माधव प्रौद्योगिकी एवं विज्ञान संस्थान ग्वालियर

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE GWALIOR

DEEMED UNIVERSITY

April-June 2025

THE FUSION FRONTIER

CENTRE FOR COMPUTER SCIENCE AND TECHNOLOGY

E-NEWSLETTER

Editorial Board

- Dr. Akhilesh Tiwari
  Head, Centre for CST
- Dr. Saumil Maheshwari
- Arya Raghuwanshi
- Kavya Saxena
- Anurag Ojha

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.

New Faculty Joining

- **Dr. Gulshan Soni,** Ph.D. (CSE) Pondicherry University, joined as an Assistant Professor in the Centre. His Area of Interest are Wireless Body Area Networks (WBANs), IoT, and Blockchain Technology.
- **Dr. Tejaswita Mishra**, Ph.D. joined as an Assistant Professor in the Centre. Her area of interest are Machine Learning, Data Analytics, Medical Image Processing, Artificial Intelligence.
- **Dr. Shraddha Dubey,** Ph.D. joined as an Assistant Professor in the Centre. Her area of interest are Computer Vision, Artificial Intelligence, Deep Learning, Medical Image Processing.
- **Dr. Suchitra Agrawal,** Ph.D. IIT Indore, joined as an Assistant Professor in the Centre. Her area of interest are Machine Learning, Optimization Techniques.

Expert Talk/Sessions organized/delivered at Institute Level

- **Dr. Akhilesh Tiwari** delivered a session on "**Implementation of NEP in the MITS-DU**" in the Faculty Development Program scheduled from 1st to 5th April 2025.
- **Dr. Saumil Maheshwari** delivered two sessions on "**Curriculum Implemented in the MITS-DU**" and "**Teaching - Learning and Assessment Practices at MITS-DU**" in the Faculty Development Program scheduled from 1st to 5th April 2025.
- **Dr. Abhishek Dixit** delivered two sessions on "**Practices for IMS & IUMS**" and "**Holistic Development through Novel Engaging Courses**" in the Faculty Development Program scheduled from 1st to 5th April 2025.

Latest Technology

6G on the Horizon: The Next Leap in Connectivity

As 5G deployment continues worldwide, the tech world is already gearing up for the 6th Generation of Wireless Technology — 6G. With commercial rollout anticipated around 2030, research and development are heating up in 2025 across industries and governments.

6G aims to dramatically surpass 5G by offering:

- ⚡ Data speeds of up to 1 Tbps
- 🕒 Latency as low as 0.1 milliseconds
- 🌐 Real-time holographic communication
- 🤖 Native integration of AI into the network infrastructure
- 🛰️ Seamless terrestrial and non-terrestrial (satellite) connectivity

Powered by Emerging Technologies

6G isn't just about speed. It's an ecosystem built on:

- Terahertz (THz) spectrum for ultra-high data rates
- AI-driven network orchestration for self-optimizing systems
- Advanced MIMO (massive input/output) and beamforming for precision targeting
- Quantum communication protocols for secure data transmission

Who's Leading the Charge?

Several major players are investing heavily in 6G R&D:

- Samsung and LG have opened dedicated 6G research labs.
- Nokia is coordinating the European Union's 6G flagship project Hexa-X.
- Huawei and ZTE are pushing for early trials in Asia.
- NTT DOCOMO and DoCoMo USA Labs are developing 6G use cases in healthcare and robotics.

🌍 Real-World Possibilities

With 6G, the following futuristic concepts may become real:

- 🌐 Digital twins for smart cities and industrial processes
- 🧠 Brain-computer interfaces with real-time interaction
- 🎮 Fully immersive XR/VR worlds without lag
- 🚗 Ultra-fast V2X (Vehicle-to-Everything) communication for autonomous transport

🔐 Challenges Ahead

While promising, 6G also brings challenges:

- 📶 Terahertz waves have limited range and penetration
- 🔒 Security and privacy risks with hyper-connected networks
- ⚡ Energy efficiency needs to match exponential data growth