

## **CYB 7863-01 Blockchain and Fintech Security Summer 2022**

The University of Tulsa

**Instructor:** Andrew Morin, Dr. Tyler Moore, Dr. Eric Olson

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**Office Hours:** By appointment.

**Synchronous Live Sessions:** Held online in Teams each Wednesday 7:30-8:45pm.

**Textbook:** Bitcoin and Cryptocurrency Technologies, Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller, and Steven Goldfeder. Publisher: Princeton University Press (2016), Princeton, NJ, ISBN: 0691171696.

Pre-publication draft available for free online at: <https://bitcoinbook.cs.princeton.edu>

### **Program Learning Objectives:**

- Possess a comprehensive understanding of the fundamental concepts of cybersecurity.
- Obtain and refine the skills necessary to improve an organization's cybersecurity posture.
- Apply theoretical concepts to the practice of cyber security.
- Demonstrate professional skills and behavior.

### **Student Learning Objectives**

Upon completing this course, students should be able to:

1. understand and explain the architecture of cryptocurrencies,
2. describe the operation of and work with blockchains,
3. develop smart contracts using Ethereum,
4. explain monetary/banking issues that have arisen in cryptocurrencies and blockchain technology
5. understand and explain relevant financial rules and regulations that impact technology.

The student will demonstrate the knowledge and skills listed above through retention quizzes, lab assignments, discussion board postings, and a final project.

### **Content Delivery and Timing**

- Video lectures, presentations, reading materials and periodic synchronous video discussion sections are made available via the course website on Harvey. Recordings of discussion sections will be preserved and made available to students who cannot participate live.
- Students should expect to spend approximately 10 hours per week on average in order to complete to complete coursework (see next section). Please plan your time accordingly.
- Weekly content is released no later than 12:01 AM on the Monday for each week. Assignments are due at the end of the week indicated above, i.e., at 11:59 PM on the following Sunday. Any modifications to the due date will be indicated directly on the assignment.
- Weekly retention quizzes cover each week's instructional materials; they are

due at the end of the week, i.e., at 11:59pm on Sunday.

### Topics and Schedule

Week	Topic	Live Session	Learning Activities
1	Intro to Cryptocurrencies & Decentralization	Office Hours	Retention Quiz (RQ) 1
2	Bitcoin Mechanics, Storage and Use	Mandatory	RQ 2, Lab 1
3	Bitcoin and Anonymity	Office Hours	RQ 3
4	Bitcoin Mining	Mandatory	RQ 4, Lab 2, Proposal
5	Intro to Ethereum	Office Hours	RQ 5
6	Ethereum Blockchain & Smart Contracts	Mandatory	RQ 6, Lab 3
7	Tokens & dApps	Office Hours	RQ 7
8	Smart Contract Security	Mandatory	RQ 8, Lab 4, Presentations
9	A Brief History of Money	Office Hours	RQ 9
10	Banking, Central Banking, and Lending	Mandatory	RQ 10, Lab 5, Feedback
11	Cryptocurrency as an Asset Class	Office Hours	RQ 11
12	Machine Learning or Other	Mandatory	RQ 12, Lab 6, Written Report

### Coursework

As you move through the topics in each module, rather than simply viewing lecture content, you will be asked to read, listen to, and watch a variety of media. You'll also be regularly prompted to actively evaluate your knowledge as you're building it.

The components in each module are designed to be completed sequentially in order. In addition to videos, readings and interactives, I want to bring your attention to a few types of learning activities you'll encounter.

- **Retention Quizzes:** At the conclusion of each module, you will complete a graded retention quiz covering concepts introduced in the module. These quizzes are designed to assess your learning at regular intervals, identify gaps in knowledge, and help you prepare for the course exams. You can take these quizzes twice.
- **Yellowdig Engage:** Each week, you'll encounter a prompt to post in Yellowdig Engage (including on the very next page). This is a discussion forum distinct from the one just mentioned. Here the prompts are shorter and much more open-ended. Your instructor won't grade the responses, but we will monitor and participate. You are also encouraged to post anything you find interesting that is related to the course that you feel is worth sharing. Since the material covered in this course is often very topical, there will be many opportunities to relate news articles, blogs and other coverage of current events. Yellowdig Engage is the place for that. Posts to Yellowdig Engage contribute to your overall class participation grade. Note: you are expected to post in weeks 1-12 AND during the week of spring break.
- **Mandatory Live Sessions:** Six live sessions with scheduled activities are scheduled throughout the course. In some sessions, you will work collaboratively with your classmates to solve a problem. In others, you'll work through steps to help you complete your lab assignments. Because these sessions often involve group work, attendance is mandatory.

- **Live Session Office Hours and Q&A:** These live sessions appear in the weeks when no mandatory synchronous activity is scheduled. Use this time to ask your instructor about any concepts you are struggling with, difficulties with assignments, or to simply share something relevant to the class you encountered this week. Participation is highly recommended but not required.
- **Labs:** There will be 6 lab assignments comprising hands-on activities and short answer questions:
  - L1: Testnet Wallet and Transactions
  - L2: Reidentifying Testnet Transactions
  - L3: Smart Contracts
  - L4: Build Your Own ERC-20 Token
  - L5: Monetary Theory
  - L6: Fintech
- **Final Project:** Your task is to evaluate a proposed blockchain or fintech application. For example, this could be a coin, token, smart contract, or decentralized application platform. You should identify its whitepaper or other technical material describing the claimed innovation. Your job is to evaluate its suitability as a technological innovation, its exposure to regulatory oversight, and make a recommendation as to whether it is suitable. If blockchain or other cryptocurrency technology is used, you should discuss whether the technology is truly needed and explain your rationale.

**Final Project Stages and Deliverables**

- **Project Proposal** (due at the end of week 4, 10% of project grade): In the one-page proposal, identify the members of your group, the application being studied (name, URL), a one to two paragraph description of the application, another one to two paragraph description of why you selected this, and one to two paragraphs explaining the questions you seek to investigate.
- **Project Presentations** (due at the end of week 8, 40% of project grade): Groups record a 15-minute presentation describing and evaluating the technology by answering the questions outlined in paragraph one above.
- **Presentation Feedback** (due at the end of week 10, 10% of project grade):  
Students will have two weeks to watch everyone’s presentations and give constructive feedback.
- **Project Report** (due end of 12<sup>th</sup> week): Writeup of the technology analysis. Groups are expected to incorporate feedback from the presentations to their final report.

**Grade Distribution**

Assignment Type	% of Final Grade
Retention Quizzes	20
Mandatory Live Sessions	5

Final Project	35
YellowDig Discussions	15
Labs / Homeworks	25

I use standard percentage cut-offs when determining letter grades (e.g., [90-100] is an A, [80-90] is a B, etc.). I do not use a curve in assigning grades, as I believe grading on a curve discourages collaboration among students. Occasionally, though, a particular assignment maybe too difficult and so I reserve the right to adjust the score appropriately.

**Policy on Late Work** The range of topics covered in this class is substantial, and course material often builds on concepts introduced in prior assignments and exams. Consequently, it is essential that you do not fall too far behind. As a result, assignments really are due at the time stated in the course schedule. If you have not finished the assignment before it is due, please turn in what you have completed.

There are three exceptions to this policy. First, if you have an emergency (e.g., serious illness, death in the family), please let me know as soon as possible so we can work out an accommodation. Second, students are given 5 lateness coupons for retention quizzes and labs (though not YellowDig posts, or final project deliverables) for use throughout the semester, with one coupon equal to a 24-hour extension. To redeem a lateness coupon, you must send an email to your instructor with subject "CYB 7863-01 Lateness Coupon" BEFORE the assignment is due. In the body of the message please let me know how many coupons you wish to redeem. The third exception to the strict deadline policy is for unforeseen circumstances that affect everyone: the power goes out on campus two hours before a lab is due, for example. In this case, I will extend the deadline in a reasonable manner (e.g., extend by 24 hours after power is restored). I will post an announcement by email if such a circumstance arises.

Any late work without a coupon will receive a 10 percentage point deduction per 24 hours it is late. No late work is accepted more than 96 hours after it is due.

**Collaboration and Attribution** I encourage collaboration between students on assignments and when studying. Collaboration is an essential skill for engineering, not to mention life in general. It's especially important in an online learning environment, which can be isolating. Unless I say otherwise, feel free to discuss assignments with your classmates, including ideas for how to solve problems. Please do not, however, share code, equations, or written answers that solve an assignment directly with other students. Solutions to homeworks should be written from scratch and must not be pieced together from other students. **You are strongly encouraged to post any content-related questions to YellowDig so that the instructor and your fellow students can contribute.**

It is also important to give credit to others when appropriate. If you implement an idea that you got from another student (or students), please say so. Furthermore, if you consult a web resource that directly assists you, please say so. As a reminder, it is also not acceptable

to copy code or equations directly from a web resource that solves a problem on an assignment.

### **Online Etiquette**

An essential goal of the MS in Cyber Security is to develop a sense of camaraderie among students in the program. Much of that interaction will take place online, where it is all too easy to be misunderstood, come across as brusque or rude, and communicate without thinking. Please remain a civil, constructive and friendly dialogue in the online postings, synchronous sections, and other online interactions. Rude, offensive, inconsiderate and disparaging communication will not be tolerated.

**ENS College Academic Misconduct Policy** In keeping with the intellectual ideals, standards for community, and educational mission of the University, students are expected to adhere to all academic policies. Cheating on examinations, plagiarism, and other forms of academic dishonesty violate both individual honor and the life of the community, and may subject students to penalties including failing grades, dismissal, and other disciplinary actions. For full details please see the College of Engineering and Natural Sciences Academic Misconduct Policy.

Any student found to have committed academic misconduct activities will, in the first instance, receive a grade of 0 on the assignment or exam. In the second instance, the student will receive a failing grade for the course. Note that this includes copying code or writing from the Internet or other resources without attribution. Note that University policy requires me to notify the Associate Dean for Academic Affairs in the event of identifying academic misconduct.

**Rules and Conduct for Using Computers** The following rules govern the proper use of computers and related resources at the University of Tulsa. Violation of such rules constitutes academic misconduct. Penalties may range from reduction of course grade to dismissal from the university. The computer or account allocated to you is to be used only by you and only for assigned course work. Logging in, running jobs under, accessing or using information in computers or accounts other than those assigned to you constitutes academic misconduct and is strictly prohibited. Giving your account number or account information such as passwords to anyone else constitutes academic misconduct and is strictly prohibited. Giving the keyless entry code to any room to anyone else constitutes academic misconduct and is strictly prohibited. Programs and data supplied by an instructor for use in courses remain the property of the instructor and/or the University of Tulsa. They may not be copied without express consent of the owner. Reading, copying, modifying or deleting of files created by other people is not allowed. Note that programs turned in that are "identical" in syntax or semantics will not be accepted, and the students involved may fail the course or even be dismissed from the University. This is a serious matter.

**Extra Credit** It is my policy to not offer extra credit assignments on a per-student basis. To ensure fairness, extra credit may only be offered to all students, and would most likely take the form of a modest reward for viewing an optional lecture, not an extra assignment.

**Student Success Team statement:** All students are encouraged to familiarize themselves with and take advantage of services provided by The Student Success Team, including Student Access, Student Success Coaching, and tutoring. To request a student success coach to improve study skills, email [successcoaches@utulsa.edu](mailto:successcoaches@utulsa.edu). To request a tutor, email [tutoring@utulsa.edu](mailto:tutoring@utulsa.edu).

**Student Access statement:** Students who have or believe they may have a disability and would like to set up accommodations should contact Student Access within the Student Success Team to discuss their needs and facilitate their rights under the Americans with Disabilities Act and related laws. Student Access provides private consultations to any student. Contact Student Access staff by email at [studentaccess@utulsa.edu](mailto:studentaccess@utulsa.edu) or by phone at 918-631-2315. The online application for accommodations may be obtained [here](#). Student Access staff will assist students in the implementation of approved accommodations. Students who qualify for accommodations should meet with the instructor privately (during office hours or by appointment) as soon as possible to arrange for their needs and obtain support for the class.

**Religious Observance** Religiously observant students wishing to be absent on holidays that require missing class should notify their professors in writing at the beginning of the semester, and should discuss with them, in advance, acceptable ways of making up any work missed because of the absence.

**Know Your IX** Sexual misconduct is prohibited by Title IX of the Educational Amendments of 1972 ("Title IX") and will not be tolerated within the TU community. Sexual misconduct encompasses all forms of sex and gender-based discrimination, harassment, violence, and assault, as well as dating violence, domestic violence, interpersonal violence, stalking and sexual exploitation. If you or someone you know has been harassed, assaulted, or stalked, or if you have questions about violence prevention resources available to you, please contact any of the following campus and community resources:

Title IX Coordinator 918-631-4602 Office of Violence  
Prevention 918-631-2324 TU Counseling and Psychological  
Services  
918-631-2241 Campus Security 918-631-5555 Domestic  
Violence Intervention Services 918-585-3163 or 918-743-5763  
Tulsa Police Department 918-596-9222 or 911 (emergency  
situations)

For more information about your rights under Title IX, please visit our Policies and Laws page

on the TU website or contact the Title IX Coordinator. Every student on our campus has the right to resources. Please come forward and ask questions, report, and help us eradicate sexual misconduct and interpersonal violence by stopping the silence surrounding it.

**Disclaimer** Please note that this syllabus is subject to change. Any changes to the syllabus will be announced on Harvey.