CS48006/SEC58006 – Decentralized Finance
Spring 2022-2023

Description and objectives
- This course aims to introduce an emerging area, Decentralized Finance (DeFi), from both computer engineering and financial perspectives.
- One of the main motivations is making the students understand if a traditional finance asset, e.g., a process, derivative, etc. is programmable, decidable and/or implementable using smart contracts as an application on an EVM compatible Blockchain.
- The course will make students aware of recent technologies and tools such as oracles and zero-knowledge proofs (i.e., snarks and starks) to implement complex DeFi assets in a secure an efficient way.
- If taken the course will make the students decide if they can have a career on Blockchain programming and make them ready.

Topics to be covered
- Introduction and Overview of DeFi (1 week)
  - Centralized/Traditional Finance, Decentralized Finance
- Introduction to Blockchain Technology (1 week)
  - Smart Contracts, Lightning Network, Rollups, Bridges
- DeFi Assets and Engineering (7 weeks)
  - Decentralized Exchanges, Decentralized Lending, Stablecoins, Oracles, Synthetics and Derivatives
- Security and Privacy of DeFi (3-4 weeks)
  - Decentralized Identities, Practical DeFi Security, Zero-Knowledge Techniques
- Regulatory Issues for DeFi (1 week)

Instructor
- Dr. Kamer Kaya, FENS G012, ext. 9566.
- Office Hour: by appointment – you can also send e-mails.

Lectures
- Monday, 12:30-13:30: https://sabanciuniv.zoom.us/j/98939840993
- Tuesday, 12:30-14:30: https://sabanciuniv.zoom.us/j/92576711600

Textbook(s)
- There are no formal books; additional materials, papers, surveys, book chapters will be provided with the course content.
  - We will use the content from https://defi-learning.org/f22

Grading:
- In-class lecturing (20%): Each student will be responsible for teaching a week of the lecture.
- Homework assignments (40%): There will be 4 (technical and non-technical) homework assignments.
- Group project (40%) – max 2 students per team

We may have to revise the course plan according to the countrywide reassessment to be made regarding higher education. This is expected to happen at the beginning of April. The content to be delivered is certain but the method of course delivery, the number and dates of exams, and some other details are subject to change.