RESEARCH & DEVELOPMENT CELL

Hackathon Report

Event: Hackathon on Quantum Technologies
Host Institution: Aditya Engineering College, Madanapalle, Andhra Pradesh.
Venue: Seminar Hall 114
Date: 28.08.2025
Organized by: Research & Development Cell(R&D Cell) in collaboration with Institute Innovation Council(IIC)

Executive Summary:

The Quantum Technologies Hackathon brought together students, faculty mentors, and industry experts to explore practical applications of quantum computing and adjacent technologies. Over **30 participants** formed **6 teams** to prototype solutions across tracks such as **Quantum Algorithms & Optimization**, **Quantum Machine Learning (QML)**, **Quantum Communication & Security**, and **Quantum Simulation**.

Within, teams ideated, built proofs-of-concept using platforms like **Qiskit** and presented demos to a jury. The event culminated with **Top-2** teams recognized for technical merit, novelty, feasibility, and impact. Feedback indicated strong interest in continued quantum skill-building and industry collaboration.

Event Snapshot:

S.No.	Item	Detail
1	Total Registrations	06
2	Teams Shortlisted	02
3	Final Demos	02
4	Gender Diversity	54%
5	Tracks Offered	Algorithms & Optimization, QML, Communication & Security, Simulation
6	Tooling	Qiskit
7	Mentors	06
8	Jury	Dr.R.Mahammad Shafi Professor,AI&DS Dr.S.Vinay Kumar,Associate Professor,CE

Objectives of the Hackathon:

- Build foundational literacy in quantum computing and its application domains.
- Encourage interdisciplinary collaboration across ECE, CSE, AI/ML, Mathematics, and Physics.
- Deliver functional prototypes demonstrating value in optimization, security, and simulation.

RESEARCH & DEVELOPMENT CELL

- Connect students with mentors from academia and industry.
- Identify promising student talent for research and internships.

Thematic Tracks & Illustrative Problem Statements:

1. **Quantum Algorithms & Optimization**
   - Portfolio optimization via VQE/QAOA
   - Scheduling & routing (Max-Cut, TSP variants)
2. **Quantum Machine Learning (QML)**
   - Variational classifiers for anomaly detection
   - Quantum kernels for small classical datasets
3. **Quantum Communication & Security**
   - QKD protocol simulation; BB84/BBM92 demos
   - Post-quantum cryptography evaluation (hybrid)
4. **Quantum Simulation**
   - Spin chains, Ising models; chemistry mini-cases (H_2, LiH)
   - Noise-aware circuit design and error mitigation

Note: Replace or augment with actual statements released to participants (see Annexure A).

Schedule at a Glance:

Day 0 (Pre-event): Awareness session + tooling setup workshop
Day 1-5: Inauguration → Problem briefing → Team formation → Hacking
Day 6-10: Mentoring clinics → Mid-checkpoint → Final demos & judging → Valedictory

Tool Stack & Infrastructure:

- **Frameworks:** Qiskit
- **Cloud/Backends:** IBM Quantum Experience
- **Collaboration:** GitHub, Google Colab

RESEARCH & DEVELOPMENT CELL

Judging Rubrics:

S.No	Criterion	Weightage
1	Innovation&Novelty	5M
2	Technical Functionality(quantum soundness)	10M
3	Novelty & creativity	10M
4	Implementation quality (code, demo clarity)	10M
5	Feasibility & impact (scalability, use-case)	10M
6	Presentation & documentation	5M

Participation & Inclusion

- **Eligibility:** UG students across ECE/CSE/AI&DS/CSE(AI),EEE
- **Team Size:** 4–6 members
- **Inclusion Initiatives:** Reserved mentor hours for first-time participants; women-led team spotlight; accessibility support.

Outcomes & Highlights:

- **Working Prototypes:** 2 teams completed functional demos.
- **Research Direction:** 2ideas shortlisted for mini-projects/final-year projects.

Awards & Recognitions

Winner: Team Quantum01

- Team1:C.Nanda Kishore & Team
- **Title:***QUANTUM INTELLIGENCE FOR AGRICULTURE & MARKET FORECASTING*
- PS no:AQVH917
- Brief description : This project explores the integration of **quantum computing, quantum machine learning, and quantum communication** to revolutionize agriculture and market forecasting. By leveraging **quantum parallelism and entanglement**, the system can process **large, complex agricultural datasets** (such as soil health, weather conditions, crop yield, and satellite imagery) much faster than classical systems.

  In addition, **quantum-enhanced AI models** will be used to predict **market demand, price fluctuations, and supply chain risks** with higher accuracy. Secure communication using **Quantum Key Distribution (QKD)** ensures reliable data transfer between farmers, distributors, and market regulators.

RESEARCH & DEVELOPMENT CELL

This approach aims to support **smart farming decisions**, improve **food security**, reduce **market volatility**, and empower farmers with **real-time insights** into both production and market trends.

Runner-Up: Quantum02

- *Team2: V.Lakshmikanth Reddy & Team*
- *Title: QUANTUM ENHANCED EMPLOYMENT &SKILLS MATCHING*
- *PS No:AQVH915*
- Brief description:This project focuses on applying **quantum computing and quantum machine learning (QML)** to transform the way employment opportunities are matched with workforce skills. Traditional job-matching platforms rely on classical algorithms that struggle with **large-scale, complex, and dynamic datasets** involving millions of candidates, diverse skill sets, and rapidly changing industry demands.

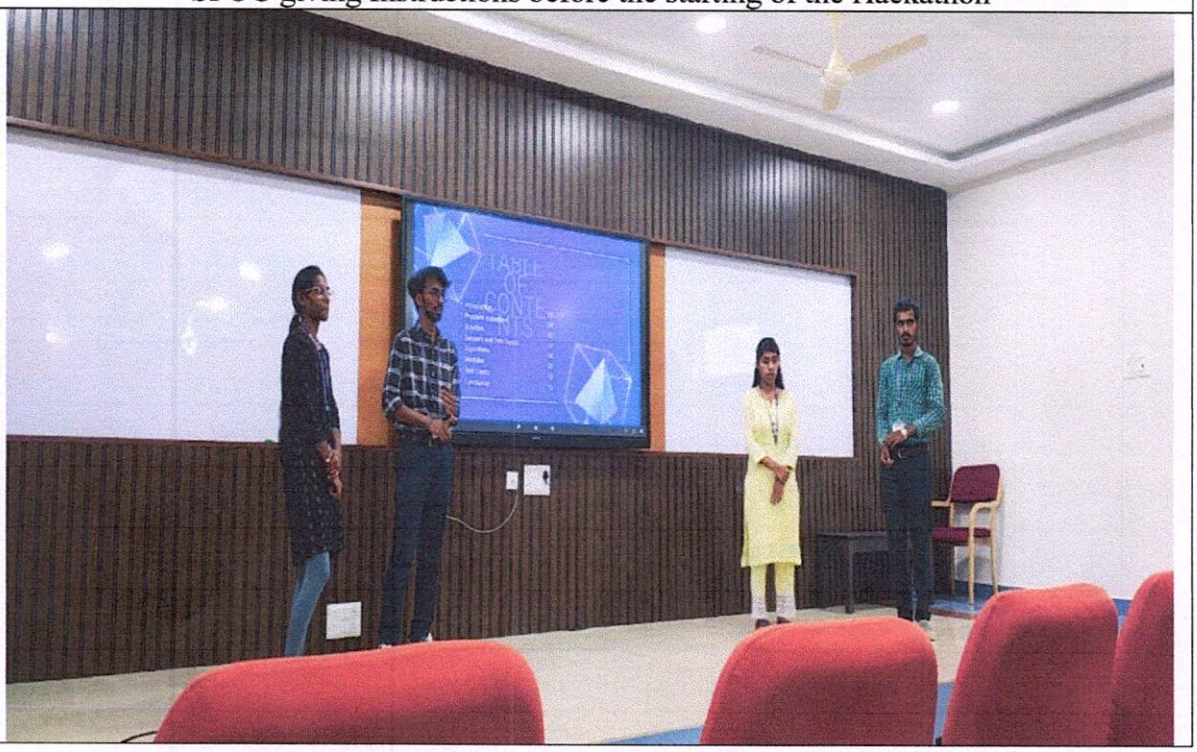
  Using **quantum parallelism**, quantum systems can analyze multiple possibilities at once, enabling faster and more accurate **matching of candidates to roles** based on qualifications, experience, and predicted performance. **Quantum optimization algorithms** can help employers design optimal recruitment strategies, while **quantum-enhanced recommendation engines** provide personalized career paths and upskilling suggestions for job seekers.

  Additionally, **quantum-secured communication** ensures privacy of sensitive employment and personal data. By integrating **quantum intelligence with HR tech**, this project can reduce skill gaps, enhance workforce productivity, and build a **future-ready talent ecosystem**.

RESEARCH & DEVELOPMENT CELL

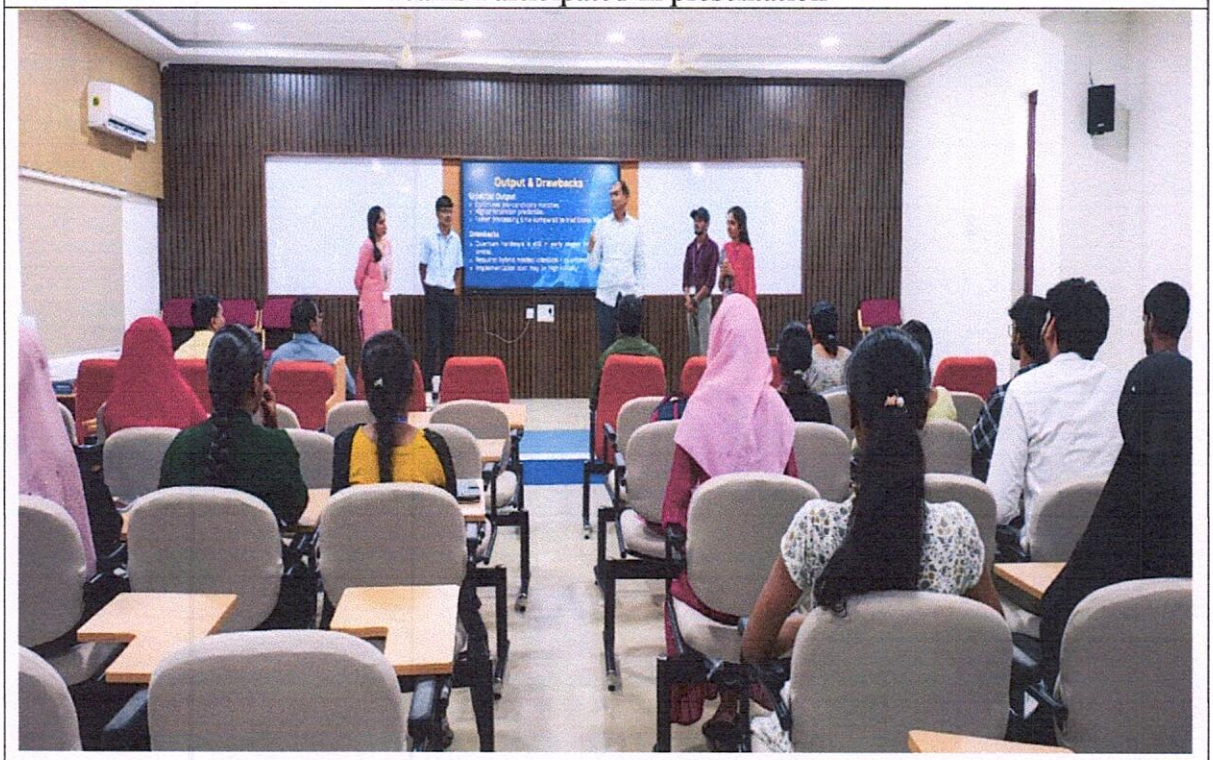
Photos:

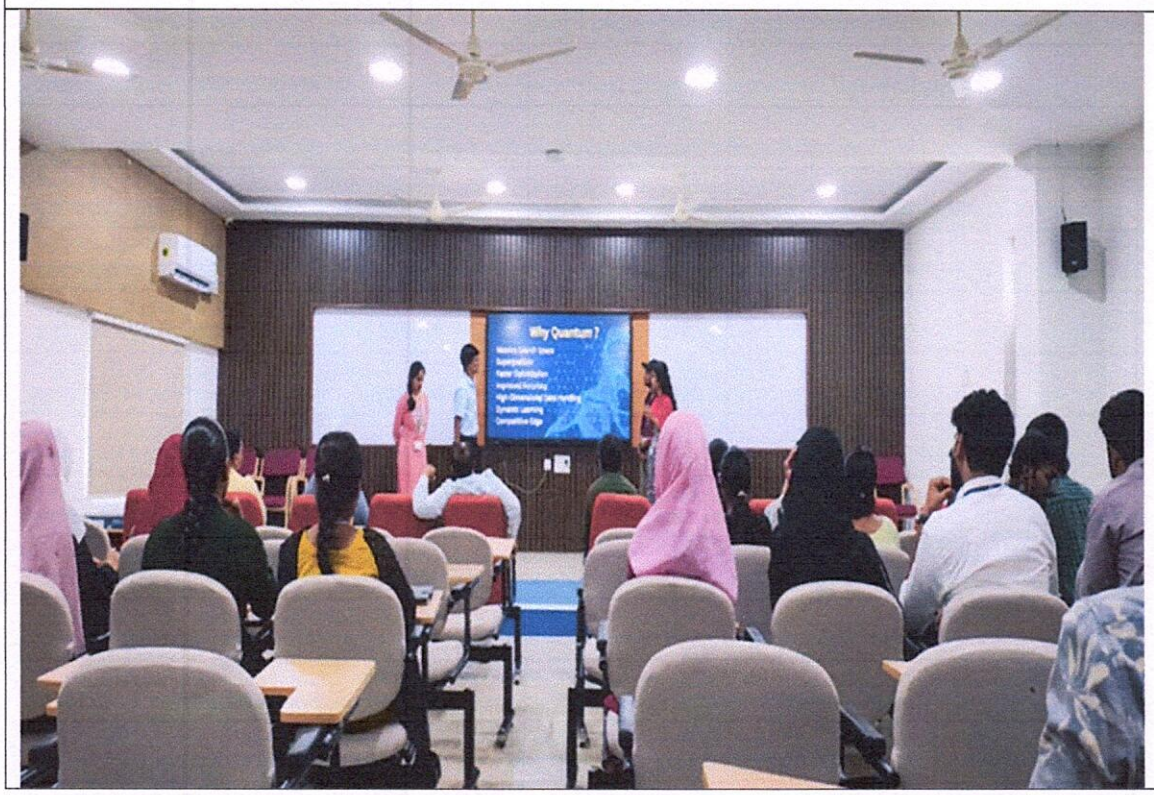
SPOC giving Instructions before the starting of the Hackathon



RESEARCH & DEVELOPMENT CELL

Teams Participated in presentation





ADITYA COLLEGE OF ENGINEERING

(UGC-Autonomous Institution)

(Approved by AICTE, New Delhi & Affiliated to JNTUA, Anantapuramu)

Madanapalle -517325, Annamayya Dist., A.P. www.acem.ac.in

RESEARCH & DEVELOPMENT CELL

Participants Group Photo

R&D Convener & SPOC

Principal

Principal
Aditya College of Engineering
Madanapalle-517 325