Course Code:	Course Title	Credit
HBCC801	DeFi (Decentralized Finance)	4

Prerequisite:	
Course Objectives:	
1	The basic concepts of Centralized and Decentralized Finance and compare them
2	The DeFi System and its key categories.
3	The DeFi components, primitives,incentives,metrics and major business models where they are used.
4	The DeFi Architecture and EcoSystem
5	The DeFi protocols
6	The real time use cases of DeFi.
Course Outcomes:	
1	Explain the basic concepts of Centralized and Decentralized Finance and compare them
2	Describe the DeFi System and its key categories.
3	Discuss the DeFi components, primitives, incentives, metrics and major business models where they are used.
4	Explain the DeFi Architecture and EcoSystem
5	Illustrate the DeFi protocols
6	Discuss the real time use cases of DeFi

Module		Content	Hours
0		**Prerequisite**	**2**
		Blockchain & Cryptocurrency, Blockchain Platform, Blockchain Development	
1		**Introduction: Centralized and decentralized finance**	**2**

		Difference between Centralized and Decentralized Finance, Traditional Financial Institution- Banks: 1. Payment and Clearance systems 2. Accessibility, 3. Centralization and Transparency, Decentralized Finance Vs Traditional Finance Self-learning Topics: The Potential Impact of Decentralized Finance	
2		**What is decentralized finance (defi)?**	**4**
		The DeFi Ecosystem, Problems that DeFi Solves How Decentralized is DeFi? Defi key Categories:- Stablecoins, Stable coin and pegging, Lending and Borrowing, Exchanges, Derivations, Fund Management, Lottery, Payments, Insurance **Self-learning Topics: How Decentralized Finance Could Make Investing More Accessible**	
3		**DeFi Primitives and Business Models**	**9**
	3.1	DeFi Components: Blockchain Cryptocurrency The Smart Contract Platform Oracles Stablecoins Decentralized Applications	
	3.2	DeFi Primitives: Transactions Fungible Token: Equity Tokens, Utility Tokens and Governance TokensNFT: NFT Standard, Multi-token standard Custody Supply Adjustment: Burn-Reduce Supply, Mint-Increase Supply, Bonding CurvePricing Supply Incentives: Staking Rewards, Slashing, Direct Rewards and Keepers, Fees Swap: Order Book Matching, Automated Market Makers, Collateralized Loans Flash Loans (Uncollateralized Loans)	
	3.3	DeFi Key Metrics: Total Value Locked, Daily Active Users, Market Cap	
	3.4	DeFi Major Business Models: Decentralized Currencies, Decentralized Payment Services, Decentralized fundraising, Decentralized Contracting. **S**elf-learning Topics: Study any real time Business model.	
4		**DeFi Architecture and EcoSystem**	**9**
	4.1	DeFi Architecture: Consumer Layer: Blockchains,	

		CrossBlockchain networks, Oracles, Digital Asset Layer: Cryptocurrencies, Infrastructure Layer: Wallets and Asset Management, DEXes and Liquidity, Lending and Borrowing, Prediction Markets, Synthetic Assets, Insurance	
	4.2	DeFi EcoSystem and Protocols: On-chain Asset Exchange, Loanable Fund Markets on-chain assets, Stablecoins, Portfolio Management, Derivatives, Privacy-preserving mixers	
	4.3	DeFi Risk and Challenges: Technical Risks, Usability Risks, Centralization Risks, Liquidity Risks, Regulation Risk Self-learning Topics: Study of the Problems which are holding DeFi adoption back	
5		**DeFi Deep Dive**	**9**
	5.1	Maker DAO: Maker Protocol: Dai Stablecoins, Maker Vaults, Maker Protocol Auctions Maker Actors: Keepers, Price Oracles, Emergency Oracles, DAO Teams, Dai Savings Rate Dai Use case Benefits and Examples	
	5.2	UniSwap: UniSwap Protocol Overview: How UniSwap Works, EcoSystem Participants, Smart Contracts UniSwap Core Concepts: Swaps, Pools, Flash Swaps, Oracles	
	5.3	Compound: Compound Protocol: Supplying Assets, Borrowing Assets, Interest Rate Model Compound Implementation and Architecture: cToken Contracts, Interest Rate Mechanics, Borrowing, Liquidation, Price Feeds, Comptroller, Governance	
	5.4	wBTC: Need for wBTC: Tokenization and common Issues wBTC Implementation and Technology: Users, Custodian Wallet Setup, Minting, Burning wBTC Governance, wBTC vs Atomic Swaps, Fees, Legal Binding, Trust Model and Transparency Self-learning Topics: MakerDAO Governance, UniSwap Governance Protocol Math, Compound Protocol Math	
6		**Use Cases**	**4**
	6.1	Decentralized Exchanges	
	6.2	Decentralized Stablecoins	

	6.3	Decentralized Money Markets	
	6.4	Decentralized Synthetix	
	6.5	Decentralized Insurance	
	6.6	Decentralized Autonomous Organization (DAO),	
		Self-learning Topics: Stock Exchange Operations, Derivatives, Tether, Ampleforth, How to get stablecoins, Synthetix Network, Token, The Ongoing Impact of The DAO's Rise and Fall, DAO Projects	
		Total	**39**

Textbooks:	
1	How to DeFi,Darren Lau, Daryl Lau, Teh Sze Jin,Kristian Kho, Erina Azmi, TM Lee,Bobby Ong-1st Edition, March 2020
2	DeFi and the Future of Finance-Campbell R. Harvey
3	DeFi Adoption 2020 A Definitive Guide to Entering the Industry
Reference Books:	
1	Blockchain disruption and decentralized finance: The rise of decentralized business models-Yan Chen, Cristiano Bellavitis
2	SoK: Decentralized Finance (DeFi)-Sam M. Werner, Daniel Perez, Lewis Gudgeon, Ariah Klages-Mundt,Dominik Harz*‡, William J. Knottenbelt,Imperial College London, † Cornell University, Interlay
3	Decentralized Finance (DeFi) –A new Fintech Revolution?
4	https://makerdao.com/da/whitepaper/
5	https://uniswap.org/
6	https://compound.finance/documents/Compound.Whitepaper.pdf
7	https://wbtc.network/assets/wrapped-tokens-whitepaper.pdf
8	https://defiprime.com/exchanges
9	https://milkroad.com/stablecoins
10	https://academy.ivanontech.com/blog/decentralized-money-markets-and-makerdao
11	https://www.gemini.com/cryptopedia/nexus-mutual-blockchain-insurance-nxm-crypto
12	https://consensys.net/blockchain-use-cases/decentralized-finance/
13	https://support.tokenlon.im/hc/en-us/articles/360041114431-DeFi-Explained-Synthetic-Assets
14	https://www.blockchain-council.org/synthetix/synthetix-snx-the-biggest-ecosystem-in-decentralized-finance/

Online References:	
1	https://www.udemy.com/
2	https://www.coursera.org/

Internal Assessment:

Assessment consists of one Mid Term Test of 20 marks and Continuous Assessment of 20 marks. The Mid Term test is to be conducted when approximately 50% syllabus is completed and its duration will be one hour.

Continuous Assessment:

Continuous Assessment is of 20 marks. The rubrics for assessment will be considered on approval by the subject teachers. It should be minimum 2 or maximum 4 from the following table.

Sr. No	Rubrics	Marks
1	Multiple Choice Questions (Quiz)	5 Marks
2	Literature review of papers/journals	5 Marks
3	Participation in event/ workshop/ talk / competition followed by small report and certificate of participation relevant to the subject	5 Marks
4	Wins in the event/competition/hackathon pertaining to the course	10 Marks
5	Case study, Presentation, group discussion, technical debate on recent trends in the said course	10 Marks
6	Project based Learning and evaluation / Extra assignment / Question paper solution	10 Marks
7	NPTEL/ Coursera/ Udemy/any MOOC Certificate course for 4 weeks or more	10 Marks
8	Content beyond syllabus presentation	10 Marks
9	Creating Proof of Concept	10 Marks
10	Mini Project / Extra Experiments/ Virtual Lab	10 Marks
11	GATE Based Assignment test/Tutorials etc	10 Marks

*For sr.no.7, the date of certification exam should be within the term and in case a student is unable to complete the certification, the grading has to be done accordingly.

Indirect Assessment	
1	Mock Viva/Practical

2	Skill Enhancement Lecture
3	Extra Assignments/lab/lecture
End Semester Theory Examination:	
1	Question Paper will comprise a total of six questions
2	All Question carries equal Marks
3	Questions will be mixed in nature(For Ex.-Suppose question 2 has part (a) from module 3 then part (b) will be from any other module other than module 3
4	Only Four Questions need to be solved
5	In the question paper, the weightage of each module will be proportional to the number of respective lecture hours as mentioned in the syllabus.