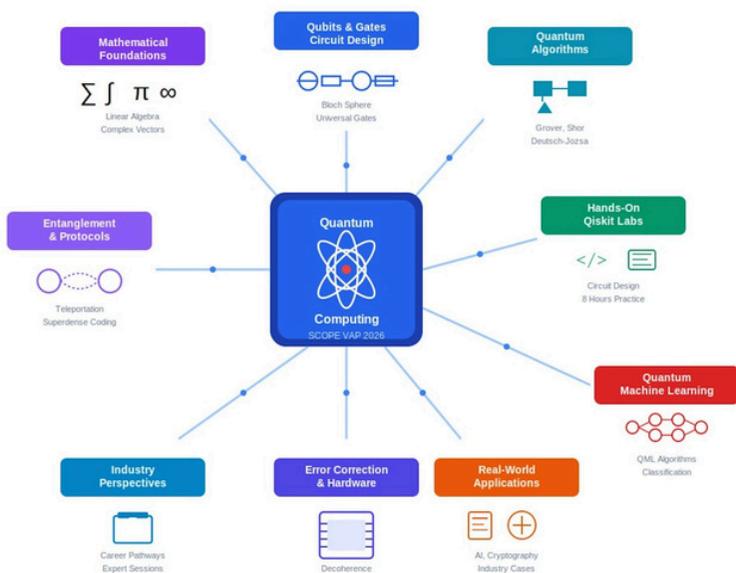**School of Computer Science and Engineering (SCOPE)**

Value Added Program (VAP)

on

Quantum Computing – Foundations, Algorithms, and Emerging Directions
(Course Code: VAC2545)
(16 February 2026 to 28 March 2026)

Organized by:
School of Computer Science and Engineering (SCOPE)
Vellore Institute of Technology, Vellore
Vellore 632 014, Tamil Nadu, India

ABOUT VIT

VIT was founded in 1984 as Vellore Engineering College by the Chancellor, Dr. G. Viswanathan. From its humble beginnings, the institution has grown exponentially to more than 45,000 students. It was conferred the University status in 2001 in recognition of its excellence in academics, research, and extracurricular initiatives. VIT was established with the aim of providing quality higher education on par with international standards. It persistently seeks and adopts innovative methods to improve the quality of higher education on a consistent basis. Currently, VIT has 6 campuses – in Vellore, Chennai, Amaravati (AP), Bangalore, Bhopal (MP), and its first international campus in Mauritius. VIT has been consistently ranked among the best institutions of the country. The National Institutional Ranking Framework (NIRF) of the MHRD, Government of India, has identified VIT as the best Private Engineering Institution in India. The campus has a cosmopolitan atmosphere with students from all the states of India and from more than 70 countries. Experienced and learned teachers are strongly encouraged to nurture the students. The global standards set at VIT in the field of teaching and research spur us on in our relentless pursuit of excellence. Our Memoranda of Understanding with various international universities are our major strength. VIT holds an exemplary placement record by consistently placing more than ninety percent of the students in good companies.

ABOUT SCOPE

The School of Computer Science and Engineering (SCOPE) at VIT comprises over 14,563 students and 338 core faculty members. SCOPE's mission is to achieve excellence in computing by producing graduates capable of integrating software and hardware systems, developing large-scale applications, and building organizational computing infrastructure. With state-of-the-art infrastructure including industry-sponsored labs from leading MNCs, SCOPE operates seven specialized departments: Software Systems, Analytics, Computational Intelligence, Database Systems, Information Security, Internet of Things, and Quantum AI, while regularly organizing technical events in emerging technologies.

ABOUT THE VAP

This comprehensive 4-week VAP on Quantum Computing – Foundations, Algorithms, and Emerging Directions is designed to equip students with theoretical knowledge and practical skills in quantum computing. The program covers mathematical foundations, quantum algorithms, hands-on programming with Qiskit, and quantum machine learning. Students will gain expertise in quantum gates, circuit design, error correction, and real-world applications through interactive online sessions with faculty and industry experts, providing insights into current research trends and career opportunities in quantum technologies.

PROGRAM OVERVIEW

Program Duration	4 Weeks (16 February 2026 – 28 March 2026)
Class Schedule	Monday to Saturday, 1.5 hours/day (Online Sessions)
Total Class Days	24 days
Total Hours	36 hours (Content: 35 hours + Assessment: 1 hour)
Evaluation Method	One Comprehensive Final Quiz Only
Holidays Excluded	All Sundays, Riviera 2026, Holi, CAT-II Period, Telugu New Year, Ramzan, Good Friday

ASSESSMENT SCHEDULE

Assessment	Date & Duration	Coverage
Comprehensive Final Quiz	28 March 2026 (Saturday) 1 hour	All Topics 1-15 (Complete Course)

CONTENTS OF VAP

- Mathematical Foundations and Quantum Fundamentals - Complex vector spaces, Linear Algebra, Quantum Postulates
- Qubits and Bloch Sphere - State representation, measurement, Dirac Notation
- Quantum Gates and Circuit Design - Single/multi-qubit gates, universal gate sets, reversible computation
- Quantum Entanglement - Teleportation, Superdense coding, Oracle role
- Deutsch and Deutsch-Jozsa Algorithms
- Bernstein-Vazirani and Grover's Search Algorithms
- Shor's Algorithm - Quantum factoring and comparison with classical methods
- Hands-On Lab I: Qiskit Basics - Environment setup, circuit design, state vector and Bloch visualization
- Hands-On Lab II: Quantum Programming and Measurement using Qiskit
- Introduction to Quantum Machine Learning (QML) - Classical vs quantum ML paradigms
- Classical versus Quantum Linear Regression
- Classical versus Quantum Binary Classification
- Quantum Noise, Error Correction and Hardware - Decoherence, error mitigation, quantum hardware landscape
- Real-World Applications and Industry Perspectives - Quantum advantage in AI, industry case studies, career pathways
- Emerging Research and Future Scope in Quantum Computing and Quantum AI

TARGET GROUP

All VIT students interested in quantum computing, quantum AI, machine learning, and emerging technologies. Basic programming knowledge in Python is recommended. No prior knowledge of quantum mechanics required.

PROGRAM COORDINATORS

Dr. Jafar Ali Ibrahim S, Dr. Rajarajan G, Dr. Vijayarajan V

RESOURCE PERSONS

The program features an exceptional blend of experienced VIT faculty members and distinguished industry experts, bringing together academic excellence and real-world quantum computing applications to provide participants with comprehensive insights into both theoretical foundations and practical implementations.

The program will be conducted online. The registration fee is ₹590/- (inclusive of GST). All VIT students are welcome to register. Participation confirmation will be sent via email after successful registration.

https://tinyurl.com/SCOPE-Qunantum-VAP-2026

IMPORTANT DATES

Registration Open: *11-02-2026*
Last Date for Registration:*15-02-2026*
Confirmation of Participation:*16-02-2026*

CONTACT DETAILS

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IMPORTANT NOTES

- *All sessions are conducted online, Monday through Saturday.*
- *Each session is 1.5 hours in duration.*
- *Attendance is mandatory. Minimum 75% attendance required to appear for the final quiz.*
- *Only ONE comprehensive final quiz covering all topics 1-15 (No intermediate quizzes)..*
- *Lab sessions (Topics 8 & 9) require students to have Python and Qiskit installed on their systems prior to class.*
- *Week 4 includes completion of Topic 15 and comprehensive revision sessions before the final assessment.*
- *Final quiz will be held on 28 March 2026 (Saturday), covering the entire syllabus (Topics 1-15).*