

EGR 8491: Blockchain Technology and Uses

Class Meetings

Section 001 and DL1: Mondays, 6:10pm – 8:50pm, CEER 307

Instructor

Professor Hasshi Sudler

Adjunct Professor (office through ECE)

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Office Hours

Office hours are available by appointment. Please contact the instructor to arrange a meeting time.

Course Objectives

To provide both a technical understanding of how the blockchain (distributed ledger technology) works and case studies of how blockchain technology is being applied in a variety of industries related to asset management, payments, public records and supply chain management.

The course addresses questions currently under research such as why and when to use blockchains, impacts on trust assumptions, how blockchains impact societies and economies, and what technical limitations currently exist in the evolution of blockchain technology.

Grading Policy

Your final grade will be determined from the following:

- Assignments: 30% of grade
- Semester Design Project: 30% of grade
- Midterm: 20% of grade
- Participation: 20% of grade

The scale used to assign letter grades is:

Numerical Grade	Letter Grade	Numerical Grade	Letter Grade
A	94 to 100	C	73 to 76
A-	90 to 93	C-	70 to 72
B+	87 to 89	D+	67 to 69
B	83 to 86	D	63 to 66
B-	80 to 82	D-	60 to 62
C+	77 to 79	F	Less than 60

Attendance

Class and laboratory attendance for first-year students is mandatory. A first-year student will receive a grade of "Y" (failure) whenever the number of unexcused absences in a course exceeds twice the number of weekly class meetings for the course.

State here if attendance is mandatory or not for your class. Provide a description of what it means to be present (seated and ready to go or just in the room, be explicit).

Where possible, students should inform their instructors if they plan to be late or absent from class. In all cases, students should be prepared to provide documentation to petition for *excused* absences to the appropriate Associate Dean. The form for requesting an *excused* absence can be found here (<http://www1.villanova.edu/villanova/engineering/resources/policies/forms/studentAbsence.html>). Excused absences do not count toward a failure in the course for first year students. Absence from class does not release the student from work assigned. Students who miss an in-class obligation (exam, presentation, etc.) due to an excused absence will not be penalized - the instructor may offer a make-up test, arrange an alternative time for a presentation, exempt a student from the assignment, or provide another arrangement.

The University's list of excused absences for all students includes the following:

- participation in NCAA athletic competitions
- participation in special academic events (e.g., conferences, field trips, project competitions)
- participation in official university business (e.g., student representatives attending meetings related to university governance)
- attendance at significant events involving the immediate family (e.g., funerals, weddings)
- religious holidays - see the University's policy on Religious Holidays
- college-approved participation in placement activities (e.g., job interviews, graduate school interviews, attending job fairs)
- documented serious illness or disability (see below how to document)

Course Materials

The course will require you to either download or access web tools for blockchain exercises.

Readings will be provided and should be read prior to class discussions.

Academic Integrity

The College of Engineering is committed to creating an environment of academic integrity and ethical decision-making that we hope is reflected in the actions of our students and graduates. As Villanova students, integrity is central to the University mission. As engineers, our code of conduct requires us to place honor and integrity at the forefront of everything we do. As engineering students, it is expected that you will begin to adopt these values and instill them into your work habits. Students violating the academic integrity policy will receive a zero on that assignment or exam and the violation will be reported to the Associate Dean for Academic Affairs.

The University's academic integrity policy can be found here:

<https://www1.villanova.edu/villanova/provost/resources/student/policies/integrity.html>.

The College of Engineering has adopted the following exam guidelines:

- Students must arrive before the start of the exam. Under exceptional circumstances a student may need to arrive late, but he/she can enter the exam no later than 5 minutes after the start of the exam.
- All cell phones must be turned off and stored away until the student exits the exam room.
- The official Villanova class attendance policy must be followed when requesting excuses for absences or lateness to an exam.
- Each student must write and sign the following statement, *"I have neither given nor received any unauthorized assistance in the completion of this exam."*

Students with Disabilities

It is the policy of Villanova to make reasonable academic accommodations for qualified individuals with disabilities. If you are a person with a disability please contact me after class or during office hours to make arrangements.

If you have a non-physical disability you need to register with the Learning Support Office by contacting 610-519-5176 or at learning.support.services@villanova.edu as soon as possible. Registration is needed to receive accommodations.

The Office of Disability Services collaborates with students, faculty, staff, and community members to create diverse learning environments that are usable, equitable, inclusive and sustainable. The ODS provides Villanova University students with physical disabilities the necessary support to successfully complete their education and participate in activities available to all students. If you have a diagnosed disability and plan to utilize academic accommodations, please contact and register with Gregory Hannah, advisor to students with disabilities @ 610-519-3209 or visit the office on the second floor of the Connelly Center.

Schedule

Lectures	Date	Descriptions
1	27-Aug	Overview of course - Course overview – Why or why not use blockchain technology, types of problems blockchains address, a framework for thinking of blockchain applications, general application areas of blockchain; How blockchains works (an introduction to blockchain technology), impacts to trust assumptions.
2	3-Sep	HOLIDAY - Labor Day (no classes)
3	10-Sep	Review S. Nakamoto paper. Technical analysis of blockchain features: double spending, Proof of Work (PoW), Proof of Stake (PoS), Proof of Human Work (PoH).
4	17-Sep	Setting up a blockchain – MultiChain, ETH test network; IBM Hyper Ledger; the creation of cryptocurrencies on the blockchain. Review of Hyperledger (Perry Hartzwick).
5	24-Sep	Programming smart contracts
6	1-Oct	Building Dapps
7	8-Oct	Building a Blockchain – Accessing source code on Github
8	15-Oct	NO CLASSES – SPRING BREAK
9	22-Oct	Application to Asset management: Digital Inheritance, tokenizing assets, energy trading
10	29-Oct	Application to Payments: cryptocurrency as a payment method, processing speed
11	5-Nov	Application to Public Records: personal identity, land titles, transparency of process
12	12-Nov	Application to Public Records: continued
13	19-Nov	Application to Supply Chain Management: music piracy, agriculture, shipping
14	26-Nov	Application to Supply Chain Management: continued
15	3-Dec	Presentation of Semester Projects
16	10-Dec	Research Presentation

Course Management

Distance Learners:

To help facilitate a dynamic learning environment, all Distance Learning students are invited to attend classroom lectures in person if time and travel permits.

ProctorU

Exams are proctored online using ProctorU.