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Department: **Computer Science & Engineering**

Project Title: ***QRC-SAFE: Quantum-Resilient Cryptography Secured Analysis Framework for Evidence.***

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Project Abstract:

The rapid emergence of quantum computing poses a significant threat to conventional cryptographic systems that secure digital communications, authentication mechanisms. QRC-SAFE aims to develop a comprehensive quantum-resilient security framework for the protection, storage, transmission, and verification of sensitive digital evidence and critical information assets. The project integrates Post-Quantum Cryptography (PQC), secure key management, blockchain-enabled integrity verification, and AI-assisted threat detection to ensure long-term confidentiality, authenticity, and non-repudiation of digital data.

The proposed framework will design and implement quantum-safe encryption and digital signature schemes compliant with emerging international standards, enabling secure evidence preservation across cloud, edge, and distributed environments. Advanced audit trails and tamper-evident mechanisms will be incorporated to strengthen the chain of custody and forensic admissibility of digital evidence. The project will further evaluate the performance, scalability, and security of the proposed solutions under real-world cyber-threat scenarios. The outcome of QRC-SAFE will be a scalable, future-ready cybersecurity platform that enhances resilience against quantum-enabled attacks while supporting law enforcement agencies, government organizations, and critical infrastructure sectors in safeguarding digital assets and maintaining trust in digital investigations. The project will also strengthen the capacity of Law Enforcement Agencies (LEAs), peer institutes, industries and organisations in the eastern sector through specialized training and skill development in emerging quantum technologies and quantum-safe cybersecurity.