New York University Tandon School of Engineering
Computer Science and Engineering Department
CS-GY 9223D / CS-UY 3943 BK09
Introduction to Blockchain and Distributed Ledger Technology
Spring 2021
Professor Ayesha Kiani
Tu 11:00AM - 1:30PM
Rogers Hall, Rm 116 Loc: Brooklyn Campus

To contact professor:

Course Prerequisites: CS-UY 1134 (Data structures and Algorithms) , CS-UY 2413 (Design and Analysis of Algorithms) and MA-UY 2314 (Discrete Mathematics). It is very important for the students to have the basic understanding of Computer Science or Cryptography. Blockchain and Cryptocurrency by nature are very technical topics and therefore, this course is for students who are interested in learning and implementing it more.

Course Description: Blockchain is the first successful technology that enables trust without any authority. This course examines the foundations of blockchain technology from technical perspectives. It is designed to provide students with an understanding of key concepts and developments around cryptocurrencies and distributed ledger systems. By the end of this course you will understand how blockchain work and the ideas, technologies, and organizations sprouting from it.

Course Structure: Most of the material will be presented in lectures. Reading assignments from online, homework assignments will reinforce this material. You should expect to spend a substantial time researching on the homework assignments. 2 hours of lecture per week, 30 minutes of interactive discussion. Assignments and other important announcements will be posted on NYU Classes. You should check the course page every day and sign up for e-mail notification of announcements.

Bitcoin and Cryptocurrency Technologies (Princeton textbook) by Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller, and Steven Goldfeder:
https://d28rh4a8wq0iu5.cloudfront.net/bitcointech/readings/princeton_bitcoin_book.pdf
(Optional/Additional) Mastering Bitcoin by Andreas Antonopoulos:
PDF: https://drive.google.com/file/d/0B8IgcDXI8hEfbXFYcTh6aXNqRkk/view?usp=sharing
Source: https://github.com/bitcoinbook/bitcoinbook

Course requirements:
Grading will be based on Homework and Quizzes (30%), Attendance (20%), Final Paper (30%), Presentation (10%) and Participation (10%). There will be assigned readings each week, which you should complete in order to do well. Quizzes are intended to be a quick, easy screen designed for you to demonstrate that you completed your readings for the current week's topic. We will administer quizzes on random weeks. Final will be based on all the material covered in the class. Students will do a final presentation in

class on a topic that they hope to work on in near future. Submitting a final paper and presentation is required to pass the class.

Course Topics:

Feb 2: Bitcoin Protocol - A technical overview and history
Feb 9: Bitcoin and Blockchain: From anonymity to widespread adoption. Blockchain Dynamics: Public and Private Blockchains, Hard and Soft Fork and Side Chains.
Feb 16: Blockchain Minings and Forks. Origins of blockchains and distributed ledgers
Feb 23: Introduction to Cryptography - Application of Cryptography to Blockchain.
March 2: Smart Contracts, Collision, Hash Functions - Alvaro Luken
March 9: Distributed Systems, Alternative Consensus and Algorithms
March 16: Ethereum and Smart Contracts
March 23: **Decentralized Finance - Guest Lecture: Santiago Roel Santos**
March 30: Usage of Blockchains
April 6: Cryptocurrencies - Guest Lecture: Aya Kantorovich
April 13: Scaling Blockchain – Merkle trees and Sharding and Layer 2 solutions
April 20: Trading Markets - Cryptocurrencies + Exchanges + Derivatives - Guest Lecture: Shiliang Tang
April 27: Presentations
May 4: Presentations and Final Review
TBD: Final

Moses Center Statement of Disability
If you are student with a disability who is requesting accommodations, please contact New York University's Moses Center for Students with Disabilities (CSD) at 212-998-4980 or mosescsd@nyu.edu. You must be registered with CSD to receive accommodations. Information about the Moses Center can be found at www.nyu.edu/csd. The Moses Center is located at 726 Broadway on the 3rd floor.

NYU School of Engineering Policies and Procedures on Academic Misconduct – complete Student Code of Conduct

A. Introduction: The School of Engineering encourages academic excellence in an environment that promotes honesty, integrity, and fairness, and students at the School of Engineering are expected to exhibit those qualities in their academic work. It is through the process of submitting their own work and receiving honest feedback on that work that students may progress academically. Any act of academic dishonesty is seen as an attack upon the School and will not be tolerated. Furthermore, those who breach the School's rules on

academic integrity will be sanctioned under this Policy. Students are responsible for familiarizing themselves with the School's Policy on Academic Misconduct.

B. Definition: Academic dishonesty may include misrepresentation, deception, dishonesty, or any act of falsification committed by a student to influence a grade or other academic evaluation. Academic dishonesty also includes intentionally damaging the academic work of others or assisting other students in acts of dishonesty. Common examples of academically dishonest behavior include, but are not limited to, the following:

1. Cheating: intentionally using or attempting to use unauthorized notes, books, electronic media, or electronic communications in an exam; talking with fellow students or looking at another person's work during an exam; submitting work prepared in advance for an in-class examination; having someone take an exam for you or taking an exam for someone else; violating other rules governing the administration of examinations.

2. Fabrication: including but not limited to, falsifying experimental data and/or citations.

3. Plagiarism: intentionally or knowingly representing the words or ideas of another as one's own in any academic exercise; failure to attribute direct quotations, paraphrases, or borrowed facts or information.

4. Unauthorized collaboration: working together on work meant to be done individually.

5. Duplicating work: presenting for grading the same work for more than one project or in more than one class, unless express and prior permission has been received from the course instructor(s) or research adviser involved.

6. Forgery: altering any academic document, including, but not limited to, academic records, admissions materials, or medical excuses.

NYU School of Engineering Policies and Procedures on Excused Absences – complete policy

A. Introduction: An absence can be excused if you have missed no more than **10 days of school**. If an illness or special circumstance has caused you to miss more than two weeks of school, please refer to the section labeled Medical Leave of Absence.

B. Students may request special accommodations for an absence to be excused in the following cases:

   1. Medical reasons

   2. Death in immediate family

   3. Personal qualified emergencies (documentation must be provided)

   4. Religious Expression or Practice

Deanna Rayment, deanna.rayment@nyu.edu, is the Coordinator of Student Advocacy, Compliance and Student Affairs and handles excused absences. She is located in 5 MTC, LC240C and can assist you should it become necessary.

NYU School of Engineering Academic Calendar – complete list   .
The last day of the final exam period is May 14. Final exam dates for undergraduate courses will not be determined until later in the semester. Do not make any travel plans until the exam schedule is finalized.
Also, please pay attention to notable dates such as Add/Drop, Withdrawal, etc. For confirmation of dates or further information, please contact Susana: .