माधव प्रौद्योगिकी एवं विज्ञान संस्थान ग्वालियर

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE GWALIOR

DEEMED UNIVERSITY

January-March 2025

THE FUSION FRONTIER

CENTRE FOR COMPUTER SCIENCE AND BUSINESS MANAGEMENT

E-NEWSLETTER

Contents

Vision

To develop top-tier professionals in Computer Science and Business Systems, nurturing innovations and leadership to bridge the tech-business divide for societal growth and development.

Mission

- **Cultivate Excellence:** Develop world-class computer science and business systems professionals with a strong foundation in both disciplines.
- **Foster Innovation and Research:** Encourage a culture of innovation and support cutting-edge research to develop solutions that bridge the gap between technology and business.
- **Empower Leaders:** Equip graduates with the skills and knowledge to become adept leaders who excel at integrating technology and business solutions.
- **Drive Societal Impact:** Prepare graduates to leverage their expertise for impactful advancements across all spheres of life and society.

FDP Attended by Faculty Members

- Dr. Saumil Maheshwari and Dr. Abhishek Dixit have successfully participated & completed AICTE Training And Learning (ATAL) Academy Faculty Development Program on Quantum Computing at Chandigarh University from 10/02/2025 to 15/02/2025.
- Mr. Utkarsh Sharma attended a Faculty Development Programme on “Information Security and Privacy in Digital World”, organized by the dept. of CSE, MNNIT, Prayagraj from 19th February 2025 to 23rd February 2025.
- Mr. Utkarsh Sharma has participated in a Faculty Development Programme on “IoT and Its Applications”, organized by E&ICT Academy IIT Guwahati held from 24th – 29th March, 2025 in association with J.I.I.T (Hub), MITS (Spoke) and IMS Engineering College.

ATAL/2024/1735626977

Skill India

ATAL

AICTE

CU

ALL INDIA COUNCIL FOR TECHNICAL EDUCATION

Nelson Mandela Marg, Vasant Kunj, New Delhi -110070

AICTE Training and Learning (ATAL) Academy

Certificate

It is certified that ***Dr. Saumil Maheshwari, Faculty members of the AICTE approved institutions*** *of* ***Madhav Institute of Technology & Science*** *has successfully participated & completed AICTE Training And Learning (ATAL) Academy Faculty Development Program on* ***Quantum Computing*** *at* ***Chandigarh University*** *from* ***10/02/2025*** *to* ***15/02/2025.***

Praveen Kumar Mannepalli
Professor (Other Institute), Coordinator
Chandigarh University

Dr. Sunil Luthra
Director & Bureau Head
Training and Learning Bureau, AICTE

NPTEL Course Attended by Faculty

- **Dr. Devanshu Tiwari** has successfully completed an 8 week MOOC course and AICTE approved FDP on “User-centric Computing For Human-Computer Interaction” with Elite-Silver certification.

Activities Organized (Workshop/Conference/FDP/STC) at Institute level

- A workshop on Blockchain Technology was organized on 1st March 2025, and 64 students participated in the Workshop.
- A mandatory workshop on Intellectual Property Rights was organized on 31st January- 1st February 2025, and 37 students participated.
- A mandatory workshop on the Indian Knowledge System was organized on 22nd–23rd March 2025, and 72 students participated.

Publications

- **Reena, A. Tiwari and S. Maheshwari,** "Self-Evolving Hierarchical Attention and Contrastive Graph Networks for Advanced Corporate Data Analytics," 2025 International Conference on Intelligent Control, Computing and Communications (IC3), Mathura, India, 2025, pp. 609-615, doi: 10.1109/IC363308.2025.10956373.

Activities by Faculty

- **Dr. Monica Chauhan Bhadoriya** was one of the jury member in Gwalior Hackathon 2025 organized by Gwalior Smart City Incubation Centre (GIncube) held on 8th March 2025.

"Education is one thing no one can take away from you."
Elin Nordegren

Latest Technogies

Quantum Computing Progress in 2025: Unlocking the Next Technological Frontier

Quantum computing, once considered a far-off theoretical endeavor, has entered a pivotal phase of advancement in 2025. While classical computers process information in binary bits (0s and 1s), quantum computers leverage qubits, which exploit quantum phenomena such as superposition and entanglement. This capability allows quantum computers to process vast amounts of data simultaneously, tackling problems that are intractable for even the most powerful classical supercomputers. As of 2025, quantum computing has moved beyond academic curiosity into real-world experimentation, cloud accessibility, and nascent commercial applications.

1. Technical Advancements

a. Scalability and Qubit Fidelity

One of the most significant developments in 2025 is the increase in the number and quality of qubits. Companies like IBM, Google, and IonQ have announced devices with over 1000 physical qubits, with IBM's Condor chip reaching 1121 qubits. However, quality matters more than quantity. The industry has shifted focus from simply adding more qubits to enhancing coherence time, gate fidelity, and error correction. Coherence time—the length a qubit can maintain its quantum state—has been extended through advancements in cryogenic engineering and materials science.

b. Quantum Error Correction (QEC)

Quantum computers are highly susceptible to noise and decoherence, which introduces errors in calculations. In 2025, quantum error correction has seen marked improvement. Google and IBM have demonstrated early versions of logical qubits, which combine multiple physical qubits to represent one reliable logical unit.

c. Quantum Advantage Milestones

Quantum advantage (or quantum supremacy) occurs when a quantum computer solves a problem faster than the best classical alternative. Google's 2019 demonstration was largely symbolic, but in 2025, newer experiments in optimization and quantum chemistry simulations have come closer to practical quantum advantage, particularly in niche domains.

2. Real-World Applications in 2025

While universal quantum computing remains several years away, domain-specific quantum applications are beginning to emerge:

a. Drug Discovery and Molecular Modeling

Quantum computing is particularly well-suited for simulating molecular interactions. In 2025, pharmaceutical companies like Roche and Merck are using hybrid quantum-classical methods to optimize molecular structures, reducing the time and cost of drug discovery.

b. Logistics and Optimization

Airlines, shipping companies, and manufacturers are piloting quantum algorithms to solve combinatorial optimization problems—such as route planning, supply chain optimization, and cargo loading. These problems are classically NP-hard, but quantum algorithms show promise in narrowing search spaces efficiently.

c. Finance

Financial institutions like JPMorgan Chase and Goldman Sachs have continued to explore quantum computing for risk modeling, portfolio optimization, and option pricing. In 2025, quantum Monte Carlo methods, when combined with high-performance classical computing, are delivering faster simulations with improved accuracy.

d. Cybersecurity

Quantum computing poses a long-term threat to classical encryption methods. In response, 2025 has seen significant momentum in post-quantum cryptography (PQC). Government agencies and tech companies are implementing quantum-resistant algorithms while simultaneously exploring quantum key distribution (QKD) for ultra-secure communications.