

# Quantum Engineering

MATH454	COMPLEX ANALYSIS	3.0
MATH458	ABSTRACT ALGEBRA	3.0

## Minor Program in Quantum Engineering

Quantum Engineering is an interdisciplinary program that seeks to equip students for careers in emerging technologies in quantum information sciences. It encompasses a wide range of disciplines that include chemistry, computer science, electrical engineering, mathematics, materials science, and physics and is necessarily a collaborative effort among many Mines departments.

## Quantum Engineering Minor

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The interdisciplinary minor in Quantum Engineering requires 18 credits.

QE minor students will be required to take Honors Linear Algebra (MATH342) or Linear Algebra (MATH332) and three of the following courses: Quantum Programming (CSCI481/CSCI581), Low Temperature Microwave Measurement (EENG432/EENG532), Solid State Physics Applications and Phenomena (PHGN441), Microelectronics Processing (PHGN435), and Fundamentals of Quantum Information (PHGN417/PHGN519).

**Students may select an additional 2 courses from the list above or the following list to further increase specialization:**

PHGN440	SOLID STATE PHYSICS	3.0
PHGN466	MODERN OPTICAL ENGINEERING	3.0
PHGN480	LASER PHYSICS	3.0
CSCI423	COMPUTER SIMULATION	3.0
CSCI440	PARALLEL COMPUTING FOR SCIENTISTS AND ENGINEERS	3.0
CSCI470	INTRODUCTION TO MACHINE LEARNING	3.0
CSCI474	INTRODUCTION TO CRYPTOGRAPHY	3.0
MTGN211	STRUCTURE OF MATERIALS	3.0
MTGN315	ELECTRICAL PROPERTIES AND APPLICATIONS OF MATERIALS	3.0
MTGN350	STATISTICAL PROCESS CONTROL AND DESIGN OF EXPERIMENTS	3.0
MTGN352	METALLURGICAL AND MATERIALS KINETICS	3.0
MTGN456	ELECTRON MICROSCOPY	2.0
MTGN473	COMPUTATIONAL MATERIALS	3.0
EENG307	INTRODUCTION TO FEEDBACK CONTROL SYSTEMS	3.0
EENG383	EMBEDDED SYSTEMS	4.0
EENG385	ELECTRONIC DEVICES AND CIRCUITS	4.0
EENG411	DIGITAL SIGNAL PROCESSING	3.0
EENG421	SEMICONDUCTOR DEVICE PHYSICS AND DESIGN	3.0
EENG428/430	COMPUTATIONAL ELECTROMAGNETICS	3.0
MATH436	ADVANCED STATISTICAL MODELING	3.0
MATH438	STOCHASTIC MODELS	3.0