MIS410/510 Syllabus

BLOCKCHAIN & CRYPTOCURRENCY

Fall, 2022

### Class Time & Location:

* ??

### Prerequisites:

* MIS207/MIS532

### Professor Contact Information:

| **Professor:** | **Dr. Tim Smith** |
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| Office: | Gerdin 3116 |
| Office Hours: | 3-4 pm, MWF |
| E-mail: | timsmith@iastate.edu |
| Contacting Me: | The best way to contact me is via email. If you send me an email before 4 PM,  you should expect a response the same day. |

## Course Description:

The potential applications for **blockchain technologies** are enormous.

Whereas most technologies tend to automate workers on the periphery doing menial tasks, blockchains automate away the center. Instead of putting the taxi driver out of a job, blockchain puts Uber out of a job and lets the taxi drivers work with the customer directly.

*Vitalik Buterin (co-founder of Ethereum)*

The course will cover the applicationaspects of cryptocurrencies, blockchain technologies, and the key value these technologies bring **-** distributed consensus and trust disintermediation. This course is not intended to promote cryptocurrencies, or advocate for investing in them. We will look at the technology for both its potential, and its limitations.

Moreover, to better prepare your knowledge as to the potential future of cryptocurrencies, this course will cover the historical context within which we find the rise of cryptocurrencies – included in this will be the history of money and the current governance structure surrounding money supply and monetary policy, and the history of digital currencies before bitcoin.

This course will focus on BitCoin and Ethereum as cases, or instances, of blockchain technology. Applications for Cryptocurrency, Finance, and business will be discussed.

## Educational Objectives:

Upon completion of the course students will be able to:

* Situate cryptocurrencies within the historical evolution of money and current monetary supply and governance.
* Understand how current monetary works, how it’s set, and the role of the federal reserve.
* Understand the potential impacts of blockchain on economic and monetary policy.
* Situate cryptocurrencies within the evolution of the Internet – and a shift from the Internet of Information, to the Internet of Value.
* Situate blockchain and modern cryptocurrencies within the historical evolution of digital currencies.
* Describe the underlying blockchain technology that underpins cryptocurrencies such as Bitcoin and Ethereum.
* Understand existing, and potential, applications that blockchain supports.
* Understand how to set up cryptocurrency wallets, the exchange between different cryptocurrencies, and conduct transactions on both the bitcoin and Ethereum network.
* Describe the role of miners that participate in both Bitcoin and Ethereum networks.
* Understand how to access data and mine blockchain information.

## Course materials:

### Class Website:

1. Canvas. All grades, quizzes and tests will be made available on Canvas

## Textbooks:

### **NOTE: This is TBD – currently reviewing potential text, and creating custom content (what you see below was taken from a grad level special topics course I taught at another university)**

### The following are recommended (but not mandatory) texts that will help augment your learning.

### The following text is a detailed technical introduction. Though portions of this are quite readable to those with a technical background in computing and the internet; some portions require understanding advanced computer science concepts. This book gets into sufficient detail to help you develop a blockchain based cryptocurrency.

|  |  |
| --- | --- |
| Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction | *Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction*  *by Arvind Narayanan and Joseph Bonneau* |

The following text is a higher-level discussion on bitcoin and blockchain. Though it does get technical in spots, its target audience is much more geared towards those without a deep understanding of computing. This book is an excellent source of understanding implications, and possible future outcomes.

|  |  |
| --- | --- |
| https://images-na.ssl-images-amazon.com/images/I/51x2tRzE%2BxL._SX324_BO1,204,203,200_.jpg | *The Blockchain Revolution: How the Technology Behind Bitcoin and other Cryptocurrencies is Changing the World*  *by Don Tapscott and Alex Tapscott* |

Finally, I recommend a pair of books written by Andreas M. Antonopoulos. The first book is quite technical and makes for a great companion book to Arvind Narayanan and Joseph Bonneau’s book. The second, is much more tailored towards a more general audience – and introduces high level aspects of blockchain and crypto currency through a number of essays/expositions by the author.

|  |  |  |
| --- | --- | --- |
| Mastering Bitcoin: Programming the Open Blockchain | | *Mastering Bitcoin*  *by Andreas M. Antonopoulos* |
| The Internet of Money by [Antonopoulos, Andreas M.] | *The Internet of Money*  *By Andreas M. Antonopoulos* | |

## Grade determination:

### Undergraduate:

|  |  |  |
| --- | --- | --- |
| *Component* | *Points* | *Description* |
| Exercises | 150 | Ten worth 15 pts each |
| Quizzes | 200 | Ten worth 20 pts |
| Final Research Project | 300 |  |
| Final Exam and Tests | 350 |  |
| **TOTAL POSSIBLE POINTS** | **1000** |  |

### Graduate:

|  |  |  |
| --- | --- | --- |
| *Component* | *Points* | *Description* |
| Journal | 150 |  |
| Presentations | 200 |  |
| Final Research Project | 300 |  |
| Final Exam and Tests | 350 |  |
| **TOTAL POSSIBLE POINTS** | **1000** |  |

The grading scale used to determine your final grade is as follows:

| 920 -1000 | A |
| --- | --- |
| 880 – 919.99 | AB |
| 820 – 879.99 | B |
| 780 – 819.99 | BC |
| 720 – 779.99 | C |
| 680 – 719.99 | CD |
| 600 - 679.99 | D |
| Below 600 | F |

## Individual Presentations:

Eight out of the ten classes will involve student presentations. Presentations are opportunities for students to expand their knowledge surrounding crypto/blockchain concepts and to share findings with others in the class. Topics covered are selected to provide you with the opportunity to expand upon the material covered in class. to improve your analytical skills and help to develop your own views on this emerging area. Each presentation should encourage discussion (pose questions to audience if no questions are raised). Early presentations (the first two) should be 5 to 15 minutes in length (including discussion). Later presentation instructions will include an expected time range.

*Note: There are* ***NO*** *make-ups for in-class presentations. In cases of excused absence, the average of the student's other presentations will be used to calculate his/her final assignment points. In cases of unexcused absences, the student will receive a grade of zero for the missed presentation (see excused absence section later in this document).*

## Journal

Journals are your reflections on class material and learnings. You must provide a journal entry for each of the ten classes. Journal entries provide you with an opportunity to reflect on your thoughts, learnings, and insights along the way. Journal entries for a class must be made before the start of the next class. These will be entered via blackboard. Students must attend the class in which the journal is submitted for in order to receive marks.

## Final Project

### You will write a final research project outlining your ideas and thoughts surrounding the application of blockchain/cryptocurrency technology to a given field or industry. An outline of your area must be submitted to the professor by end of week 2 (at the latest). Each student research project must be specific, and unique, therefore if your idea is similar to one already approved for another student, you will be required to submit a new idea.

## Class Participation:

This mark will be assessed by the professor based on your positive demeanor, contributions, and participation in classroom discussion and activities. Positive contributions may include being called upon to answer questions and present solutions to the class.

## Grading Appeals:

If you have questions about your grade for a particular quiz/homework/exam, please stop by my office or e-mail me. I will not discuss grades during class time. You can appeal your grade within 48 hours from the time the grade has been assigned. After this 48-hour period the grade becomes final.

## Incomplete Grades:

Incomplete grades will be assigned only in the event of an extraordinary circumstance that prevents you from completing the class this semester. Students must have completed the first two tests with a passing grade before being considered for an incomplete. All incomplete grades must be completed by the date specified on the incomplete form submitted to the Registrar.

## Class Schedule

| **Session** | **Date** | **Topic(s)** | **Objectives** |
| --- | --- | --- | --- |
| Module 1 |  | * Course Introduction * Cryptocurrencies situated within the historical evolution of money. * Money supply, and monetary policy (US and international) | * Describe examples of previous forms of money. * Describe the role of a central bank. * Describe the structure of the Federal Reserve, and the process through which rates are set. |
| Module 2 |  | * Cryptocurrencies situated within the evolution of the Internet – and a shift from the Internet of Information, to the Internet of Value. Situate blockchain and modern cryptocurrencies within the historical evolution of digital currencies. Discuss the emergence of alt-coins. | * Describe examples of previous forms of digital currency (before Bitcoin) * Describe how modern (post Bitcoin) cryptocurrencies differ from previous digital currencies. * Describe the use of the term "a new internet" when referring to the future of cryptocurrencies. |
| Module 3 |  | * Underlying blockchain technology that underpins cryptocurrencies such as Bitcoin and Ethereum. Proof of work vs Proof of stake. | * Describe the components of the blockchain * Describe the process confirming a block for proof-of-work based cryptocurrencies. * Describe the process confirming a block for proof-of-stake based cryptocurrencies. * Create a smart contract on the Ethereum Network |
| Module 4 |  | * Existing, and potential, applications that blockchain supports. | * Describe the Ethereum virtual machine * Create an ERC-20 token using Solidity |
| Module 5 |  | * Managing transactions: Cryptocurrency wallets, the exchange between different cryptocurrencies, the role of exchanges, and how to conduct and monitor transactions on both the bitcoin and Ethereum network. | * Create a smart contract which exchanges ERC-20 tokens created in previous assignment. |
| Module 6 |  | * Understand how to access data and mine blockchain information. | * Describe the structure of data stored within a given blockchain application. * Identify insights that can be gleaned from an analysis of blockchain data. |

**Important:** This is a proposed outline of course topics. Schedule variations, additions and deletions, will most likely be required during the semester. Any changes made will be reflected in the current live version found on the class website.

## Academic Expectations:

The course will challenge you to develop critical thinking and analytical problem-solving skills that will be benefit you throughout your career, no matter your major. This course will also involve a great deal of reading, watching videos, and independent research.

Simply attending class each will not guarantee you an A. You will be expected to contribute to class discussion. Classes will be kept to a reasonable length as to leave some class time for your independent work.

## Computer Resources:

Our class meets in a computer lab, and all required software will be installed on those computers to perform in-class work. You are greatly encouraged though to bring and use your own laptops.

*NOTE1: Classroom computers are wiped clean each night, therefore if your use these computers it is recommended that your bring a flash drive to save all your work from each class*

*NOTE2: If you store your files on a network storage service like OneDrive, Drobox, etc., be warned that the network can be slow when the entire class tries to save work – therefore, if you choose this method, be prepared for potential issues. It will be your responsibility to properly manage your files and work.*

## Student’s Professional Responsibilities

Students are expected to behave courteously and professionally in the classroom. This means arriving for class early (arriving right as class starts means you are late), contributing to the class in a positive and constructive manner, staying until the class is over, minimizing restroom breaks, side-bar conversations, etc. You also need to come to class having read any required readings (or review required videos) for that class session.

Prepare for each class by reviewing any materials covered, completing any assignments given, and attempting any recommended work.

1. Arrive on time to class. Entering the room late disturbs everyone’s concentration. If you do arrive late, do not interrupt the class.
2. Side conversations and ringing cell phones during class make it difficult for your classmates to actively listen and learn. If you must have a cell phone with you, be sure it is in a silent mode, and only respond to true emergencies after you have left the classroom.
3. It is your responsibility to monitor Blackboard and your UT e-mail account for class communications, assignments, etc.
4. Be respectful and courteous in your interactions with the professor and fellow students.
5. If you are having problems with the course materials, please approach the professor after class, or via email to let your professor know as soon as possible. The professor will be available during office hours to help.

## Class Attendance & Participation

A class is a multiway form of communication; it’s an opportunity to engage in the material covered in the class. As a graduate course, students will be expected to contribute to class discussion, and be engaged in the co-creation of knowledge for those in attendance.

The classroom is not the forum for you to dispute grades, express any grievance, or other concerns. If you have such issues, please contact the professor and arrange a meeting during office hours or communicate via email.

The professor’s role in your academic experience is to be both a source of knowledge and your “learning coach”: The professor will provide resources and materials, demonstrations, marking and feedback that help guide you during your process of learning. The professor’s goal is to have you become a more self-sufficient student and help prepare you for both the workplace and more advanced studies.

Attendance is mandatory. If you are absent, it is your responsibility to acquire any material that you have missed, not the professor’s responsibility. This course is delivered in a compressed fashion, with classes that cover a significant amount of material, therefore it is important that you do not miss classes. Coming to class late, leaving early, failing to be prepared for class, or failing to fully participate in class, will count as an absence.

* 1 absence: 0 points subtracted from final course grade
* 2 absences: 20 points subtracted from final course grade
* 3 absences: 40 points subtracted from final course grade
* 4 absences or more: failure in the course, despite assignments average

If an absence qualifies as an excused absence (see UT’s general attendance policy), the instructor will accommodate the excused absences in a fair manner. Any work missed MUST be made up in a timely manner; arranging to replace missed work is the responsibility of the student. Students must give notification to their instructors of excused absences in advance as soon as they are aware of it and documentation is REQUIRED. Failure to provide notification in advance can result in an UNEXCUSED absence. Employment schedules, athletic conditioning and practice schedules and personal appointments are NOT valid reasons for scheduled absences. Making up work for UNEXCUSED absences may be allowed or declined entirely at the discretion of the instructor. Extended illnesses may interfere with the successful completion of courses, and in such cases a student may want to withdraw from the course.

## Excused Absences

There are two categories of excused absences for which accommodations will be made by the faculty: scheduled and unscheduled.

Scheduled absences involve time conflicts that are known in advance, for which students have notified their instructors. Acceptable reasons for scheduled absences include:

* Court-imposed legal obligations (e.g., jury duty and subpoenas)
* Medical procedure
* Required participation in University-sponsored events (e.g., performances, athletic events, academic research presentations)
* Observation of religious holy days
* Requirements of military service

Unscheduled absences involve unforeseen emergencies such as illness, injury, hospitalization, deaths in the immediate family, consequences of severe weather and other crises. Students should contact instructors as soon as possible in these cases. Instructors may require documentation or verification to excuse unscheduled absences.

NOTE: Employment schedules, athletic conditioning and practice schedules, club/sorority/fraternity meetings, and personal appointments **are not valid reasons** for scheduled absences.

## Procedures for Excused Absences and Make-up Work

Students must give notification to their professor of any scheduled absences in advance as soon as they are aware of it (for approved reasons as noted above). In the event of an emergency unscheduled absence (as described above), students must contact their instructors as soon as possible and provide documentation if required.

If an absence qualifies as an excused absence as defined above, the professor will accommodate the excused absences in a fair manner. Instructors will provide an alternative opportunity to replace missed work or assignments; however, arranging to replace missed work is the responsibility of the student.

If an excused absence coincides with other graded work (e.g., presentations, homework collection, in-class activities, quizzes, presentations, activities, etc.), the student shall be given an opportunity to replace such work or shall not have that work averaged into the student’s grade, at the discretion of the instructor, provided it is not identical to the course’s stated accommodation for an unexcused absence. An instructor may determine that missing a certain amount of participation-dependent activities (whether excused or not) precludes successful accomplishment of learning outcomes. In cases like this, the instructor may advise students to withdraw from such courses.

Making up work for unexcused absences may be allowed or declined entirely at the discretion of the instructor.

## Court Imposed Legal Obligations

The University respects the need for all citizens to serve on a jury when called to duty. If a student serves as a juror, class absences will be considered excused when the student provides advance notice to the instructor, the instructor acknowledges the request and the student provides written verification of jury selection and proof of service.

Any potential student juror may notify the court of conflicts or undue hardship and request an excuse from service. The individual student must make the decision as to whether jury service will present an undue hardship and then take the affirmative action to request to be excused from service, and may need to provide a written explanation to the court. If a student does not request to be excused and is selected to serve, the student may miss a prolonged period of time resulting in the inability to complete the academic requirements of classes.

## Documented Medical Attention for Illness

Students are excused for absences due to documented illnesses or injury that require medical attention. Documentation must be provided from a licensed health care provider and clearly indicate that the student is unable to attend class. While students should not attend class with infectious conditions, even if medical attention is not sought, the decision to excuse absences from undocumented illnesses is at the discretion of the individual instructor. Extended illnesses may interfere with the successful completion of courses, and in such cases a student may want to withdraw from the course. After the withdrawal deadline, students may submit an academic petition with proper documentation to withdraw from courses.

## Documented University Sponsored Activities

The University recognizes the importance of participation in University-sponsored activities such as musical and theatrical performances, athletic competitions and research presentations. It also recognizes that such participation may result in conflicts with scheduled class times. It is the responsibility of participating students to provide a full list of anticipated conflicting days to instructors by the end of the first week of the term, and directors and advisers of University activity programs have an obligation to assist students with this task. Students are responsible for identifying potential absences specific to a particular class and notifying individual instructors of these conflicts. Please note that a general schedule for a team or ensemble does not satisfy this notification requirement. Students should provide instructors with addenda (e.g., end-of-season tournaments, newly scheduled events or rescheduled events) that result in new conflicts as soon as they are available. Directors and advisers of University activity programs should consult with participating students prior to registration to help them choose courses that do not have excessive anticipated conflicts.

## Academic Integrity

Cheating, plagiarism, copying and any other behavior that is contrary to University standards of behavior will not be tolerated.

Students caught violating any aspect of the Iowa Stat’s Academic Integrity Policy will be penalized in all cases. Penalty ranges from “0” on an assignment to “F” for the course without regard to a student’s accumulated points. Students may also face expulsion. It is the student’s responsibility to become familiar with the policies of the university regarding academic integrity and to avoid violating such policies. Policy information is found at [Academic Misconduct](https://catalog.iastate.edu/academic_conduct/#academicdishonestytext) Policies.

All submissions, quizzes, tests and exams will be monitored for violations of the academic integrity policy.

* Under no circumstances are you to provide an electronic copy of your work to another student. This includes allowing them access to your computer where they may access the file on their own without your consent! It is your responsibility to protect the integrity of your work. All parties involved will be reported.
* Do NOT provide students in the other section, in case there are multiple sections of a class, with information regarding class discussion or “answers” to class preparation assignments. This hinders their ability to learn the material and is considered a violation of the academic integrity policy. This violation would be considered a “Class preparation assignment” violation and would receive the sanction detailed below.
* You must properly document all sources used both in bibliographic format and through proper citation within the text itself. Failure to provide proper citations within the text of any assignment that you submit is plagiarism and will be reported. This DOES NOT JUST APPLY to research papers. It also means that you need to identify where data was obtained when it is presented.

The University has a subscription to turnitin.com plagiarism prevention software. This software compares documents to web resources as well as papers that have been submitted to Turnitin from any institution. I will evaluate each document for plagiarism before I grade it using the information from turnitin.com, along with my own examination of each document.

If you have any questions about the policy, please feel free to talk with me.

## Disruption Policy

Disruption policy: Every student has the right to a comfortable learning environment where the open and honest exchange of ideas may freely occur. Each student is expected to do his or her part to ensure that the classroom (and anywhere else the class may meet) remains conducive to learning. This includes respectful and courteous treatment of all in the classroom. According to the terms of the University of Tampa Disruption Policy, the professor will take immediate action when inappropriate behavior occurs. Details of the policy can be found at [Disruption of the Academic Process](http://ut.smartcatalogiq.com/en/current/catalog/Academic-Policies-and-Procedures/Disruption-of-the-Academic-Process).

## General Disclaimer

The professor reserves the right to make changes to this syllabus as necessary.