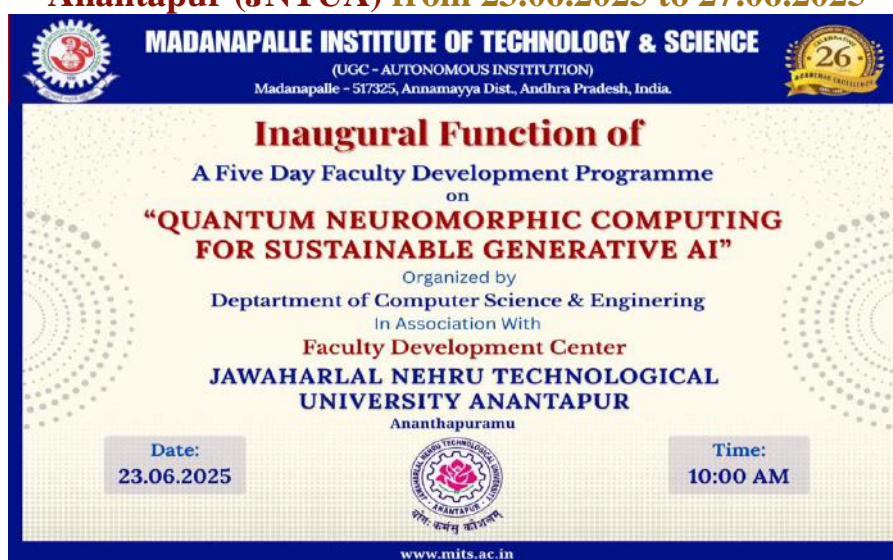


**A Report on Five-day Faculty Development Program on**  
**“Quantum Neuromorphic Computing for Sustainable Generative AI”**  
**Organized by Department of Computer Science & Engineering in Association with**  
**Faculty Development Center - Jawaharlal Nehru Technological University**  
**Anantapur (JNTUA) from 23.06.2025 to 27.06.2025**



**Report Submitted by:** Mrs. M. Sangeetha, Assistant Professor, Department of Computer Science & Engineering.

**Event Coordinators:** Dr. R. Nidhya, Professor, Department of Computer Science & Engineering; Dr. M. Sreedevi, Professor & HoD, Department of Computer Science & Engineering.

**Total No. of Participants:** 37

**Time and Venue:** 9:30 AM to 5:00 PM and Seminar Hall- A

**Mode of Conduct:** Offline

**Report Received on** 07.07.2025.

The Programme started at 10 AM with lightening of the lamp. Dr. R.Nidhya, Professor/CSE, MITS has welcomed everyone for the FDP programme. She mentioned the details about the resource persons for the FDP and about the schedule overview. She thanked Vice Chancellor & Registrar sir of JNTUA for providing opportunity to organize this event and she thanked Management & Principal sir for providing all the support for organizing this event in our campus. Welcome address was delivered by Dr M Sreedevi, Professor & HoD, Department of Computer Science & Engineering, MITS. The presidential address was delivered by Dr. P. Ramanathan, Vice Principal (Academics), MITS. Chief guest of the inaugural Dr. B. Surendiran Associate Professor/CSE, NIT Puducherry. Has delivered the inaugural address to the participants. He explained participants regarding the importance of the Quantum computing in current situation.



**Day 1: 23.06.25 (Monday) & Session 01**

**Resource Person:** Dr B Surendiran Associate Professor/CSE, NIT Puducherry

**Topic:** Introduction to Quantum Computing: Concepts and Opportunities

The resource person started the session by extended his thanks to Management, Principal, HoD, Organizers. He started offered participants a foundational understanding of quantum computing principles and their future potential. The session also shed light on the differences between classical and quantum computing, illustrating real-world applications and current

advancements in the field. Participants were introduced to emerging opportunities in quantum research, industry collaborations, and available platforms for simulation and experimentation. The session was highly informative and sparked great interest among attendees to explore this transformative technology further. The session ended with Feedback and Q&A session with participants.

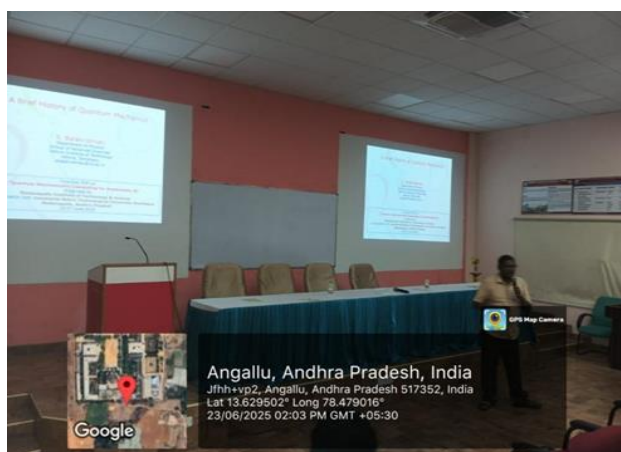


### Day 1: 23.06.25 (Monday) & Session 02

**Resource Person: Dr. S. Balakrishnan, Associate Professor & Head / Advanced Computing, VIT Vellore**

**Topic: Quantum Neuromorphic Computing: Synergizing Two Paradigms**

The session on "*Quantum Neuromorphic Computing: Synergizing Two Paradigms*" explored the convergence of quantum computing and neuromorphic engineering, highlighting their combined potential to revolutionize AI. It emphasized how quantum principles can enhance brain-inspired computing models, leading to faster and more efficient data processing. The resource person discussed research trends, practical applications, and future prospects, providing valuable insights that encouraged participants to delve deeper into this cutting-edge interdisciplinary field. The session ended with Feedback and Q&A session with participants.



### Day 1: 23.06.25 (Monday) & Session 03

**Resource Person: Dr. S. Balakrishnan, Associate Professor & Head / Advanced Computing, VIT Vellore**

**Topic: Sustainable AI: Challenges in Energy Consumption and Efficiency**

The session on *Sustainable AI: Challenges in Energy Consumption and Efficiency* highlighted the growing energy demands of AI models and the urgent need for eco-friendly computing practices. It emphasized optimizing algorithms, using energy-efficient hardware, and adopting green data centers to balance AI advancements with environmental sustainability. The session ended with Feedback and Q&A session with participants.





### Day 2: 24.06.25 (Tuesday) & Session 01

**Resource Person:** Dr U Srinivasulu Reddy, Associate Professor/CSE, NIT Tiruchirapalli

**Topic:** Quantum Algorithms for Machine Learning: QAOA, VQE, and Quantum SVM

The session on *Quantum Algorithms for Machine Learning: QAOA, VQE, and Quantum SVM* was insightful and well-structured. It effectively introduced complex quantum concepts and their applications in ML. The real-world relevance and clear explanations made it highly engaging and informative for participants from diverse technical backgrounds. The session ended with Feedback and Q&A session with participants.

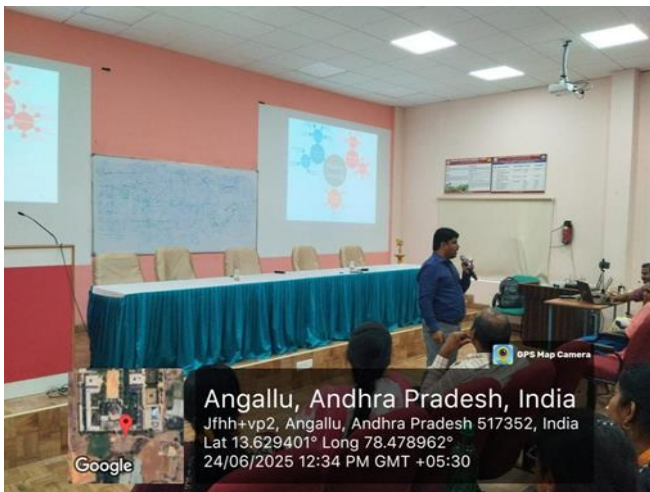


### Day 2: 24.06.25 (Tuesday) & Session 02

**Resource Person:** Dr U Srinivasulu Reddy, Associate Professor/CSE, NIT Tiruchirapalli

**Topic:** Generative AI Models: GANs, VAEs, and Diffusion Models

The session on "*Generative AI Models: GANs, VAEs, and Diffusion Models*" was highly informative and engaging. It provided a clear understanding of the architecture, applications, and differences among the models. The practical insights and real-world examples helped in grasping complex concepts effectively, making it a valuable learning experience. The session ended with Feedback and Q&A session with participants.

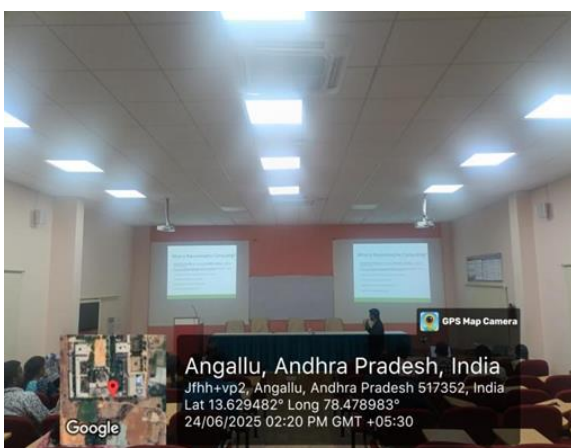


### Day 2: 24.06.25 (Tuesday) & Session 03

**Resource Person:** Dr. Shashidhara R, Senior Chief Engineer/Block Chain, Samsung R&D Institute, Bangalore

**Topic:** Security & Privacy Issues in Quantum Neuromorphic Computing

The session on "*Security & Privacy Issues in Quantum Neuromorphic Computing*" was thought-provoking and enlightening. It highlighted emerging challenges and potential solutions in this futuristic domain. The speaker effectively bridged advanced theoretical concepts with practical concerns, enhancing our understanding of the risks and safeguards in quantum-inspired intelligent systems. The session ended with Feedback and Q&A session with participants.





### Day 2: 24.06.25 (Tuesday) & Session 04

**Resource Person: Dr. Shashidhara R, Senior Chief Engineer/Block Chain, Samsung R&D Institute, Bangalore**

#### **Topic: Security and Privacy in Quantum Neuromorphic AI: Opportunities and Threats**

The session on "*Security and Privacy in Quantum Neuromorphic AI: Opportunities and Threats*" was highly insightful. It shed light on the dual aspects of innovation and vulnerability in this emerging field. The balanced discussion on future opportunities and potential threats provided a comprehensive understanding of the topic's significance. The session ended with Feedback and Q&A session with participants.

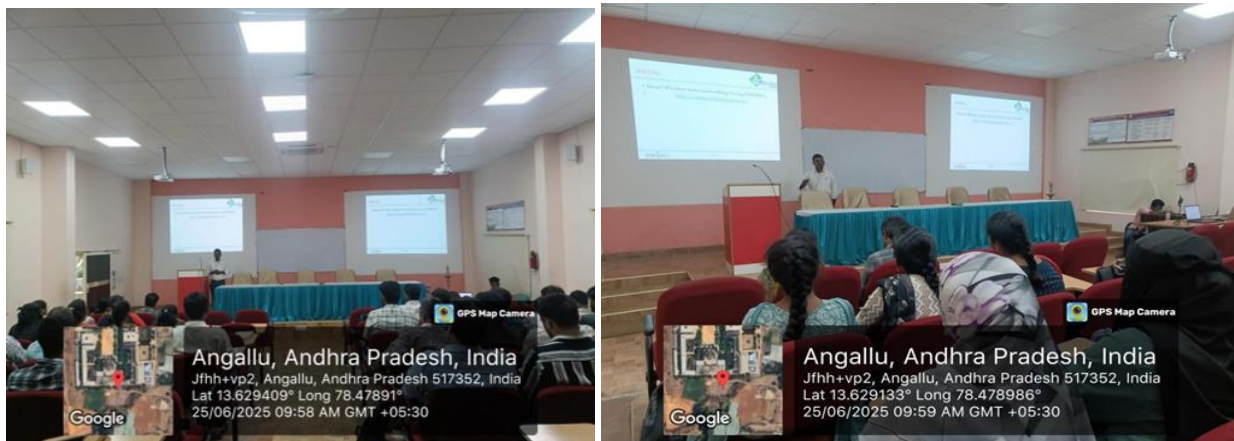


### Day 3: 25.06.25 (Wednesday) & Session 01

**Resource Person: Dr. Koppala Guravaiah, Assistant Professor/CSE, IIIT Kottayam**

#### **Topic: Quantum Neuromorphic Systems for Federated and Edge Learning**

The session on "*Quantum Neuromorphic Systems for Federated and Edge Learning*" was informative and forward-looking. It effectively explored the integration of quantum neuromorphic computing with decentralized learning models. The discussion provided valuable insights into scalability, efficiency, and real-world applications, enhancing our perspective on next-generation AI systems. The session ended with Feedback and Q&A session with participants.



### Day 3: 25.06.25 (Wednesday) & Session 02

**Resource Person: Dr. Koppala Guravaiah, Assistant Professor/CSE, IIIT Kottayam**

#### **Topic: Quantum-Inspired Neuromorphic Algorithms for Generative Art and Media Creation**

The session on "*Quantum-Inspired Neuromorphic Algorithms for Generative Art and Media Creation*" was creative and inspiring. It showcased the fusion of advanced computing with artistic innovation, highlighting unique possibilities in media generation. The interdisciplinary approach made the session both intellectually stimulating and relevant to emerging trends in AI-driven creativity. The session ended with Feedback and Q&A session with participants.



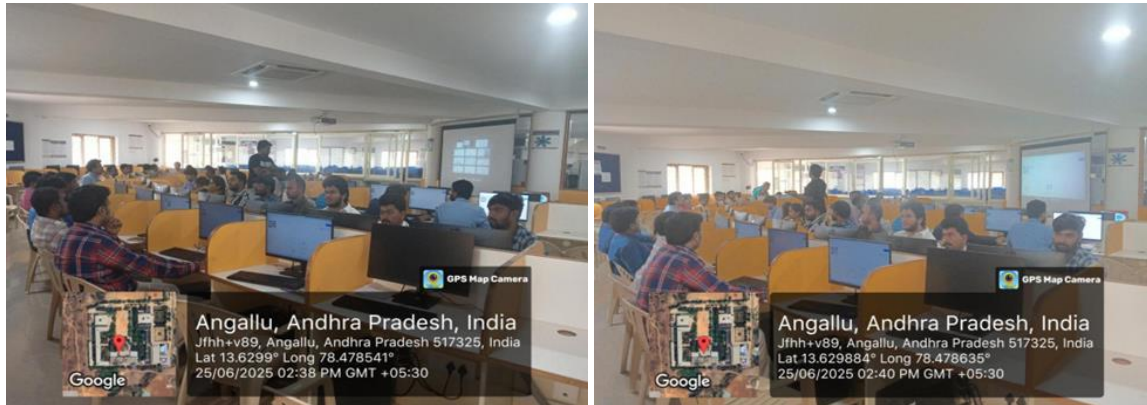


### Day 3: 25.06.25 (Wednesday) & Session 03

**Resource Person:** Dr. Aswath Babu H, Assistant Professor/Physics, IIT Dharwad.

#### **Topic:** Quantum Algorithms for AI

The session on "*Quantum Algorithms for AI*" was highly enlightening and well-structured. It provided a clear overview of how quantum computing enhances AI capabilities through faster computations and novel algorithmic approaches. The speaker's clarity and real-world examples made complex concepts accessible and engaging for all participants. The session ended with Feedback and Q&A session with participants.

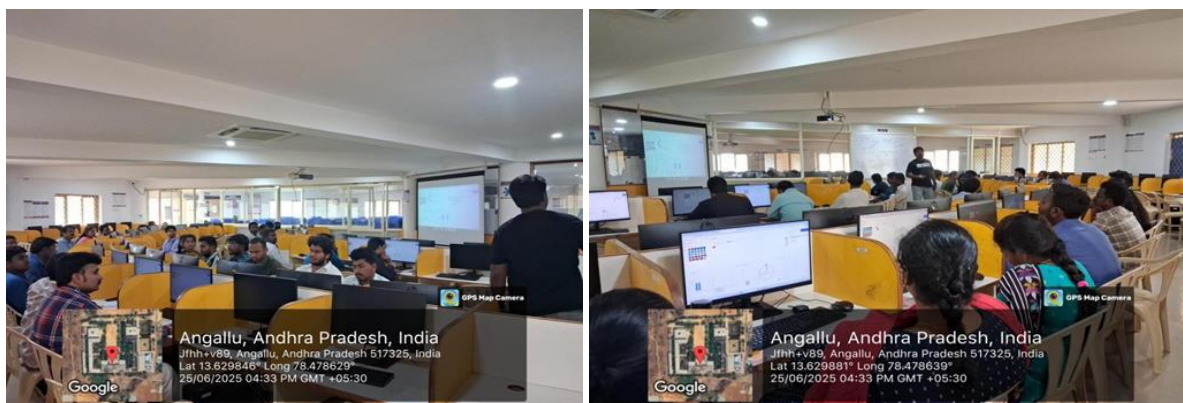


### Day 3: 25.06.25 (Wednesday) & Session 04

**Resource Person:** Dr. Aswath Babu H, Assistant Professor/Physics, IIT Dharwad.

#### **Topic:** Building Quantum Neuromorphic Simulations: Tools and Frameworks

The session on "*Building Quantum Neuromorphic Simulations: Tools and Frameworks*" was both practical and insightful. It offered a comprehensive overview of the latest tools and frameworks used in simulating quantum neuromorphic systems. The hands-on approach and detailed explanations enhanced participants' understanding of implementation techniques in this cutting-edge domain. The session ended with Feedback and Q&A session with participants.

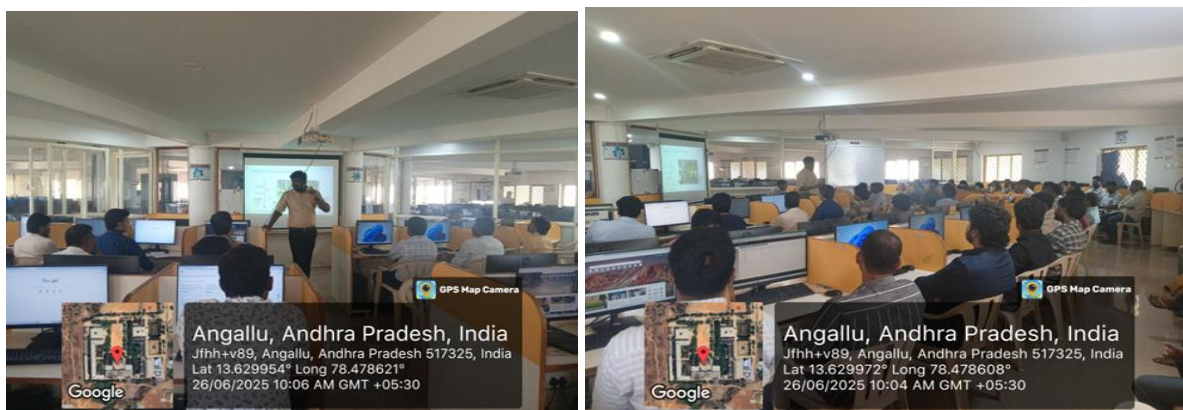


### Day 4: 26.06.25 (Thursday) & Session 01

**Resource Person:** Dr. T. Kalaipriyan, Assistant Professor SG-2, VIT Chennai

#### **Topic:** Quantum Hardware: Qubits, Quantum Gates, and Circuits

The session on "*Quantum Hardware: Qubits, Quantum Gates, and Circuits*" was foundational and informative. It clearly explained the core components of quantum computing, bridging theoretical concepts with hardware implementation. The session enhanced participants' understanding of how quantum systems operate at the physical level, laying a strong groundwork for advanced topics. The session ended with Feedback and Q&A session with participants.



### Day 4: 26.06.25 (Thursday) & Session 02

**Resource Person:** Dr. T. Kalaipriyan, Assistant Professor SG-2, VIT Chennai

#### **Topic:** Modeling Spiking Neural Networks (SNNs) with Quantum Mechanics Principles

The session on "*Modeling Spiking Neural Networks (SNNs) with Quantum Mechanics Principles*" was innovative and intellectually stimulating. It effectively connected neuroscience-inspired models with quantum theory, offering fresh



perspectives on neural computation. The detailed explanations fostered a deeper understanding of potential advancements in AI and quantum-inspired neural architectures. The session ended with Feedback and Q&A session with participants.



#### Day 4: 26.06.25 (Thursday) & Session 03

**Resource Person: Dr. K. Vijayaprabakaran, Assistant Professor SG-1, VIT Chennai**

**Topic: Quantum-Enhanced Generative Models: Variational Quantum Circuits for AI**

The session on "*Quantum-Enhanced Generative Models: Variational Quantum Circuits for AI*" was insightful and cutting-edge. It highlighted how variational quantum circuits can improve generative AI models, blending quantum computing with machine learning. The clear explanations and practical examples made complex quantum concepts accessible and highly relevant to AI advancements. The session ended with Feedback and Q&A session with participants.



#### Day 4: 26.06.25 (Thursday) & Session 04

**Resource Person: Dr. K. Vijayaprabakaran, Assistant Professor SG-1, VIT Chennai**

**Topic: Impact of Quantum and Neuromorphic Techniques in Generative AI**

The session on "*Impact of Quantum and Neuromorphic Techniques in Generative AI*" was highly insightful, showcasing how these emerging technologies can revolutionize generative AI. The discussion effectively covered potential improvements in efficiency, creativity, and scalability, providing a comprehensive understanding of future directions in AI innovation. The session ended with Feedback and Q&A session with participants.



#### Day 5: 27.06.25 (Friday) & Session 01

**Resource Person: Dr. G. N. Vivekananda, Associate Professor/ SITE, VIT Vellore**

**Topic: Neuromorphic Approaches to Generative AI: Energy-Efficient Learning**

The session on "*Neuromorphic Approaches to Generative AI: Energy-Efficient Learning*" was enlightening and relevant. It effectively highlighted how neuromorphic computing can significantly reduce energy consumption in generative AI models. The practical insights and examples offered a clear understanding of sustainable AI advancements and their future potential. The session ended with Feedback and Q&A session with participants.



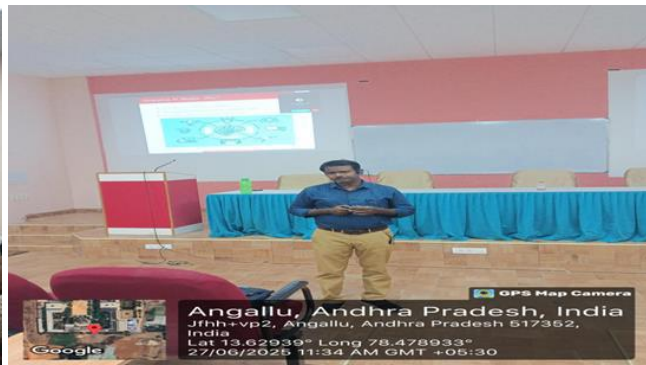


### Day 5: 27.06.25 (Friday) & Session 02

**Resource Person: Dr. Masilamani V , Professor/CSE, Indian Institute of Information Technology, Design and Manufacturing, Kancheepuram**

**Topic: Roadmap to Scalable, Sustainable Quantum Neuromorphic Systems for Next-Gen AI**

The session on "*Roadmap to Scalable, Sustainable Quantum Neuromorphic Systems for Next-Gen AI*" was effectively addresses the critical path toward developing scalable and sustainable quantum neuromorphic systems, highlighting their potential to revolutionize next-generation AI. It emphasizes integration challenges, energy efficiency, and scalability, offering valuable insights for researchers aiming to advance quantum-inspired AI hardware architectures. The session ended with Feedback and Q&A session with participants.



### Day 5: 27.06.25 (Friday) & Session 03

**Resource Person: Dr. Masilamani V , Professor/CSE, Indian Institute of Information Technology, Design and Manufacturing, Kancheepuram**

**Topic: Ethical Considerations in the Quantum Enabled Generative AI**

The session on "*Ethical Considerations in the Quantum Enabled Generative AI*" was thoughtfully explores the ethical challenges posed by quantum-enabled generative AI, including privacy, bias, and accountability. It encourages responsible innovation by addressing potential societal impacts, ensuring that advancements align with ethical standards and promote trustworthy, fair, and transparent AI development. The session ended with Feedback and Q&A session with participants.



### Day 5: 27.06.25 (Friday) & Session 04

**Valedictory Function**

**Location: Seminar Hall A**

The valedictory function of the offline Faculty Development Programme (FDP) on **QUANTUM NEUROMORPHIC COMPUTING FOR SUSTAINABLE GENERATIVE AI** was conducted with great enthusiasm and active participation. The session was gracefully anchored by Ms. Thiripthi P. Balakrishnan, who ensured a smooth flow of events throughout the program. The function began with a heartfelt address by the **FDP Coordinator, Dr. R. Nidhya**, who shared a brief overview of the FDP journey, its key highlights, and expressed her gratitude to all the resource persons, participants, and organizing team. Following this, **Dr. Sree Devi**, Head of the Department, CSE, addressed the gathering and appreciated the efforts taken

by the faculty members to engage in continuous learning and professional development. **Dr. Kalpana**, PG Vice Principal, extended her warm wishes and congratulated the organizing team for the successful completion of the FDP. She emphasized the importance of such faculty development initiatives in enhancing teaching quality and promoting research-oriented thinking. Then, the **certificates were distributed** to all the participants by the dignitaries present on the dais, including the resource person, FDP coordinator, HoD/CSE, and PG Vice Principal. The program concluded with **participants expressing their feedback** on the FDP, highlighting the knowledge gained, practical insights, and the overall quality of the sessions. Their positive remarks reflected the impact and effectiveness of the programme.



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### Outcome:

- Participants gained a solid foundation in quantum computing, neuromorphic engineering, and how these paradigms intersect to enable sustainable and efficient generative AI models.
- The programme included practical sessions and demonstrations using simulation tools and platforms, allowing participants to explore quantum algorithms and neuromorphic architectures in real-time.
- Faculty members were exposed to the convergence of physics, computer science, neuroscience, and AI, fostering cross-domain thinking and innovative research ideas.
- The sessions encouraged the formulation of new research proposals and collaborations focused on energy-efficient AI systems using quantum and neuromorphic approaches.
- Participants were empowered to incorporate emerging topics like quantum AI and neuromorphic computing into their teaching and curriculum design, aligning with futuristic educational goals.



**విశాలాంధ్ర-జేఎన్టీయూఐ:** మధనపవ్త్ర ఇన్స్టిట్యూట్ ఆఫ్ టెక్నాలజీ సైన్స్ (మెట్)లోని కంప్యూటర్ సైన్స్, ఇంజనీరింగ్ విభాగం, జవహర్లాల్ నెహ్రూ టెక్నాలజికల్ యూనివర్సిటీ కంపౌండ్ పురం ఫ్యాకల్టీ దేవలవమలలో నిలబడితే ఈ "కాంబల పాప" స్ఫూర్తమార్పిడి కంప్యూటర్ ఫర్ సస్టైనబుల్ ఇనోవేటివ్ ఏ.బి.ఎస్ బదుల పాపకర్త దేవలవమల ప్రోగ్రామ్ నిర్వహించినట్లు కళాకారి ప్రిన్సిపాల్ డాక్టర్ సి. యువరాజ్ తెలిపారు. పుష్పవేరిగల్ నేషనల్ ఇన్స్టిట్యూట్ ఆఫ్ టెక్నాలజీ అసోసియేట్ ప్రొఫెసర్ డాక్టర్ బి.సురేంద్రన్ నేపథ్యంగా... స్ఫూర్తమార్పిడి కంప్యూటింగ్లో ఉద్బుద్ధస్థున్న ధోరణులు, జనరేటివ్ ఏ.బి.ఎ టెక్నిక్కుల చేయదలో దాని పాత్రకల్ప అంతర్వేషులను మనమధ్యనా, కాంబలం కంప్యూటింగ్, స్ఫూర్తమార్పిడి ఇంజనీరింగ్ మరియు స్థిరమైన ఏ బి నమూనాల అత్యధునిక రంగాల్లో ఫ్యాకల్టీ సభ్యుల జ్ఞానం, బోధనా సామర్థ్యాలను పెంపొందించడం ఈ ఫ్యాకల్టీ దేవలవమల ప్రోగ్రామ్ లక్ష్యం అని అన్నారు. ఈ కార్యక్రమంలో ప్రముఖ విద్యార్థిత్వల, పరిశ్రమ నిపుణుల నుండి నిపుణుల, విభాగాధిపతి డాక్టర్ శ్రీదేవి, కనీసం డాక్టర్ పాలా పాల్నాగు.