam at the same time on the scheduled day. If a student has a valid excuse not to take the final exam on the exam day, one that complies with the University regulations, the student must contact me and obtain permission to take the exam on another day. Failure to obtain the necessary permission will result in a zero grade.

Students are expected to learn how to mine, organize, and utilize knowledge gained through the Internet. Please do NOT copy/paste from websites! Use your own words and make sure that you cite the materials from the Internet or from other sources appropriately so as to avoid violating the academic honesty policy.

Grades:

- A 94 +**
- A- 90 – 93.99**

- B+ 87 – 89.99**
- B 84 – 86.99**
- B- 80 – 83.99**

- C+ 77 – 79.99**
- C 74 – 76.99**
- C- 70 – 73.99**

- D 65 – 69.99**
- F >65**

PRELIMINARY COURSE SCHEDULE

ASSIGNMENTS AND PROPOSALS ARE DUE BY MIDNIGHT ON MONDAY OF THE WEEK THEY ARE DUE IN THE SYLLABUS.

Lecture	Topic(s)	Item(s) due
1	Introduction to Blockchain	

	<ul style="list-style-type: none"> • History of blockchain. <ul style="list-style-type: none"> ○ Double spending problem ○ Satoshi nakamoto • What is a distributed ledger system. <ul style="list-style-type: none"> ○ Centralized v. Decentralized ledgers • Blockchain Fundamentals <ul style="list-style-type: none"> ○ Linking blocks ○ “immutability” 	
2	<p>Mining and Hashing</p> <ul style="list-style-type: none"> • Various mining algorithms and how they works. <ul style="list-style-type: none"> ○ Proof of stake ○ Proof of work ○ Mining reward schemes • Exchanges (how they work) <ul style="list-style-type: none"> ○ Computational cost/benefit ○ Transaction fees ○ Wallet storage (hot and cold wallets) ○ Loss of anonymity 	
3	<p>Blockchain and Data Sharing</p> <ul style="list-style-type: none"> • Public vs. Private blockchains <ul style="list-style-type: none"> ○ Costs and benefits of either ○ Some applications (governmental, supply chain, public use) • Encryption and public key cryptography <ul style="list-style-type: none"> ○ Uses in cyber currency ○ Blockchain ledger uses. 	Assignment 1, due
4	<p>Attacks on blockchain networks</p> <ul style="list-style-type: none"> • Blockchain vulnerabilities • Various attacks <ul style="list-style-type: none"> ○ 51% attack ○ Race attack 	

	<ul style="list-style-type: none"> ○ Transaction Malleability ○ Wallet attacks ○ Exchange attacks ● Famous Attacks (Mt.Gox) ● Forking <ul style="list-style-type: none"> ○ Hard vs. soft forking ○ Forking use cases. 	
5	<p>Cyber Currencies</p> <ul style="list-style-type: none"> ● Examples <ul style="list-style-type: none"> ○ Traditional cyber currencies ○ Stable coins ● Evaluation issues ● What is an ICO? ● Economics of <ul style="list-style-type: none"> ○ Special economic considerations (inflationary issues, volatility) ○ Economic impacts (capital bleed etc.) ● Exchanges as financial institutions ● Regulatory concerns around the world ● Tax implications <ul style="list-style-type: none"> ○ Business perspectives ○ Personal perspectives 	
6	<p>Smart Contracts (visitor)</p> <ul style="list-style-type: none"> ● What are smart contracts? ● Definition ● History <ul style="list-style-type: none"> ○ · How do they complement blockchain technology? ● What are the benefits of smart contracts on blockchain distributed ledgers ● How do these benefits differ from smart contracts that are not on blockchain <ul style="list-style-type: none"> ○ · Are smart contract utilized to automated legal contracts only? ● Business use case examples ● Government use case examples – forward-looking vision <ul style="list-style-type: none"> ○ · Demo of smart contract 	<p>Project Proposal Due Assignment 2, due</p>

	<ul style="list-style-type: none"> ○ · What are some of the challenges related to smart contracts for business use cases? • Data standardization across blockchains • Deployment of smart contracts – once a smart contract is programmed it may not be as easy to integrate it to blockchain • Maintenance of smart contracts • Provenance of oracles <ul style="list-style-type: none"> ○ · What are some of the challenges related to smart contracts for auditing use cases? • Same 4 issues as on point directly above • Regulatory challenges – is a smart contract an audit procedure? <ul style="list-style-type: none"> ○ · What are some of the challenges related to smart contracts for government use cases? • Same 4 issues • Challenges <ul style="list-style-type: none"> ○ · How can we move forward? 	
7	<p>Auditing and blockchain (Visitor)</p> <ul style="list-style-type: none"> • Special concerns auditing blockchains <ul style="list-style-type: none"> ○ Distributing nodes ○ Understanding technologies • Utilizing Blockchain as an audit tool <ul style="list-style-type: none"> ○ Secure data sharing ○ Integration with regulators ○ Triple entry accounting • Utilizing smart contracts in auditing <ul style="list-style-type: none"> ○ Special concerns involving smart contracts for audit. ○ Evaluating smart contracts ○ Smart Contracts and audit procedures ○ Smart contracts and internal controls. ○ Smart contract analytics. 	
8	<p>Government uses for blockchain and smart contracts (Visitor)</p> <ul style="list-style-type: none"> • Government open data ledgers 	

	<ul style="list-style-type: none"> ○ Sharing government data ○ Special concerns and chain maintenance ○ Armchair auditing ○ Monitoring government data such as purchase processes. ● Tracking public data <ul style="list-style-type: none"> ○ Tracking ownership ○ Increased assurance provisions 	
9	<p>Stable coins and cryptocurrencies: Auditing and valuation concerns (Visitor)</p> <ul style="list-style-type: none"> ● Financial reporting for cryptocurrencies <ul style="list-style-type: none"> ○ Japanese and Australian accounting standards ○ IFRS ○ US GAPP ○ Discussion on possible asset categories ○ Fair value measurement ○ Lukka Prime project ● Stablecoins <ul style="list-style-type: none"> ○ Introduction ○ Quick preview on Libra <p>Stable Coin examples</p>	Assignment 3, due
10	<p>Using Blockchain and Smart Contracts to enable Audit 4.0 (Visitor)</p> <ul style="list-style-type: none"> ● Background of Industry 4.0 and Audit 4.0 ● Reengineering of Audit Processes to Enable Audit 4.0 Using Blockchain and Smart Contracts ● Applying Audit 4.0 to Accountability Audit of Air Pollution Controls In China <ul style="list-style-type: none"> ○ Problems in the Accountability Audit of Air Pollution Controls ○ A Continuous Accountability Audit System ○ Demo 	
11	<p>Hands-on exercise of creating a blockchain (Visitor)</p>	

	<ul style="list-style-type: none"> • Introduction to MultiChain • How to implement <ul style="list-style-type: none"> ○ Create and initiate a blockchain ○ Connect to the blockchain ○ Issue coins and transfer coins • Applications in accounting and auditing <ul style="list-style-type: none"> ○ 	
12	<p>PRESENTATIONS DUE</p> <p>FINAL EXAM</p>	<p>Assignment 4, due</p> <p>Project Papers and Presentations Due</p>