

QUANTUM SCIENCE AND TECHNOLOGY (QST)

Quantum Science and Technology (QST) Courses

QST 6003. Introduction to Quantum Information. (3-0) 3 Credit Hours.

Prerequisite: MAT 2233 or equivalent. Fundamentals of quantum information and its classical counterparts. Basic principles of quantum mechanics, such as entanglement, are approached from the information perspective for computing, communications, and sensing. Quantum computing elements include qubits, quantum gates, and quantum circuits. Course Fee: LRMS \$37.50.

QST 6103. Quantum Cybersecurity. (3-0) 3 Credit Hours.

Prerequisite: IS 6303 and QST 6003, or consent of instructor. Cybersecurity in quantum computing. Post-quantum encryption, IT/OT security in the quantum computing stack from base architecture to algorithms. Course Fee: LRMS \$37.50.

QST 6123. Quantum Computing. (3-0) 3 Credit Hours.

Prerequisite: QST 6003, and prior completion of an Introduction to Programming course or consent of instructor. Corequisites: QST 6203. A project-based quantum computing course covering the practical implementation of quantum algorithms and software. The course begins by covering the theoretical analysis of existing quantum algorithms, and we then cover strategies for implementing quantum software for specific quantum architectures. Topics covered include Shor's Algorithm, Grover's algorithm, stack computing, quantum compilers/transpilers, and quantum-classical computing challenges. Course Fee: LRMS \$37.50.

QST 6203. Quantum Sensing. (3-0) 3 Credit Hours.

Prerequisite: Prior completion of a Calculus, Linear Algebra, and Differential Equations course or consent of instructor. Corequisites: QST 6003. Foundations of quantum sensing, including qubits, coupling to classical fields, and decoherence. Quantum sensing technology applications and comparison to classical sensing with superconducting, photonic, and other quantum hardware. Quantum and classical transduction and materials for sensing. Quantum advantage with entangled sensors. Course Fee: LRMS \$37.50.

QST 6973. Special Topics in Quantum Computing. (3-0) 3 Credit Hours.

An organized course offering the opportunity for specialized study not normally or not often available as part of the regular course offerings. May be repeated for credit when topics vary, but no more than 6 hours, regardless of discipline, will apply to the degree. Course Fee: LRMS \$37.50.