



Blockchain, Cryptocurrencies and Digital Tokens Demystified (MBA)

B8776-001 - Summer 2024
Blockweek Course, 3.0 Credits
July 29 to August 2 (all inclusive), 10:00 to 18:00

<u>Faculty</u>	<u>Office Hours (7/29-8/02)</u>	<u>Email</u>
R.A. Farrokhnia	before and after class	farrokhnia@gsb.columbia.edu

IMPORTANT: Please read the following announcements:

- Auditing is NOT permitted (no exceptions)!
- This class is an intense, fast-paced course covering a lot of ground and requiring focus, discipline, and commitment; so please be sure you can devote your full attention and time to it to gain maximum value.
- The course content is modular, some of which include either required or recommended recorded videos and lectures students will have to watch before each class session – the course faculty will provide ample advance notice and instructions on how and when to view such video content. Note that some guest presenters may join our virtually; your class participation requirements will not change as a result and same standards apply, regardless of in-person or online.
- No prior technical or advanced math background is required to attend this class. Nonetheless, given the accretive and sequential nature of the course modules, it is imperative to attend all sessions, watch all required videos recordings, and actively participate in class discussions. If you fall behind, particularly for the first two days, it will be very difficult to catch up!

COURSE SUMMARY

The publication of the pioneering whitepaper by Satoshi Nakamoto on Bitcoin in October 2008 and the creation of its reference implementation heralded a new era in digital currencies and distributed systems, with many other innovations having followed since in a variety of disciplines. By solving a myriad of technical and financial challenges that had impeded the actualization of digital currencies, blockchain and Bitcoin protocols have also enabled the emergence of other imaginative and disruptive ideas for use in and beyond financial services. Given that nascent aspect of these concepts and the startups they

have spawned, it may be too early to judge the success, or the lack thereof, of many of them. Nonetheless, there is little doubt about the profound potential effect and future impact of blockchain, cryptocurrencies, and distributed protocols (including consensus) on financial services, technology, economics, trade, healthcare, government, and other relevant realms.

Indeed, it is easy to recognize that we are still in the very early phases of development in this field, and many important questions in regard to implications in classical economics theories, monetary policies, role of central banks, economic growth, fiscal policies and tax collection, access to financial products, national sovereignty, cybersecurity, and others are yet to be definitively addressed. As such, gaining a solid understanding of the innerworkings and underlying technologies, protocols, and ecosystems is critical in order to see through the hype and discern the real potential.

This class offers a comprehensive and interdisciplinary primer on the aforementioned subject matters, with a format particularly suitable and accessible for those who have little or no technical background. We will start by covering the basics and fundamental building blocks of the technological developments and innovations that made distributed systems and digital currencies such as blockchain and Bitcoin, respectively, possible. We will ultimately end the course on more complex topics and the latest research in the field, including the fundamental challenges to our existing economics and financial frameworks and the incumbent firms as well as potential solutions to such matters.

By the course's conclusion, students will have a firm overview and thorough knowledge of blockchain, cryptocurrencies, and digital tokens ecosystems, real-world applications, and impending questions that are yet to be answered. Participants will also be able to follow literature and technical news with ease, interact with industry participants, formulate ideas and corporate strategy initiatives, and continue learning more advanced topics at their own pace after the completion of the course.

As for the intended audience, MBAs or students from engineering, law, medical, or other graduate schools with an interest in the curriculum who intend to pursue careers in finance, technology, or startups will find the course particularly beneficial, including those with roles as future managers, business development and operations, consultants, strategists, and entrepreneurs. As mentioned, no prior programming, technical, or advanced mathematical skills are required (see prerequisites).

CURRICULUM FORMAT

In summary, the course curriculum is divided into seven modules, covering each of the following topics in sequence:

1. Fundamentals of communication networks and web protocols
2. Cryptography and encryption, with a special focus on construct and applications in Blockchain
3. The theory and practice of Blockchain and distributed systems as well as their implementations
4. Bitcoin, the most widely used (thus far!) use case of Blockchain
5. Ethereum, Cryptocurrencies and Digital Tokens
6. DEX, DeFi, NFTs, and more complex technical topics
7. Latest research and industry developments

In each module, we will cover the background, foundational elements, and technologies underlying the topics at hand, discuss and understand how all the elements, first individually and then as a group, fit together in the overall ecosystem. More details on each module will be shared during the Virtual Orientation session.

COURSE PREREQUISITES

There are no required prerequisites. Recommended, but not required, courses are: 1) “*Capital Markets and Investments*” (B8306), and 2) general familiarity with tech/programming through either a class such as “*Web App Programming in Python*” (B8126) or “*Introduction to Programming Using Python*” (B8136) – having taken these classes would be helpful, but again, it is not a requirement.

GRADING

This course has a demanding curriculum and requires active participation, diligence, and on-time completion of readings and assignments prior to each session. Relevant materials (articles, cases, notes, white- and research papers, news articles, videos, etc.) will be posted in Canvas and/or handed out in before each session.

The final course grades will be calculated using the following criteria:

- a) Final Project and Deliverables (40%)
- b) Class Participation (40%)
- c) In-class exercises (20%)

Details of the grading components mentioned above are as follows:

- a) Final Project (may entail a short presentation): students are expected to form teams (no more than 3 members per team) by the end of the second day of class. During the third day of class, teams will be assigned a crypto company on which the team will write a comprehensive report based a template that will

be shared with students by then. This final paper will be in the form of a comprehensive analysis detailing the idea's origin, its white paper, business proposition, merit, market report, underlying technical implementation, competition, and other applicable evaluative analyses as well as each team's assessment about its potential, shortcomings, and growth potential. Select teams will present a quick summary of the crypto company they are assigned to at the end of Day 5 of our blockweek course – each presentation will be no more than five minutes. Details will be provided during our course orientation.

Students will have ample time after the end of the course to draft and submit this final paper. There is no limit to the number of pages, but based on precedent, most reports are expected to be in the 15-20 page range (single-space), with additional pages for index of citations, appendices, and accompanying material. The deadline to submit this written assignment electronically (both MS-Word and PDF) is **Wednesday August 14, 2024 at 17:00 (5:00 pm) ET**. Please upload your final paper to Canvas, and only email it to the course TAs before the deadline in case you have difficulties with Canvas.

- b) Class Participation: fairly self-explanatory! We will cover the details during our Virtual Orientation and first session. Note that attendance and quality contributions to class discussions are parts of your participation grade.
- c) In-class exercises and activities: throughout class, we will engage in a number of interactive exercises, polls, debates, discussions, quizzes, or similar activities. Your active and constructive participation in these exercises is an important part of the learning process and will contribute to your final grade. Furthermore, each team will work on a mini-project that will be assigned by the course faculty at the beginning of the course – more details will be shared during first day of class (hint: it will involve ChatGPT!!).

EXPECTATIONS AND CONDUCT

Given the complexity of the technical topics covered, students are expected to devote significant time to this class. In order to have meaningful discussions, it is imperative that you come prepared ahead of each session. Class attendance and participation is an integral part of this course learning process, and as such, unexcused absences and disruptive behavior will not only have a detrimental effect on your final grade, but also will be considered disrespectful to your classmates. PLEASE minimize disruptions and distractions at your place of residence to maximize your learning and respect for your peers.

During the last two modules, we may interact via virtual video calls with a few entrepreneurs, practitioners, and legal experts. In order to show the due respect and proper appreciation for the time and effort undertaken by such individuals to participate in and contribute to the course, it is imperative that all students be in full compliance with Columbia's honor code of professional conduct.

OFFICE HOURS

Students are encouraged to take advantage of course faculty's office hours. Given the scheduling format of block week classes, office hours will be offered either before or after the end of each day's session. If you need to schedule an individual time with the course faculty, please email the course TA and you'll be given details for a one-on-one meeting, virtually or in-person.

Thank you for your interest in this course, and I look forward to having a fun, educational, and productive class with you all.