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Department of Artificial Intelligence and Machine Learning

15.05.2025

Submitted,

Sub: Report – Five days National Level online FDP on "**The Foundations and Future of quantum Computing**" - Reg.,

The Department of Artificial Intelligence and Machine Learning, in association with the AI Club as well as ISTE chapter of our college has a organized Five days National Level online FDP on the Foundations and Future of quantum Computing from 05.05.2025 to 09.05.2025. Dr.Sivaprakash.C, Head of the Department of AIML delivered welcome address. Dr.B.Shadaksharappa, Principal, SSCE, delivered presidential address. Then the FDP began with an insightful inaugural session by Mrs. Sudha Thamotharan, Technical Project Manager at Optconmy, Chennai. She emphasized the importance of quantum computing in shaping the future of technological innovation. Her address focused on the necessity of industry-academia collaboration in fostering quantum research, and she inspired faculty members to embrace interdisciplinary approaches. She also highlighted how organizations are gradually integrating quantum principles into complex problem-solving environments and how such programs play a vital role in building foundational knowledge.

DAY 1 (05.05.2025)

Dr.T.Subha, Associate professor, NITTR Chennai was the resource person for the session 1 and she deliverd about Introduction to Quantum Mechanics In this session, the resource person has, introduced the audience to the theoretical underpinnings of quantum computing by explaining fundamental quantum mechanics concepts such as superposition, entanglement, and quantum coherence. She skillfully related these concepts to the behavior of qubits and their computational significance. The resource person also discussed quantum measurement and state collapse, which are crucial for understanding quantum algorithm execution. Her session served as the cornerstone for the rest of the program, building a clear bridge between quantum physics and computational systems.

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DAY 2 (06.05.2025)

Mrs. Jaya Sundaresan Packaged Application Assistant Manager, was the resource person for the session 2 and she delivered about Classical vs Quantum Computing. In her address she compared classical and quantum computing models. She began with a historical overview of classical computing limitations and gradually transitioned to quantum concepts such as qubits, entanglement, and interference. Using visual aids and real-world analogies, she helped participants understand why quantum computing offers exponential speed-ups for certain problem classes. Her session laid a clear conceptual framework for identifying where and how quantum computing can be more effective than traditional approaches.

Dr.S.Ananthakumar, Dean Academics of VIT, Bhopal was the resource person for the session 3 on 06.05.2025. in this address he spoke about about Building Blocks of Quantum Computation. He elaborated on the role of quantum logic gates such as Hadamard, Pauli-X/Y/Z, CNOT, and Toffoli gates, and demonstrated how these gates manipulate quantum states. Dr. Reddy explained quantum circuits, quantum registers, and reversibility in quantum operations, all while integrating Qiskit-based code snippets to show practical implementation. This session empowered participants with knowledge of how to construct and simulate quantum algorithms using fundamental quantum building blocks.

DAY 3 (07.05.2025)

Session 4 of the FDP has been handled by Dr. R.Leena Sri, Associate Professor, Thiagarajar College of Engineering, Madurai. She focused on quantum algorithms and their integration with edge computing. She explained how edge devices, when combined with quantum principles, can yield ultra-fast decision-making systems. The session delved into landmark quantum algorithms such as Grover's and Shor's, highlighting their mathematical foundations and applications. Dr. Leena also touched upon hybrid computing frameworks that merge quantum computing with classical edge devices, opening new avenues for smart, decentralized computing systems.

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Mr.P.Ramkumar, Assistant Professor of Sri Sairam College of Engineering, was the resource person for the session 5. He has explained about Quantum computing applications in Machine learning and optimization. He discussed quantum-enhanced versions of classical ML algorithms and explained how quantum kernels, annealing, and variational quantum circuits are used to train models more efficiently. His talk included use cases in clustering, classification, and optimization, demonstrating how quantum speed-up could benefit AI workflows. The session also covered current challenges in hardware and algorithmic scaling in quantum-enhanced AI models.

DAY 4 (08.05.2025)

Dr.S.N.Deepa Associate Professor, NIT Calicut was the resource person. She presented a futuristic perspective on the convergence of quantum and edge computing. She explained how the synergy between quantum processing and edge devices could solve real-time, resource-constrained problems with higher efficiency. Dr. Deepa also explored potential architectures for implementing quantum edge networks and discussed security implications, latency concerns, and data handling strategies. The session concluded with predictions on how edge intelligence might evolve with quantum-enhanced nodes over the next decade.

Dr.Sivaprakash. C, Prof& Head, Sri Sairam College of Engineering was the resource person for the session 7. He highlighted the practical application of quantum algorithms in solving industrial and societal problems. He discussed case studies in logistics optimization, cryptography, material simulation, and drug discovery. The session covered both gate-model and annealing-based approaches, offering insight into choosing the right quantum model for a given problem. Dr. Sivaprakash. C also emphasized the importance of scalability, hardware feasibility, and the interdisciplinary nature of applied quantum research.

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DAY 5 (09.05.2025)

Dr. V. Shanmuganeethi, Professor at NITTTR, Chennai, delivered an inspiring session on emerging research directions and future trends in quantum computing. He discussed advances in fault-tolerant quantum systems, topological qubits, and quantum cloud platforms. The session also touched upon quantum supremacy, global funding trends, and startup ecosystems. Dr. Shanmuganeethi encouraged faculty to engage in multidisciplinary research collaborations and to consider quantum education as a vital part of the modern engineering curriculum.

The initiative aligns with Sustainable Development Goals – Goals 4(quality Education) by enhancing faculty's access to high quality in research ; Goal 8(Decent Work and Economic Growth) by equipping learners with relevant skills for the digital economy' Goal17(partnerships for the goals) by facilitating meaningful collaboration between academia from various institutions.

The FDP concluded with a valedictory address by Dr. R. Arunkumar, Chief Operating Officer of Sairam Institutions. He appreciated the dedication of the organizing team and the enthusiastic participation of attendees. Dr. R. Arunkumar reflected on the FDP's impact in igniting interest in quantum technologies among faculty and stressed the need to continue learning and engaging with the fast-evolving landscape of quantum computing. He encouraged participants to apply the acquired knowledge in both teaching and research.

We Thank the Management, Principal, ISTE Technical chapter as well as AI club of the institution for their support and motivation for conduction this online FDP successfully.

Thanking You

Your's Sincerely

15/05/2025

15/05/2025

Professor & Head
Dept. of Artificial Intelligence & Machine Learning
Sri Sairam College of Engineering
Sai Leo Nagar, Guddanahalli (Post)
Anekal, Bengaluru - 562 106

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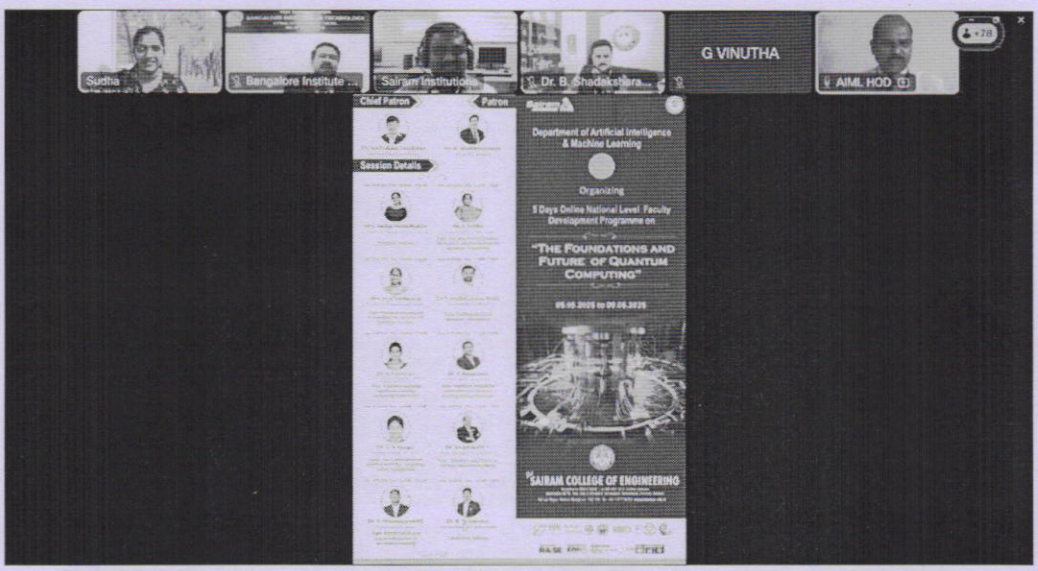
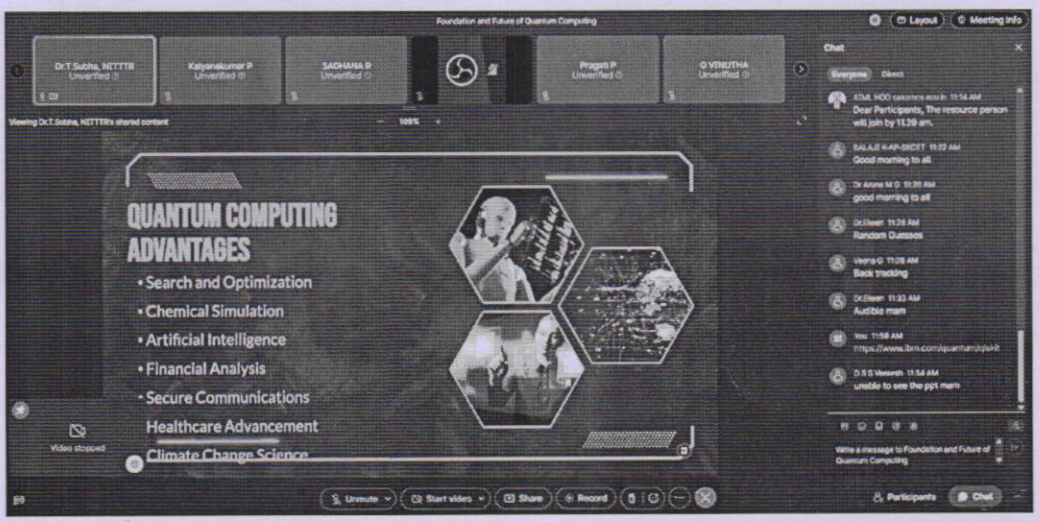
Glimpse of the Event – Day 1





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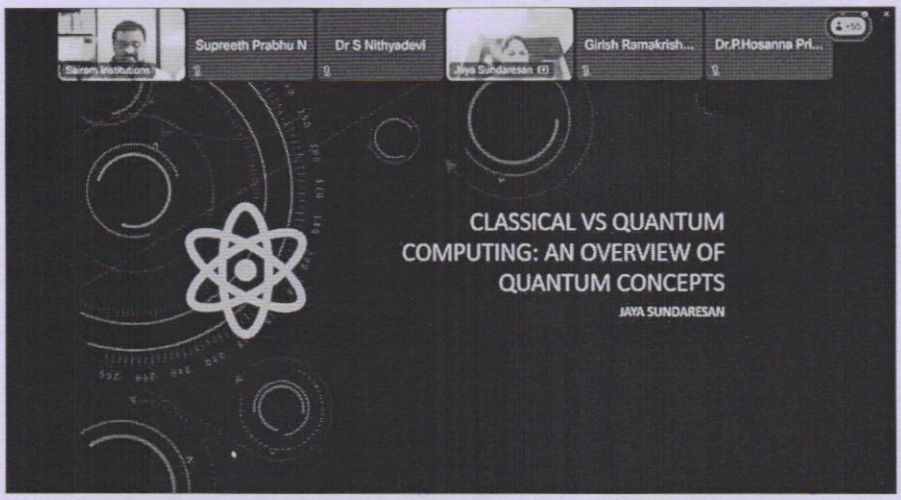
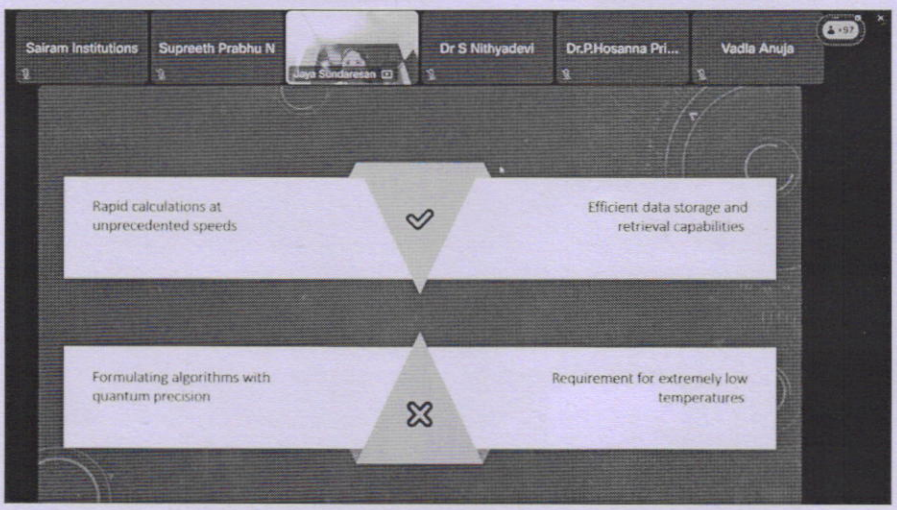
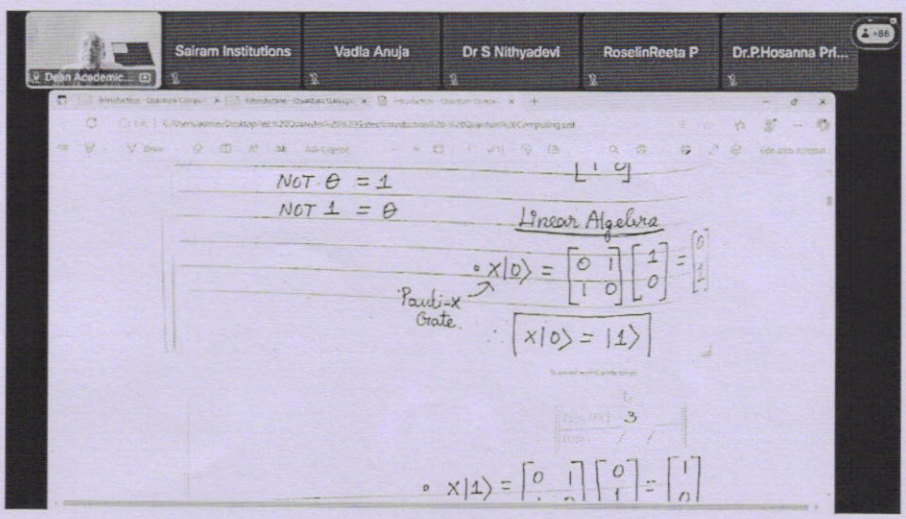
DAY 2







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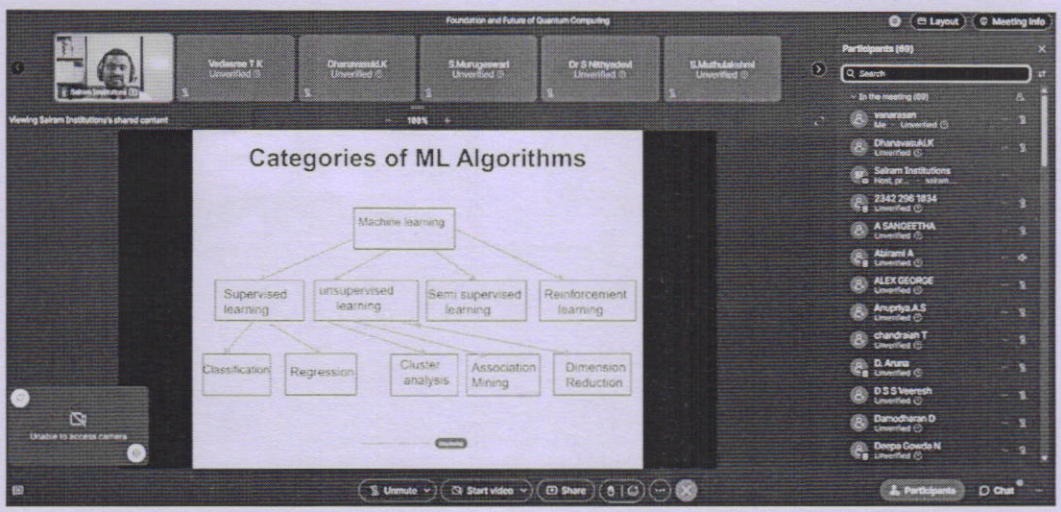
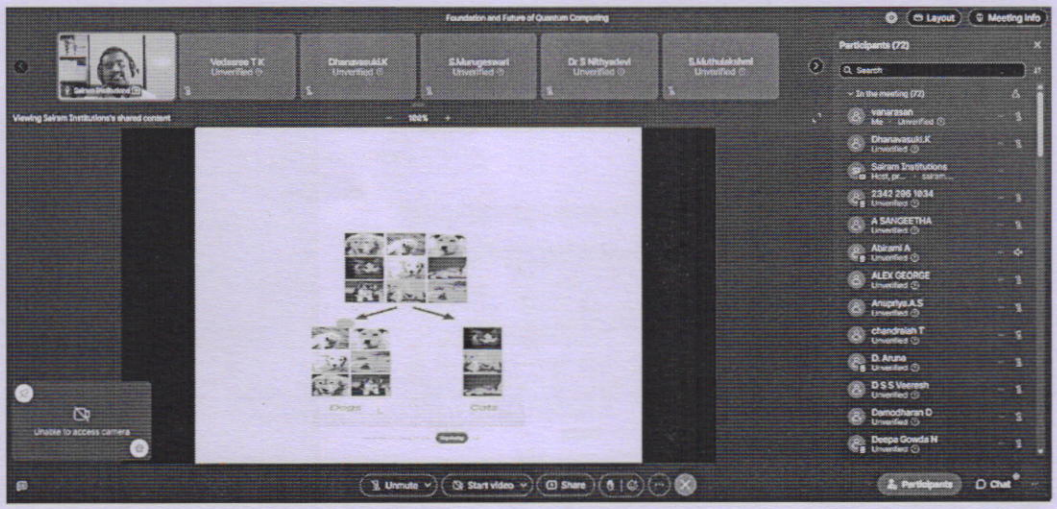
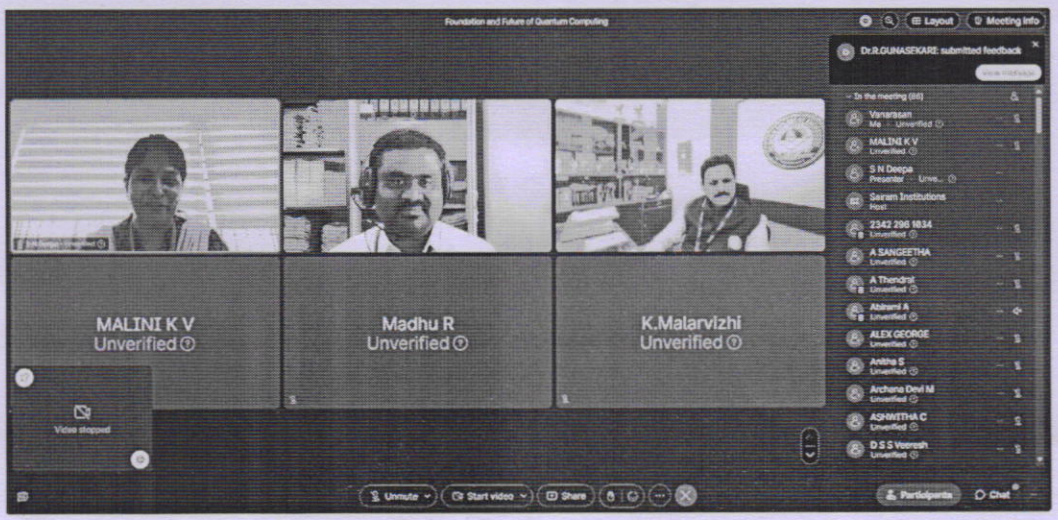
DAY 3







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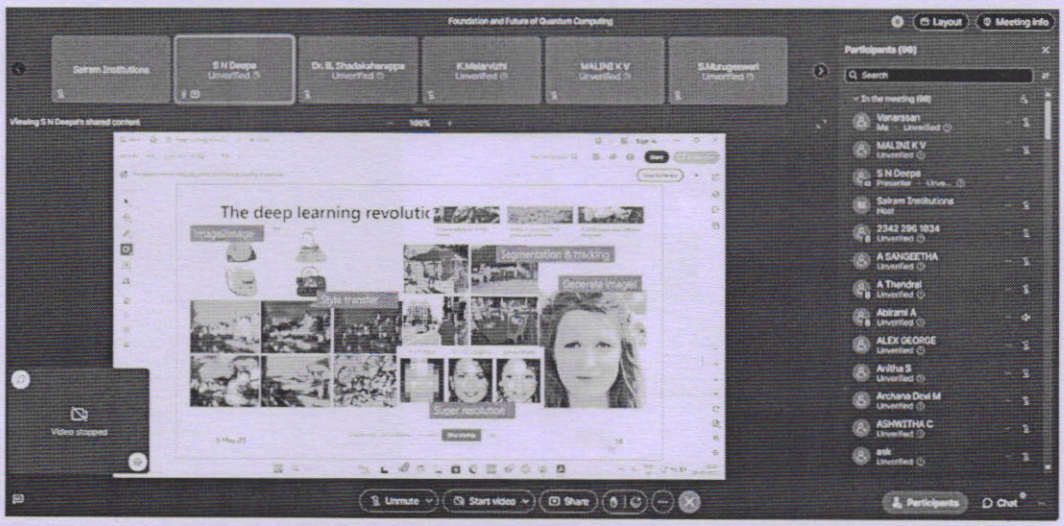
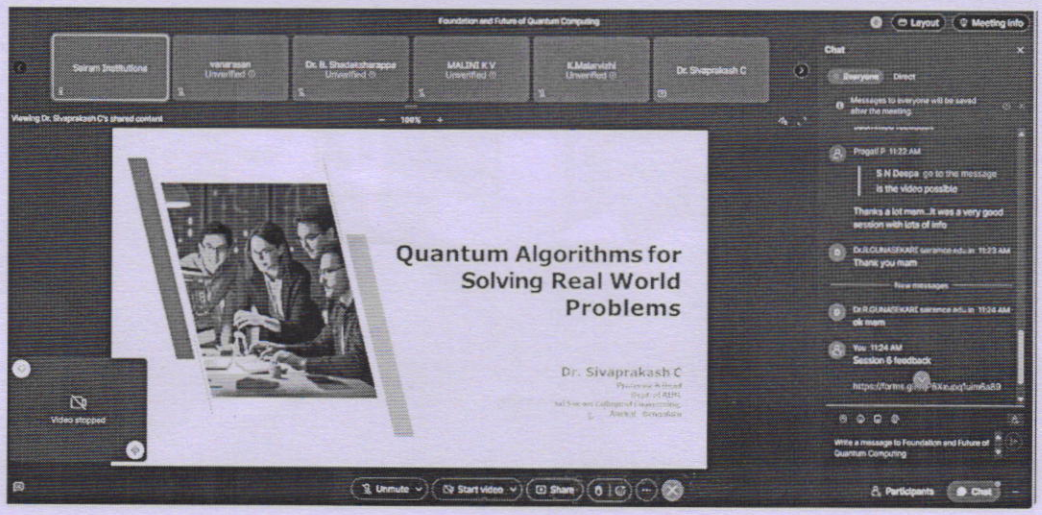
DAY 4





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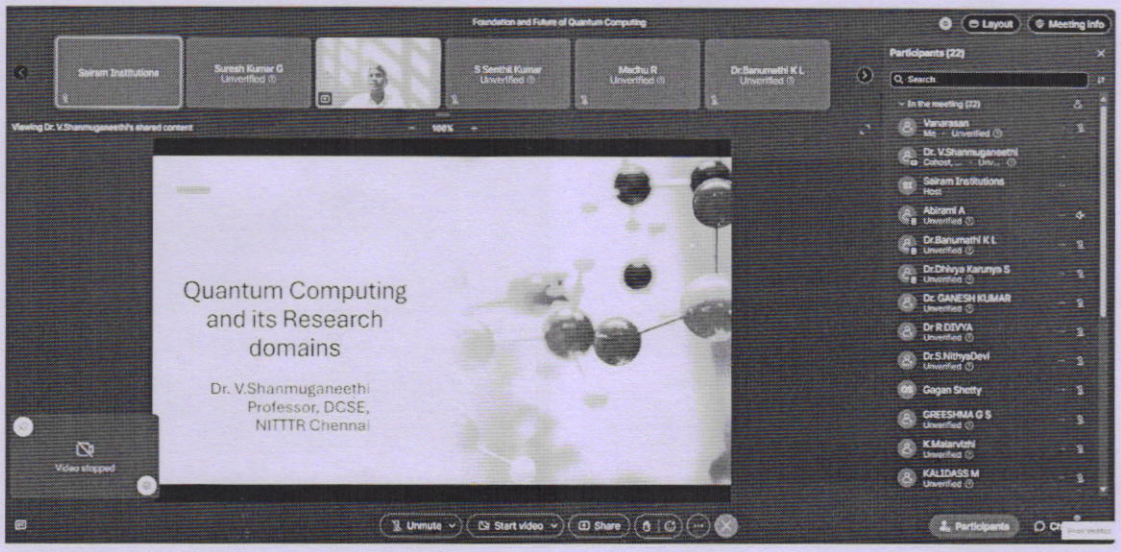
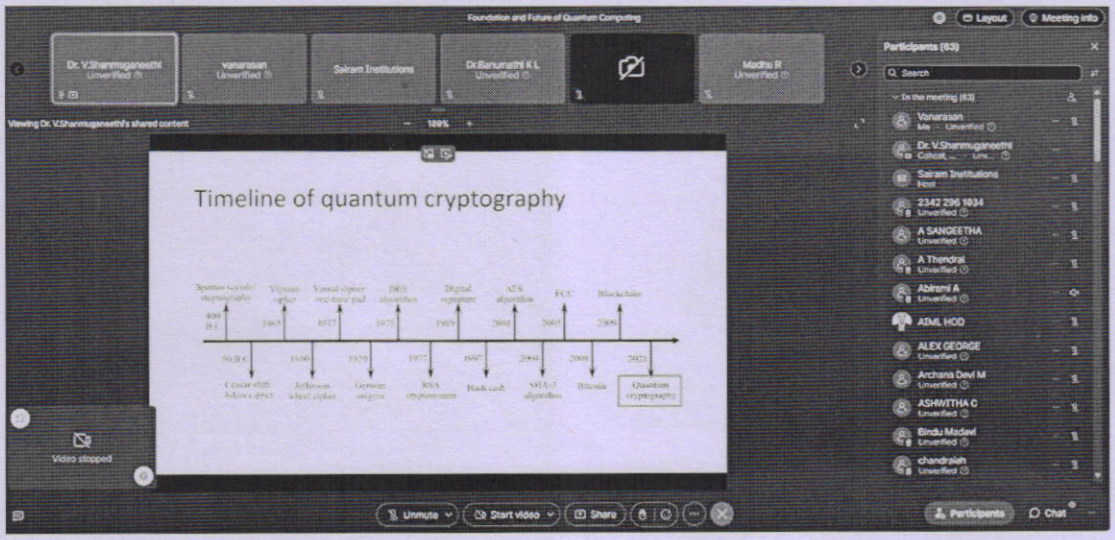
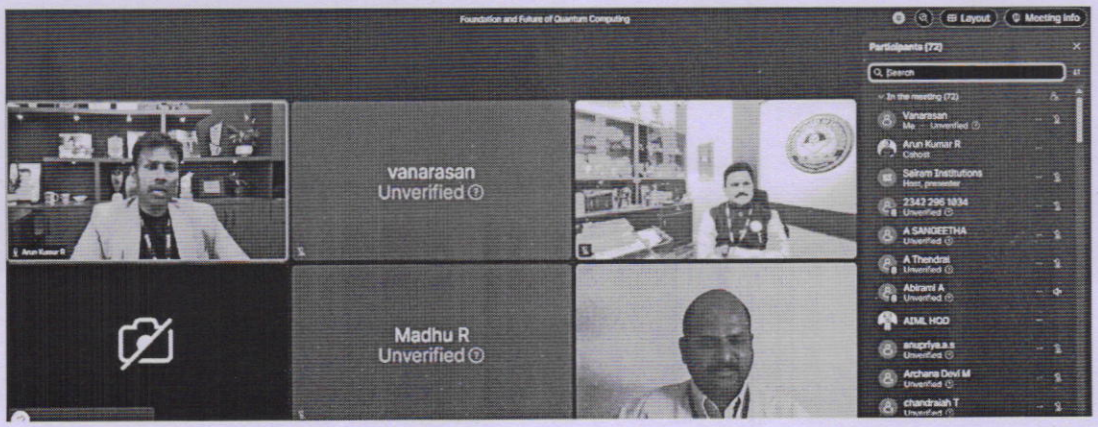
DAY 5







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Chairman & CEO, Sairam Institutions

Patron

Dr. B. Shadaksharappa
Principal, SCE, Bengaluru

Session Details

Date : 05.05.2025 / Time : 10.00AM - 11.30 AM

Mrs. Sudha Thamotharan

Inaugural Address

Date : 05.05.2025 / Time : 11.30AM - 1.00PM

Dr. T. Subha
Associate Professor, NITTTR, Chennai

Topic: Introduction to Quantum mechanics: The Foundations of quantum computing

Date : 06.05.2025 / Time : 10.00AM - 11.30 AM

Mrs. Jaya Sundaresan
Packaged Application Assistant Manager

Topic: Classical vs Quantum Computing: An overview of quantum concepts

Date : 06.05.2025 / Time : 11.30AM - 1.00PM

Dr. S. Anathakumaran Reddy

Topic: Building blocks of quantum Computation

Date : 07.05.2025 / Time : 10.00AM - 11.30 AM

Dr. R. Leena Sri

Topic: Exploring quantum algorithms and edge computing frameworks

Date : 07.05.2025 / Time : 11.30AM - 1.00PM

Mr. P. Ramkumar

Topic: Quantum computing applications in machine learning and optimization

Date : 03.05.2025 / Time : 10.00AM - 11.30 AM

Dr. S. N. Deepa
Associate Professor, NIT, Calicut

Topic: The Convergence of quantum and Edge computing: Future Possibilities

Date : 08.05.2025 / Time : 11.30AM - 1.00PM

Dr. Sivaprakash, C

Topic: Quantum algorithms for solving real world problems

Date : 09.05.2025 / Time : 10.00AM - 11.30 AM

Dr. V. Shanmuganeethi
Professor, NITTTR, Chennai

Topic: Future trends and research directions in quantum computing

Date : 09.05.2025 / Time : 11.30AM - 1.00PM

Dr. R. Arunkumar
Chief Operating Officer, Sairam Institutions

Valedictory Address

Sairam

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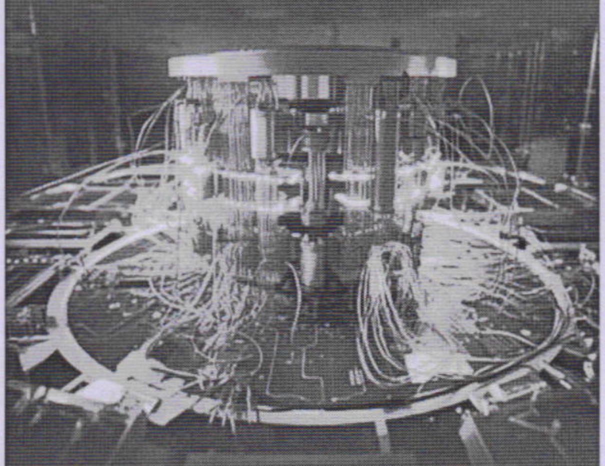
Organizing

5 Days Online National Level Faculty Development Programme on

"THE FOUNDATIONS AND FUTURE OF QUANTUM COMPUTING"

05.05.2025 to 09.05.2025



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Session 1

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How relevant was the content to your current role or academic interests?

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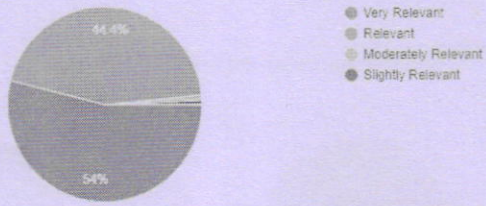

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How well did the speaker explain the concepts during the session?

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Session 2

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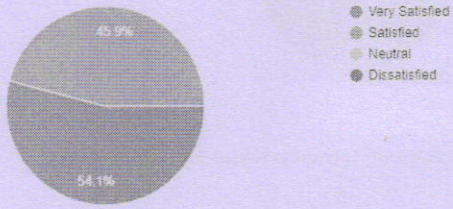

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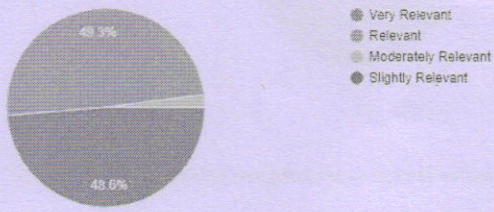

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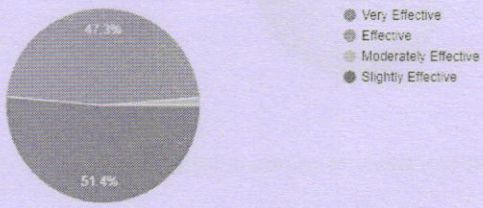

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Session 3

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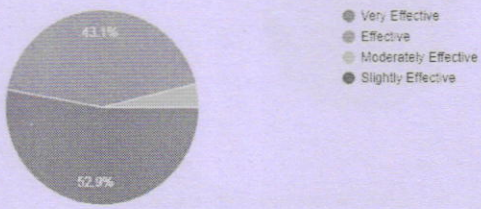

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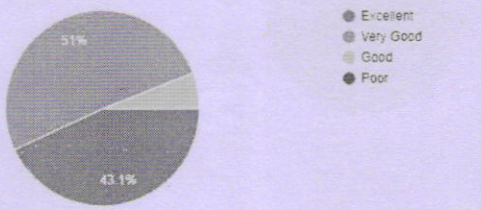

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Session 4

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Session 5

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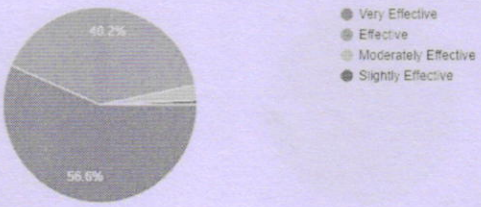

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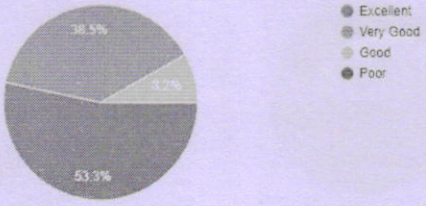

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Session 6

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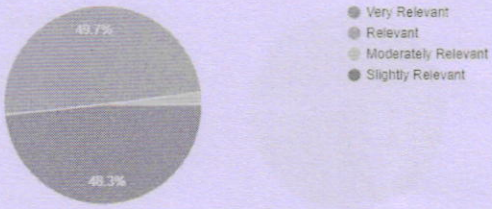

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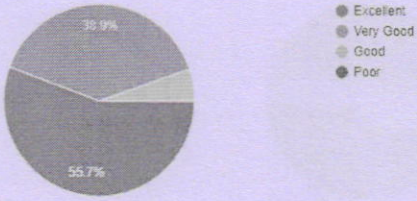

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session 7

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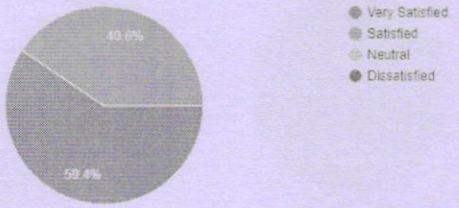

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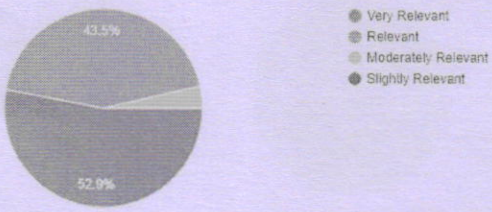

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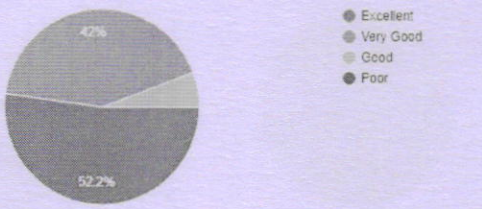

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Session 8

How satisfied were you with the session?

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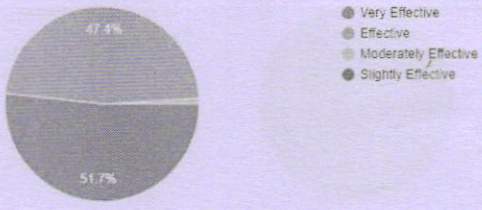

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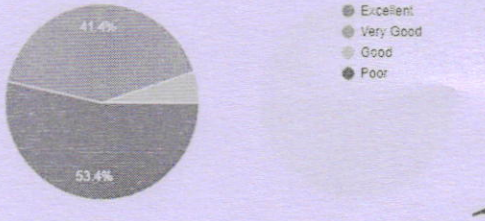

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