GANPAT UNIVERSITY

FACULTY OF COMPUTER APPLICATIONS

Programme	Master of Computer Applications	**Branch/ Spec.**	Computer Application
Semester	III	**Version**	1.0.0.0
Effective from Academic Year	2024-25	**Effective for the batch Admitted in**	June 2024
Subject Code	P13A5BC2	**Subject Name**	Blockchain Technology-II

Teaching scheme						**Examination scheme (Marks)**			
(Per week)	**Lecture (DT)**		**Practical (Lab.)**		**Total**		**CE**	**SEE**	**Total**
	L	TU	P	TW					
Credit	2	0	2	0	4	Theory	40	60	100
Hours	2	0	4	0	6	Practical	20	30	50

Objective:

- To educate students on the need of developing a secure cryptographic distributed and replicated ledger of events, transactions, and data produced by a variety of IT processes, and to bring this topic to their attention.

Pre-requisites:

- The student has the understanding of blockchain, bitcoin, Ethereum, smart contract and its basic applications.

Course Outcomes :

- **1 = Slight (Low); 2 = Moderate (Medium); 3 = Substantial (High); "-" = No Correlation**

Name of CO	Description
CO1	Explain and analyze blockchain fundamentals, architectures, transaction workflows, and Hyperledger Fabric components to evaluate enterprise blockchain solutions.
CO2	Develop and evaluate decentralized applications using Ethereum concepts, smart contracts, tokens, and DAO frameworks for real-world use cases.
CO3	Design, deploy, and manage blockchain networks and smart contracts using enterprise frameworks, CI pipelines, and advanced consensus mechanisms.
CO4	Analyze blockchain governance, regulatory challenges, business models, and scalability issues to assess the future viability of blockchain ecosystems.

Mapping of CO and PO

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3	2	1	2	–	–	–	2
CO2	2	3	3	3	1	–	2	2
CO3	2	3	3	3	1	–	–	2
CO4	2	3	2	1	–	–	3	2

Content Theory Syllabus:

Unit	SECTION-I	Hrs
1	**Foundations of Blockchain**: What is Blockchain? Four Core Building Blocks of Blockchain framework, Transaction Workflow, Simple Payment Verification, Blockchain Forks, where blockchain technology has been and where it's going, Technology considerations for choosing a blockchain framework, Enterprise integration and designing for extensibility, **Exploring Hyperledger:** Open Computing, Fundamentals of the Hyperledger, Hyperledger frameworks, tools, and building blocks, Hyperledger Fabric component design, Hyperledger Fabric – the journey of a sample transaction**,** Benefits of blockchain applications over current real-world processes, Network components' configuration	9
2	**Ethereum, Decentralized Organizations and Ethereum Token**: Introduction to Ethereum, Accounts in Ethereum, State, Storage, and Gas, Solidity Programming Language, Blockchain-as-a-Service, Decentralized Applications, Aragon Kernel, Identity Management, DAO/Company Walkthrough, Tokens and Value Creation, Ethereum Computational Market, Golem Network, Supercomputing Organized by Network Mining, Use Cases	6
	SECTION-II	
3	**Blockchain Network and Development:** Smart contract considerations, Integration layer considerations, configuring a continuous integration pipeline, Customizing the pipeline process, Publishing smart contract package, Configuring your Git repository, Modifying or upgrading a Hyperledger Fabric application, Fabric blockchain and application life cycle, Smart contract and policy updates, EOS Blockchain, Delegated Proof-of-Stake, Parallel Execution, Scheduling, Chain Core, Ethereum Enterprise Alliance, zk-SNARKs, Ethereum Enterprise Roadmap	8
4	**Revolutions, Governance, Necessary Evil and Challenges in Blockchain:** State of the Blockchain Industry, Digital Currency Exchanges, Regulation Technology: RegChain, New Blockchain Companies and Ideas, Decentralization and governance, Exploring the business models, Healthcare, Network business model, Currency Multiplicity: Monetary and Nonmonetary Currencies, Government Regulation, Governance structure, Governance and the IT solution, The road ahead for Blockchain, Addressing the divide – the enterprise blockchain and crypto asset-driven ecosystem, Scalability and economic viability of the blockchain solution	7

Practical Content:

List of programs specified by the subject teacher based on above mentioned topics.

Text Books:

1	Blockchain Enabled Applications_ Understand the Blockchain Ecosystem and How to Make it Work for You by Vikram Dhillon , David Metcalf , Max Hooper,Publisher : Apress; 1st ed. edition (31 December 2017).
2	Hands-on blockchain with Hyperledger_ Building decentralized applications with Hyperledger

	Fabric and Compose by Luc Desrosiers, Nitin Gaur, Petr NovotnyPublisher : Ingram short title (1 January 2018).
3	Blockchain: Blueprint for a New Economy by Melanie Swan,Publisher : Shroff/O'Reilly; First edition (1 January 2015).
Reference Books:	
1	Beginning Blockchain, A Beginner's Guide to Building Blockchain Solutions book by Bikramaditya Singhal, Gautam Dhameja, Priyansu Sekhar Panda, Publisher : Apress; 1st ed. edition (7 July 2018).
2	Introducing Ethereum and Solidity Foundations of Cryptocurrency and Blockchain Programming for Beginners by Chris Dannen,Publisher : APRESS; 1st edition (1 January 2017).
MOOC/Certification Courses:	
1	https://nptel.ac.in/
2	https://www.edx.org/
3	https://www.vlab.co.in/
4	https://www.udemy.com/
5	https://www.lynda.com.cach3.com/

Question Paper Scheme:

University Examination Duration: 3 Hours

Note for Examiner: -

(I) Questions 1 and 4 are compulsory with no options.

(II) Internal options should be given in questions 2, 3, 5 and 6.

SECTION – I

Q.1 –8 Marks

Q.2 –11 Marks

Q.3 –11 Marks

SECTION - II

Q.4 –8 Marks

Q.5 –11 Marks

Q.6 –11 Marks