# A Report on
## Five- Day Online Professional Development Programme(PDP) on
## "Block Chain Technologies"
### Organized by
## Internal Quality Assurance Cell (IQAC)
### in association with
### NITTTR, Chennai
### 03.06.2024 – 07.06.2024

**Submitted by: Mrs. Prudhivi Anuradha, Assistant Professor, Dept. of CSE-Data Science and Document Manager, IQAC**

**Report Received on 19.06.2024**

**Resource Person Details: Dr. A. Kannan, Senior Professor at VIT Vellore,**
**Dr. S. Sasirekha, Associate Professor, Department of CSE, NITTTR, Chennai**
**Dr. Prasad, Assistant Professor, VIT ,Chennai**
**Mr. Sridhar Pandurangiah, Founder and CTO of Sastra Technologies Pvt. Ltd.,**
**Dr. V. Shanmuganeethi, Professor and Head of the Department of CSE at NITTTR Chennai**
**Dr. Seshu Babu Pulagara, Assistant Professor, Department of CSE, NITTTR Chennai**

**Mode of Conduct: Online**

Five-Day Online Professional Development Programme (PDP) on 'Blockchain Technologies' for the faculty members was conducted from 3rd June 2024 to 7th June 2024 in the East Block Scale-up classroom. Forty faculty members from various departments attended the PDP.



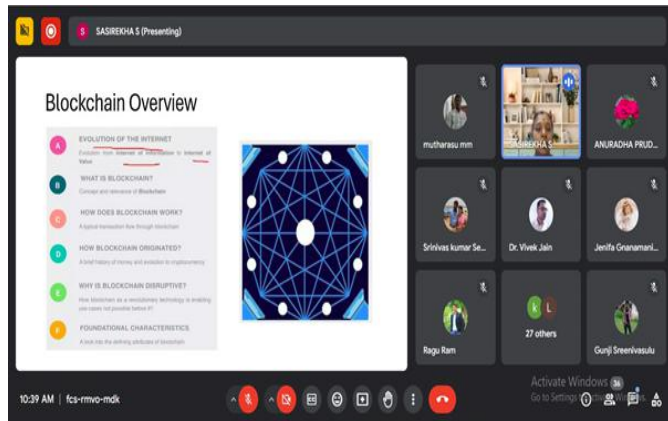The objectives of this program are to enable participants to:

- Gain a solid understanding of Blockchain Technology, its components and underlying Cryptographic principles.

- Understand the differences between public and private Blockchains and their respective use cases.

- Analyze real-world case studies to understand the practical implications and challenges of implementing Blockchain Technology.

- Develop the skills needed to design, develop and deploy Blockchain-based solutions for enterprise use cases.

The Course Coordinator, Dr. S. Sasirekha, and the Resource Persons, Dr. V. Shanmuganeethi and Dr. Seshu Babu Pulagara from NITTTR, Chennai, handled the sessions. The program commenced with an inauguration session on 3rd June 2024. Mrs. Prudhivi Anuradha, IQAC, welcomed the gathering. Dr. P. Ramanathan, Vice Principal (Academics), delivered the welcome address. Dr. C. Yuvaraj, Principal, MITS, delivered the Presidential address. Dr. K. Sathesh, IQAC Coordinator, introduced the Chief Guest. Dr. S. Sasirekha, Associate Professor, Department of CSE, NITTTR, Chennai and also described the importance of the PDP.
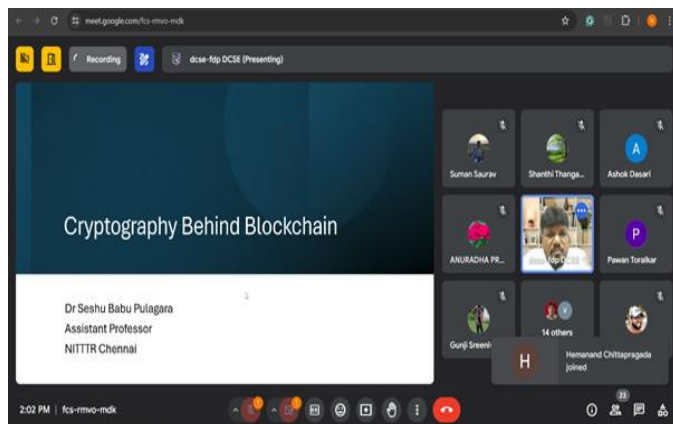
**Day 1: 03.06.2024, Monday**

**Forenoon Session:**

The session led by Dr. S. Sasirekha, Associate Professor, Department of CSE, NITTTR Chennai, covered the evolution of the internet and Blockchain Technologies, highlighting their integration and the transition from Web 2.0 to Web 3.0. She discussed the differences between centralized, decentralized, and distributed networks and emphasized the importance of Blockchain education. Dr. Sasirekha explained the mechanics of blockchain, its applications across various sectors, and addressed the realistic potential versus the hype surrounding the technology. The session provided a comprehensive understanding of blockchain's transformative impact on the future.
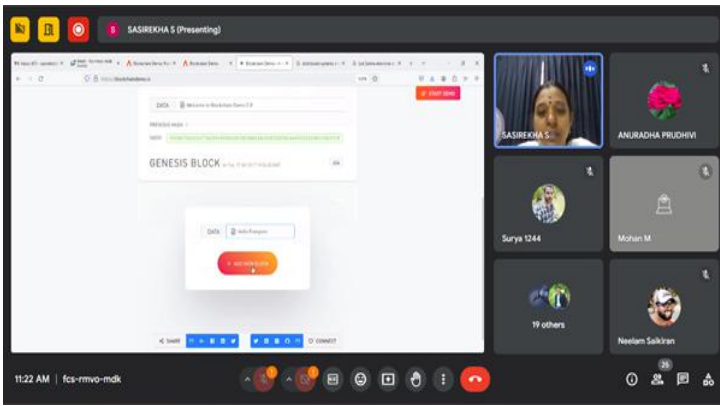


**Afternoon Session:**

Dr. Seshu Babu Pulagara, Assistant Professor, Department of CSE, NITTTR Chennai, delivered a session on the cryptographic foundations of blockchain, covering cryptography goals, symmetric and public key encryption, digital signatures, and cryptographic attacks. He emphasized Kerckhoffs' principle and provable security, explaining their significance, and discussed key cryptographic algorithms and the role of X.509 certificates. The session offered a comprehensive understanding of the cryptographic principles crucial for ensuring blockchain security.
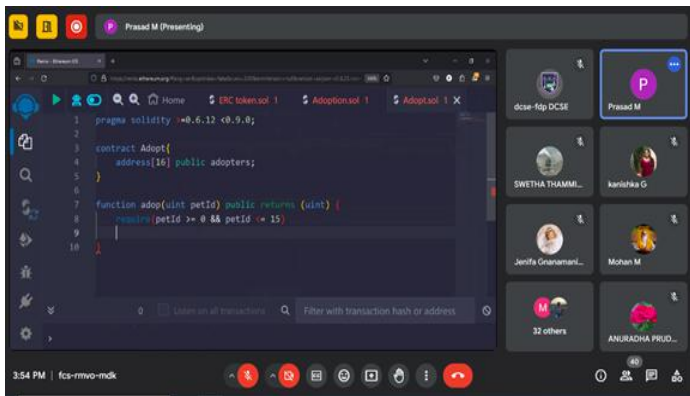




**Day 2: 04.06.2024,  Tuesday**
**Forenoon Session:**

Dr. S. Sasirekha comprehensively covered various aspects of blockchain technology, including block structure, mining, decentralization in Bitcoin, and distributed peer-to-peer networks. She delved into smart contracts, blockchain consensus algorithms, and the history of blockchain, while also addressing concurrency issues and solutions. Moreover, she provided a demonstration of how blockchain works and highlighted its disruptive potential. Additional topics included distributed ledgers, peer-to-peer networks, digital signature in blockchain, and blockchain wallets, with further resources available at https://andersbrownworth.com for a blockchain demo.
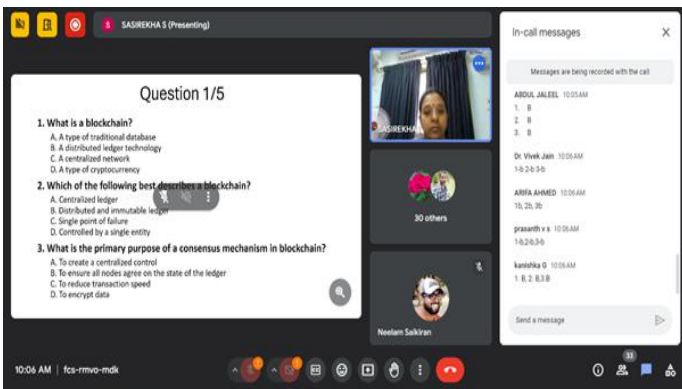
**Afternoon Session:**

Dr. Prasad, Assistant Professor, VIT ,Chennai, provided practical knowledge on blockchain with Ethereum, explaining its unique features and applications. He covered topics such as smart contracts, Ethereum's blockchain structure, and how to develop decentralized applications (dApps) on the Ethereum platform. Dr. Prasad also demonstrated real-world use cases and guided participants through hands-on exercises to build and deploy their own smart contracts on Ethereum. This practical session helped attendees gain a deeper understanding of Ethereum's capabilities and its role in the blockchain ecosystem.
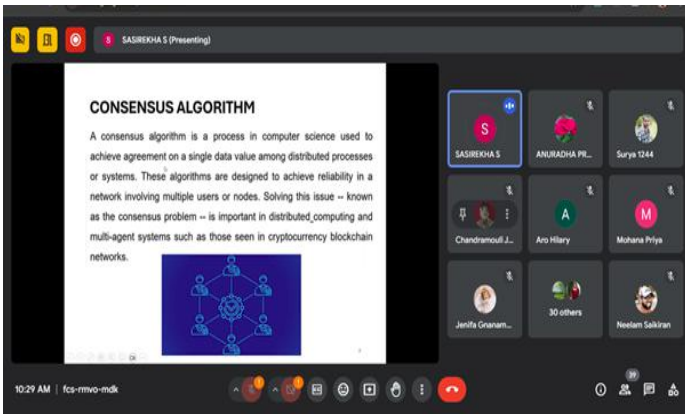


**Day 3: 05.06.2024, Wednesday**
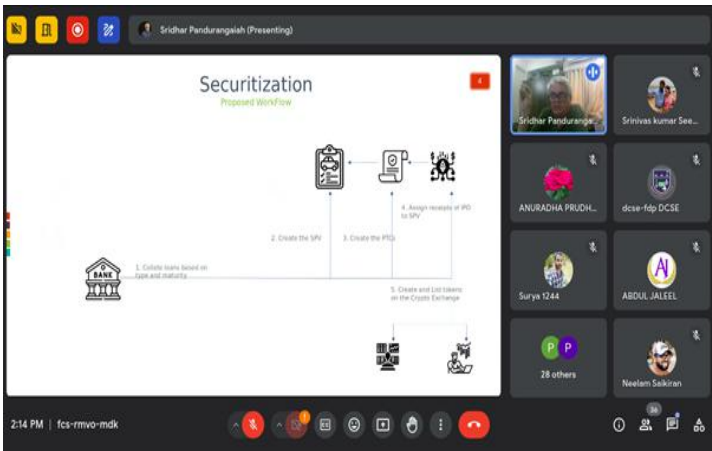**Forenoon Session:**

Dr. S. Sasirekha began the session with a questionnaire and then covered various aspects of consensus algorithms and approaches. She discussed consensus attacks, distributed consensus, and consensus in open systems, specifically focusing on the Bitcoin network. The session included detailed explanations of different consensus algorithms, including proof of work, proof of stake, proof of authority, Byzantine fault tolerance, federated Byzantine fault tolerance, proof of activity, proof of capacity, proof of elapsed time, and proof of importance. Additionally, she covered the concept of "goofy coin" and the process of spending coins, as well as Bitcoin mining.

**Afternoon Session:**

Mr. Sridhar Pandurangiah, Founder and CTO of Sastra Technologies Pvt. Ltd., covered securitization, setting up the Ganache Ethereum blockchain, and configuring the web3 environment. He explained how banks can securitize their loan portfolios and offer them as tokens to retail investors on an Ethereum blockchain.
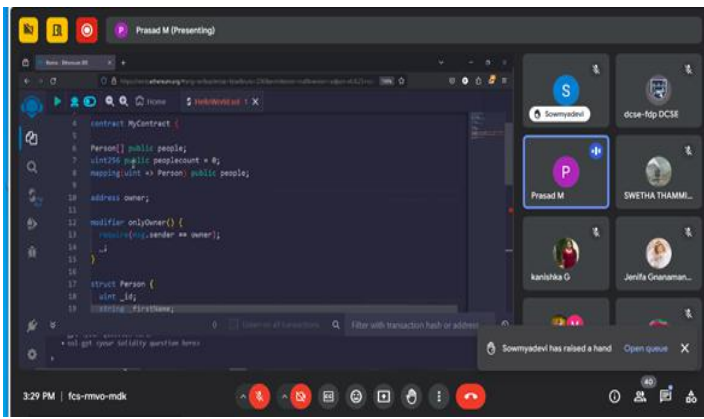


**Day 4: 06.06.2024, Thursday**
**Forenoon Session:**

Dr. V. Shanmuganeethi, Professor and Head of the Department of CSE at NITTTR Chennai, covered the topic of building a blockchain in Python. He provided a step-by-step guide on how to develop a simple blockchain, explaining the core concepts and functionalities such as block creation, hashing, and adding blocks to the chain. This hands-on session helped participants understand the practical aspects of blockchain technology by implementing it in Python.
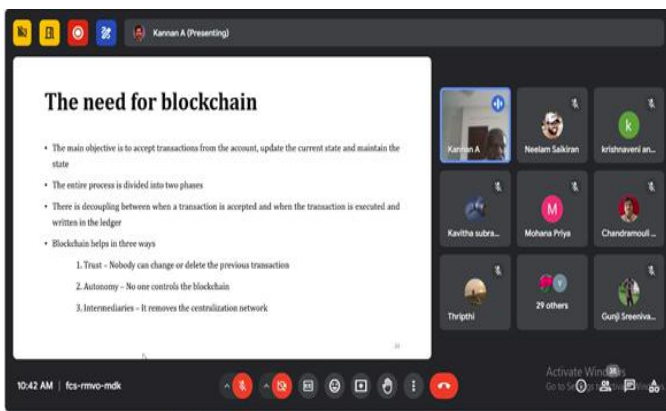


**Afternoon Session:**

Dr. Prasad led a hands-on session on Hyperledger, focusing on the transition from public to permissioned blockchains. He detailed Hyperledger's architecture and components, highlighting its relevance in enterprise settings. The session emphasized the differences between public blockchains (such as Bitcoin and Ethereum) and permissioned ones, emphasizing Hyperledger's strengths in security, privacy, and scalability for business requirements. Attendees received practical guidance on deploying Hyperledger frameworks for various use cases, enriching their understanding of blockchain technology's applications in enterprises.

**Day 5: 07.06.2024, Friday**
**Forenoon Session:**

Dr. A. Kannan, Senior Professor at VIT Vellore, delivered session on the Applications and Research trends of Blockchain Technology. He discussed Blockchain fundamentals, its applications in cryptocurrencies, supply chain management, healthcare, finance, and voting systems. Research trends covered included scalability, interoperability, security, energy efficiency and regulatory challenges. The session highlighted Blockchain's evolving role and its future potential across various industries.



**Afternoon Session:**

In the afternoon session, an assessment was conducted to evaluate the participants' understanding of the topics covered.

In summary, the Five-Day Online Professional Development Programme Coordinated by Dr. S. Sasirekha and featuring sessions led by Dr. V. Shanmuganeethi, Dr. Seshu Babu Pulagara, and guest faculties, the program aimed to impart a thorough understanding of Blockchain Technology, its applications, and emerging research trends. Practical sessions on Ethereum, Hyperledger, and Python-based blockchain development were included. The program concluded with an assessment to gauge participants' comprehension of the covered topics.

The five-day online Professional Development Programme (PDP) concluded with a valedictory session. Dr. D. Pradeep Kumar, Chief Coordinator of the PAARC Cell, delivered opening remarks, and Dr. P. Ramanathan, Vice Principal (Academics), expressed the Vote of Thanks. Faculty members shared their experiences regarding the PDP, highlighted insights gained from resource persons, and acknowledged the efforts of the organizing committee. Gratitude was extended to the Management and the Principal for their invaluable support in the successful completion of the programme.

With regards,
**Dr. C. Kamal Basha,** **M.E., Ph.D.**
Vice Principal - Administration,
Madanapalle Institute of Technology & Science
Madanapalle - 517 325, A.P.
viceprincipaladministration@mits.ac.in