CSE234: INTRODUCTION TO BLOCKCHAIN

COURSE DESCRIPTION

This course introduces the Blockchain as a means for recording, securing and transferring assets without an intermediary. Topics include: distributed ledger, transactions, block, and chain of blocks, public-private key pair, hashing, digital signatures, mining, proof of work and smart-contracts. A Blockchain testbed will be used to provide learners with hands-on experience in designing and programming an end-to-end Blockchain application.

Course Prerequisites: CSE116 Introduction to Computer Science for Majors II or equivalent or permission of the instructor

COURSE ORGANIZATION / SCHEDULE

Lecture#	Description
1	**History of Bitcoin Blockchain; Blockchain as a method for securing, recording and enabling peer-peer transfer of assets.**
2	**Fundamentals: public key-private key pair encryption; digital signatures; RSA and ECC; (overview)**
3	**Fundamentals: peer-peer networks; Hash functions; Merkle tree; SHA 256; finite state machines (FSM)(overview)**
4	**Blockchain components: transaction, block and Blockchain; distributed ledger.**
5	**Blockchain concepts: immutability, consensus, anonymity, proof of ownership and verification;**
6	**Blockchain operations: Mining and proof of work;**
7	**Blockchain operations: Transaction verification.**
8	**Issues: block size, scalability, hard and soft fork, governance.**
9	**Set up a test Blockchain (eg.: Hyperledger, Ethereum).**
10	**Deploy a Blockchain and transact on it.**
11	**Code execution (FSM) on a Blockchain: smart-contracts**
12	**Design and program a smart-contract.**
13	**End-end application development process; Prototype a domain application using a Blockchain.**
14	**Future directions: Application models, distributed apps (Dapps), side chains; regulatory issues.**

Evaluation: Quizzes and Final Project.