



<http://www.mnit.ac.in/eict>

QT-05: Quantum Computation

July 11 – Aug 2, 2025

Twenty Days (Mon to Sat)

Time: 2 – 4 PM (Daily 2 Hours)



Innovation Centre for Education

Chairman, EICT Academy & Director MNIT Jaipur

Prof. Narayana Prasad Padhy

Chief Investigator, EICT Academy

Prof. Vineet Sahula, ECE

Coordinator, EICT Academy

Dr. Satyasai Jagannath Nanda, ECE

Co- Chief Investigators, EICT Academy

Prof. Lava Bhargava, ECE

Prof. Pilli Emmanuel Shubhakar, CSE

Dr. Ravi Kumar Maddila, ECE

Objective (Electronics & ICT Academy-Phase II)

- 1) To conduct specialized FDPs for faculty/mentor training in line with the vision of MeitY by promoting emerging areas of technology and other high-priority areas that are pillars of both the "Make in India" and the "Digital India" programs.
- 2) To promote synergy and collaboration with industry, academia, universities and other institutions of learning, especially in emerging technology areas.
- 3) To support the National Policy on Electronics 2019 (NPE 2019) which envisions positioning India as a global hub for ESDM sector, including MeitY Schemes/policies such as Programme for Semiconductors and Display Fab Ecosystem; India AI; National Programme on AI, Production Linked Incentive Scheme for IT Hardware & Large-Scale Electronics Manufacturing; EMC; SPECS; Chips to System (C2S); etc.
- 4) To promote standardization of FDPs through Joint Faculty Development Programmes.
- 5) To support the vision of the National Education Policy (NEP 2020), which mandates that Indian educators go through at least 50 hours in professional development programmes per year.
- 6) To design, develop & deliver specialised FDPs on emerging technologies/ niche areas/ specialised modules for specific research areas for Faculty in Higher Education Institutions (HEI), besides FDPs on multi-disciplinary areas connected with ICT tools and technologies and other digital hybrid domains, covering a wide spectrum of engineering and non-engineering colleges, polytechnics, ITIs, and PGT educators.

An intensive **20 Day - 40 Hours** Training Programme in Online Mode is being organized for faculty and doctoral students of engineering, science and technological institutions. It is also open to working professionals from industry/ organizations. The programme will be run for **only two hours** in the afternoon from **14:00 to 16:00 hours Daily (Mon to Sat)**.

QT-05: Quantum Computation is the **fourth** in a series of Faculty Development programmes aligning to the courses in the recently approved **Minor Course Curriculum on Quantum Computing** by AICTE, DST and IBM.

<https://facilities.aicte-india.org/Minor Quantum Technologies.pdf>

Experts/Speakers-

- 1) Dr. Aswath Babu, Assistant Professor, IIIT Dharwad
- 2) Dr. Jayakumar Vaithiyashankar, CEO Anuthantra & IBM Educator
- 3) Dr. Dr. Ritajit Majumdar, Research Scientist, IBM Quantum
- 4) Dr. Anindita Banerjee, Project Manager, CDAC Pune
- 5) Dr. Santosh Vipparthi, Assoc. Prof. & Head, School of AI & DE, IIT Ropar
- 6) Dr. Mostafizur Rahman, Research Scientist, IBM Quantum, Bengaluru
- 7) Ms. Janani A, Support Engineer, IBM Quantum
- 8) Mr. A. Ananda Raman, Scientific Officer – E, NISER, Bhubaneswar
- 9) Mr. Jinesh VN, PES University, Bengaluru
- 10) Dr. Raghavendra, SRM University, Bengaluru

Programme Modules:

Qubits versus classical bits: Spin-half systems and photon polarizations, Trapped atoms and ions, Artificial atoms using circuits, Semiconducting quantum dots, Single and Two qubit gates – Solovay - Kitaev Theorem. Quantum advantage claims, Roadmap for future.

Quantum correlations: Entanglement and Bell's theorems

Review of Turing machines and classical computational complexity: Time and space complexity (P, NP, PSPACE), Reversible computation, Universal quantum logic gates and circuits, Quantum parallelism

Quantum algorithms: Deutsch algorithm, Deutsch Josza algorithm, Bernstein - Vazirani algorithm, Simon's algorithm **Database search:** Grover's algorithm **Quantum Fourier Transform and prime factorization:** Shor's Algorithm. **Quantum complexity classes – Q, EQP, BQP, BPP, QMA, Additional Quantum Algorithms:** Variational Quantum Eigensolver (VQE), HHL, QAOA.

Error correction: Fault-tolerance, Simple error correcting codes, Survey of current status, NISQ era processors, Quantum Computer Vision.

Principal Coordinator

Dr. Pilli Emmanuel Shubhakar
9462937359 (M)

Joint-Principal Coordinator

Dr. Satyendra Singh Chouhan
9549650273 (M)

Registration:

Registration is open to faculty, working professionals, industry persons, doctoral, postgraduate and graduate students. Participants will be admitted on first-come first-served basis.

Register online at – (<http://online.mnit.ac.in/eict/>)



Certification Fee:

- Academic (Faculty/PhD Scholars) [(India/SAARC/African countries)]: ₹500/-
- Professionals / Industry / Others [India / SAARC / African countries]: ₹1000/-
- Participants from the **Rest of the World USD: US\$ 60**

(A) The fee covers online participation, material and certification charges.

(B) Webinar Classes will be on Cisco **WebEx**, Notes / Slides will be shared and Quizzes / Assignments will be conducted on **Canvas e - Learning Platform**,

→ For any other query, email us at fdp.academy@mnit.ac.in