State University of New York Polytechnic Institute
CS 538 : Blockchain: From Cryptography to Optimization

Instructor: Dr. Chen-Fu Chiang
Semester: Spring 2022
Time: MW 4:00 pm - 5:15 pm
Location: Kunsela Hall C104
Office Hours: MW: 1:30 pm - 4:00 pm || By appointment
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Email: chiangc@sunyply.edu (best way to reach me)
URL: http://www.cs.sunyit.edu/∼chiangc

Required Text

Optional: Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction
Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller and Steven Goldfeder

Useful Online Reference & Lab for Lecture Notes

1. Blockchain and Money
https://ocw.mit.edu/courses/sloan-school-of-management/15-s12-blockchain-and-money-fall-2018/
2. Algorand Development
https://developer.algorand.org/docs/

Course Description

This course is for students wishing to explore blockchain technology's potential use to change the world of money and finance. The course begins with a review of Bitcoin and an understanding of the commercial, technical, and public policy fundamentals of blockchain technology, distributed ledgers, and smart contracts. The class then continues on to current and potential blockchain applications in the financial sector. For realization, we will use the Algorand framework to implement decentralized application to realize of interest protocols in a decentralized network. General advice: Please read blockchain news websites, such as CoinDesk, CCN.com, and Coin Telegraph, every week. As the world of blockchain technology and crypto finance are rapidly changing, specific (short) articles might be added to the reading when relevant.

Student Learning Outcomes

Upon completion of this course the student should be able to:

- Understand the basic concepts associated with the filed of blockchain
- Analyze specific problem areas of study within decentralized network models
- Explore current state-of-the-art approaches and techniques used in research in this field

Topics

Each topic should last for 1 or 2 lectures, based on the progress in the class. The instructor will speed up or slow down the lectures according to students' understanding of the material. It is recommended that the students read the material (and the original papers) ahead before the lecture.

seq #	Topics	seq #	Topics
1	Introduction	2	Blockchain and Money Fundamentals
3	Blockchain Basics and Cryptography	4	Blockchain Basics and Consensus
5	Blockchain Basics and Transactions	6	Smart Contracts and DApps
7	Permissioned Systems	8	Challeges and Opportunities
9	Digital ID	10	Algorand Intorduciton
11	Development Environment	12	Tokenization
13	NFT and Security Tokens	14	Integration
15	Search On-chain Data	14	Cross Chain Search

Grading (Tentative)
The lecture format will be the basic mechanism used in the course. Computer demonstrations in the classroom will be used whenever appropriate. Assessment of student performance will use a criterion-referenced model which will include written assignments (30%), 1-2 term paper writeup(s) and its presentation (45%), and a comprehensive final exam (25%). **Late assignment will not be accepted unless you have made prior arrangements with me**. The acceptable format of your solution will be specified in the assignment. All examinations are closed-book. Percent and Grade :
89.5-100 A 79.5-89.5 B 69.5-79.5 C 59.5- 69.5 D Below 59.5 F
(+/- modifiers will also be used ; for instance, [95.5-100]: A+, [92.5-95.5): A, [89.5-92.5): A-)

Attendance Policy
Attendance and active class participation are required. Be prepared to participate by asking and answering questions during class meetings. Please send me an email if you know you have to miss a class.

Academic Integrity/Policy
Plagiarism and Cheating of any kind on an examination, quiz, or assignment will result at least in an F for that assignment (and may, depending on the severity of the case, lead to an F for the entire course). I will assume for this course that you will adhere to the academic creed of this University and will maintain the highest standards of academic integrity. In other words, do not cheat by giving answers to others or taking them from anyone else. The code of academic conduct is detailed on the SUNY Poly student handbook. Make-ups are only given under extreme circumstances. I will also adhere to the highest standards of academic integrity, so please do not ask me to change (or expect me to change) your grade illegitimately or to bend or break rules for one person that will not apply to everyone.

Plagiarism Warning
The work you submit must be your own. You will not receive credit for work which is not your own. You may ask others (classmates/friends/instructors) for advice or help regarding the subject matter of a problem set. However, your answers and the actual design, coding, entry, and running of your programs must represent your own work. All sources of ideas that are used in any way (quoted, paraphrased, or summarized), including ideas taken from the text, must be acknowledged in problem set program

documentation. Failure to provide proper attribution constitutes academic dishonesty, and it will result in a failing course grade. Substantially identical program submissions by multiple students, even with attribution, may result in a failing course grade to all who submit the same program. Submitting a program written by someone else, even with attribution, is strictly prohibited and will result in a failing course grade. Students are further reminded that it is their responsibility to take reasonable precautions to prevent copying of their work by other students and that there are now criminal penalties for computer trespass and computer tampering.

Cancellation of Classes Due to Inclement Weather or Other Emergency

SUNY Poly has a 24-hour hotline to inform students, faculty and staff when severe winter weather prompts the cancellation of all classes. On-campus, you can call the "Snowline" by dialing ext. 7669 ("SNOW"). Off-campus, Snowline can be reached by calling 315-792-7385. Snowline cards are available at various locations on campus. In the event of severe weather, Snowline will announce only the cancellation of ALL classes. The cancellation of all classes will also be posted online, at sunypoly.edu, and will be broadcast on radio and television stations in the Utica-Rome, Syracuse, and Albany areas. Individual class cancellations are always available at sunypoly.edu/apps/canceled_classes .

Accommodations for Students with Disabilities

Your access in this course is important to me. In compliance with the Americans with Disabilities Act of 1990 and Section 504 of the Rehabilitation Act, SUNY Polytechnic Institute is committed to ensuring comprehensive educational access and accommodations for all registered students seeking access to meet course requirements and fully participate in programs and activities. Students with documented disabilities or medical conditions are encouraged to request these services by registering with the Office of Disability Services. Please request accommodations early in the semester, or as soon as you become registered with Disability Services, so that we have adequate time to arrange your approved academic accommodation/s. Once Disability Services creates your accommodation plan, it is your responsibility to provide me a copy of the accommodation plan.

If you experience any access concerns that may require the need for adaptive or alternate format/presentation of materials, reach out to me or Disability Services right away.

For information related to these services or to schedule an appointment, please contact the Office of Disability Services using the information provided below. The Office of Disability Services can accommodate virtual meeting requests. The website has helpful information, and the link can be found here: https://sunypoly.edu/student-life/diversity-equity-inclusion/disabilities-services/contact-us.html

Leslie K. Reid, Director (she/her/hers)
Office of Disability Services
reidl@sunypoly.edu
(315) 792-7170

Utica Campus
Peter J. Cayan Library, L145

Albany Campus
Suite 309, Students Services Office
NanoFab South