

PROGRESSIVE DEGREE PROGRAM COURSE PLAN TEMPLATE

USC SCHOOL	Viterbi School of Engineering
ACADEMIC DEPARTMENT	Ming Hsieh Department of Electrical and Computer Engineering
GRADUATE PROGRAM	MS in Quantum Information Science (MSQIS)
POST CODE	1816
TERM EFFECTIVE DATE	Fall 2025

PROGRAM DESCRIPTION

A brief description of the graduate program.

In recent years, experimental progress has led to the construction of the first small quantum information processors and quantum communication systems. Both established companies (like IBM, Google, Intel and Microsoft) and startups (like ID Quantique, D-Wave, Rigetti and IonQ) have begun investing heavily into the development and commercialization of quantum technologies. Initially, the quantum workforce was engaged largely in research, and was dominated by scientists and engineers with PhDs. Now, there are increasing opportunities for engineers with non-research based backgrounds in quantum information science to work on the design, construction and programming of quantum systems. This Master's program is designed to fill this new need in a field with great potential for future growth.

https://catalogue.usc.edu/preview_program.php?catoid=20&poid=29263&hl=Quantum+information+systems&returnto=search

A list of common bachelor's degrees that undergraduate students pursue in advance of pursuing a progressive degree option with this graduate program. Some programs are restricted to certain majors while others are open to all students.

BSEE	BSCHEM
BSCECS	BSMATH
BSCSCI	BSAPPLIED COMPUTATIONAL MATH
BSPHYS	

PREPARATORY UNDERGRADUATE COURSES

A list of courses at the undergraduate level that prepare students for the graduate program. Required coursework is listed first, followed by recommended courses. If not applicable, this section will be blank.

Dept. Prefix - Course #	Course Title	Required or Recommended	Units
~EE 141 or	Linear Algebra or	Required equivalent	
~Math 225 or	Linear Algebra and Diff EQ or	Required equivalent	
~Math 235	Linear Algebra and Applications	Required equivalent	

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~EE 364 or ~Math 407	Probability	Recommended equivalent	
EE 471 or PHYS 438	Applied Quantum Mechanics	Recommended	
EE 510	Linear Algebra	Recommended	

UNDERGRADUATE COURSES USED TO REDUCE GRADUATE LEVEL UNITS

A list of undergraduate level courses that may be used to reduce the number of graduate level units required for the graduate program. If there are none, that is specified instead.

Dept. Prefix - Course #	Course Title	Units
	None	

CORE GRADUATE PROGRAM REQUIREMENTS (# units required)

A list of all required graduate courses for the graduate program. None of these courses may be used toward satisfying undergraduate degree requirements.

If special exceptions for any of these courses are made by the academic department, the course # is marked with an asterisk () and the exception is explained in the "Department Notes" section at the end of this course plan template.*

Dept. Prefix - Course #	Course Title	Units
Take two Required Foundations		
PHYS 513	Applications of Quantum Computing	4
EE 520	Introduction to Quantum Information Processing	4
Take 3 from Core		
CSCI 575	Quantum Computing and Quantum Cryptography	4
EE 514	Quantum Error Correction	4
EE 515	Quantum Sensing: Machine Learning, Inference and Information	4
EE 589	Quantum Information Theory	4
PHYS 550	Theory of Open Quantum Systems	4
PHYS 559	Quantum Devices	4

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PHYS 660	Quantum Information Science and Many-Body Physics	3

PRE-APPROVED ELECTIVE COURSEWORK

Elective coursework is approved at the discretion of the academic department. Note the following details about the total number and units required of elective coursework.

8-9	TOTAL ELECTIVE UNITS REQUIRED FOR THE TRADITIONAL GRADUATE DEGREE
0	TOTAL ELECTIVE UNITS REQUIRED FOR THE PROGRESSIVE GRADUATE DEGREE

TOTAL UNIT COUNTS AND REQUIRED GRADUATE UNITS

28	TOTAL UNITS REQUIRED FOR THE TRADITIONAL GRADUATE DEGREE
8	TOTAL GRADUATE UNITS THAT MAY BE WAIVED (IF ANY)
19-20	MINIMUM NUMBER OF GRADUATE UNITS THAT MUST BE AT THE 500 LEVEL OR ABOVE

Students will take both Foundations classes (8 units) and 3 Core courses (12 units). Most students will complete with 20 units. We have listed 19 units as the minimum required to accommodate students choosing PHYS 660 which is 3 units.

Students may have an opportunity to have one class (4 units) “added” to the foundations list if an appropriate course becomes available (new courses in Quantum or an appropriate 599), and if approved through faculty advisement.

NOTES FROM THE DEPARTMENT

This section highlights any unique considerations, exceptions, or requirements for the graduate program. If a program has specific restrictions (courses, majors, etc.), they are detailed below.

Kelly Goulis	DocuSigned by:  407039A646C8431...	4/3/2025 12:51:42 AM PDT
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Authorizing Dean’s Name	Date Approved
Senior Associate Dean	

Authorizing Dean’s Title