SRI SATHYA SAI INSTITUTE OF HIGHER LEARNING
(DEEMED TO BE UNIVERSITY)

FACULTY DEVELOPMENT PROGRAMME

DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE

FOUNDATIONS AND APPLICATIONS OF QUANTUM COMPUTING

18th March – 3rd April 2025

ABOUT THE FDP

This Faculty Development Program (FDP) offers a comprehensive overview of quantum computing, covering its foundational principles, emerging trends, and practical applications. The program is structured with a series of lectures and hands-on sessions for educators and researchers eager to understand both the theoretical and practical aspects of quantum computing. Faculty members from universities, Post-Doctoral Researchers, PhD students and Industry professionals working in allied areas are eligible to apply for the program. The topics are designed based on the QT 01 and QT 05 Model Curriculum for the Minor Degree in Quantum Technologies for UG Degree Courses, as released by AICTE in December 2024.

SALIENT FEATURES

- Aligned with QT 01 and QT 05 Courses released by AICTE
- Engaging with top experts in Quantum Technologies
- No Advanced Knowledge Required
- Hands-On Experience

EVENT INFORMATION

- **Mode**: Online
- **Dates**: 18th March to 3rd April (2 weeks)
- **Timing for Lectures**: 6:00PM to 8:00PM
- **On Saturdays:**
  - **Hands-On Session**: 10:00AM to 12:00PM
  - **Discussion-Forum**: 1:30PM to 3:30PM
- **Who can apply:** Faculty | Industry Professionals | Researchers

REGISTRATION DETAILS

- **Register Here**
- **Last Date to Apply:** 12th March 2025

FDP COORDINATOR

Dr. N. Uday Kiran, DMACS, SSSIHL

CONTACT Details for FDP

+91 9849519516

events.dmacs@sssihl.edu.in

FEE DETAILS

A nominal fee of **₹1000 per participant** to be remitted to the bank account as per the below details:
Account Name: Sri Sathya Sai Institute of Higher Learning
Bank Name & Branch: Canara Bank, Puttaparthi
Account Number: 2351101005980
IFSC: CNRB0002351

"End of Education is Character"

- SRI SATHYA SAI BABA
FOUNDER CHANCELLOR, SSSIHL

ABOUT SSSIHL

Founded in 1981, Sri Sathya Sai Institute of Higher Learning (Deemed to be University), Prasanthi Nilayam, Andhra Pradesh, India, is a visible manifestation of our Founder Chancellor Bhagawan Sri Sathya Sai Baba's vision of "Education for Human Transformation" providing merit based quality education, free for all students irrespective of income, religion, or region.

The Institute hosts students from across the country for its undergraduate, postgraduate, professional, and research programmes across its four campuses located in the states of Andhra Pradesh and Karnataka, in India.

With the state-of-the-art Central Research Instruments Facility (CRIF) at the Prasanthi Nilayam Campus and the Central Research Laboratory (CRL) at the Anantapur campus, SSSIHL provides a strong research environment, with exceptional academic practices, that have resulted in the growth of national and international collaborations.

In line with the vision of the Revered Founder Chancellor, research at SSSIHL is needs-based leading to societal benefit.

Visit us at: sssihl.edu.in

PATRONS OF FDP

- Prof. B. Raghavendra Prasad, Vice-Chancellor, SSSIHL
- Dr. Srikanth Khanna, Registrar, SSSIHL
- Sr. Prof. Pallav Kumar Baruah, Dean of Sciences, SSSIHL
- Dr. Y. Lakshmi Naidu, Head of the Department, Department of Mathematics and Computer Science (DMACS), SSSIHL

Visit DMACS - SSSIHL

SPEAKERS

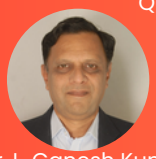
Dr. L Venkata Subramaniam,
IBM Quantum India Leader,
IBM Master Inventor

Mr. Chintan Oza,
Co-Chair, QIT WG IEEE Future Networks
Founder Anantam Ecosystems

Prof. Binayak S. Choudhury,
Professor
IIEST, Shibpur

Dr. Richa Goel
Quantum Client Support
IBM

Dr. T. S. L. Radhika,
Associate Professor,
BITS Pilani, Hyderabad

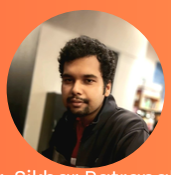


Mr. L. Ganesh Kumar,
CEO,
iFocus Pvt Ltd

Dr. J. A. Gokhale,
President,
Emerging Open Tech Foundation

Dr. Seshagiri Rao Vellanki,
Former Distinguished
Scientist, SDSC-ISRO

Col. (Retd.) Sai Shankar,
Director, QClairvoyance
Quantum Labs Pvt. Ltd.



Dr. Sikhar Patranabis
Research Scientist
IBM Research

Prof. Harshawardhan Wanare,
Department of Physics,
IIT Kanpur

Dr. K. Vijay Sai,
Associate Professor
and Head, DPHY, SSSIHL

Dr. N. Uday Kiran,
Associate Professor,
DMACS, SSSIHL

TOPICS

Module 0: Introduction and Motivation
Overview of the FDP and Key Takeaways, National Perspectives and Strategies in Quantum Computing, Current Trends Quantum Computing and It's Applications

Module 1: Overview of Quantum Technologies
Overview of Basic Required Mathematics, Qualitative Overview of Salient Aspects of Quantum Physics, Quantum Hardware, Architecture, Full Stack Development, Quantum Communications and Quantum Information Theory, A Perspective on Quantum Sensing and Imaging, Quantum Teleportation

Module 2: Foundations of Quantum Computing
Qubits, Superposition and Interference, Quantum Correlation : Entanglement and Bell's Theorem, Reversible Computation, Universal Quantum Logic Gates and Circuits

Module 3: Basic Quantum Algorithms
Deutsch algorithm, Deutsch Jozsa algorithm, Bernstein-Vazirani algorithm, Simon's algorithm

Module 4: Tackling Intractable Problems Using Quantum Computing
Overview of Intractable Problems and Complexity Classes (P, NP, PSPACE), Grover's Search Algorithm, Quantum Fourier Transform, Shor's Algorithm, Overview of Quantum Complexity Classes (Q, EQP, BQP, BPP, QMA)

Module 5: Applications
Quantum Error Correction, Quantum Machine Learning, Quantum Chemistry and Drug Discovery, Quantum Sage, Quantum Cryptography

Hands-On Session for Modules 2 & 3