

<b>Course Code</b>	BF3222
<b>Course Title</b>	Blockchain and AI in Finance
<b>Pre-requisites</b>	AB1202 Statistics & Analysis; To be M.E. with BC3409
<b>No of AUs</b>	4

### A) Course Aims

This course provides the foundation for developing new financial business models and trading strategies using blockchain and artificial intelligence (AI) technologies. It is designed for students who are interested in the applications of blockchain and AI in finance. Experience with linear algebra, basic probability theory and basic calculus is necessary to complete assignments in this course. You will learn the basics of blockchain and AI technologies and related practical topics, such as CBDC, crypto economics, digital asset management. You will also learn how to use open-source Python packages to design, test, and implement algorithms in finance. With relevant knowledge and skills, you will be ready for more advanced courses such as smart contract for finance, computational law in token economy, reinforcement learning in finance.

### B) Intended Learning Outcomes (ILO)/Objectives

By the end of this course, you should be able to:

1. Describe recent developments of blockchain and AI technologies and analyze their impact on the financial services
2. Explain the technologies underlying cryptocurrencies and blockchains, and the concepts of AI, machine learning, supervised learning, unsupervised learning, deep learning, and reinforcement learning
3. Design smart contracts and decentralized applications
4. Value blockchain project and other ventures
5. Compare stable coins, CBDC, Libra and other digital currencies
6. Apply data mining and AI techniques in FinTech and develop applications

### C) Course Content

1. Blockchain technology – characteristics of public, private, consensus algorithms, blockchain cryptography for distribution of trust and protection of privacy
  2. Create smart contract on Ethereum network
  3. Token Economics, digital asset management and valuation analysis of the drivers of returns
  4. CBDC, stable coins
  5. Data Structure and data mining
  6. Supervised learning - Logistic model, boosting, random forest, and support vector machines
  7. Unsupervised learning: risk control and anti-fraud
  8. Graph theory and networks: valuation of venture firms\*
  9. Reinforcement learning: trading strategy\*
- \*advanced topics that depend on students' progress.

### D) Assessment (includes both continuous and summative assessment)

Component	Weighting
1. Quizzes	40%
2. Group project (written report and in-class presentation *)	30%
3. Homework Assignments	20%
4. Class Participation	10%
Total	100%

### E) Planned Weekly Schedule

Week	Topic
1	Overview of the application of Blockchain and AI in Finance
2	Blockchain technology: characteristics of public, private, consensus algorithms, blockchain cryptography for distribution of trust and protection of privacy
3	Smart contract: creating smart contract on Ethereum network
4	Token Economics and valuation analysis: crypto-token fundraising methods and analysis of the drivers of returns.
5	Digital asset management: alternative investment
6	CBDC and stable coins
7	AI: Data Structure, Neural Network, Machine Learning, Deep Learning, web crawling
8	Supervised learning - Logistic model, boosting, random forest, and support vector machines
9	Application in credit risk modeling
10	Unsupervised learning
11	Application in risk control and anti-fraud
12	Graph theory and networks: valuation of venture firms
13	Presentations by Students (15- 20 mins per group)