

**PROGRESSIVE DEGREE PROGRAM  
COURSE PLAN TEMPLATE**

<b>USC SCHOOL</b>	Viterbi School of Engineering
<b>ACADEMIC DEPARTMENT</b>	Mork Family Department
<b>GRADUATE PROGRAM</b>	Materials Engineering
<b>POST CODE</b>	484
<b>TERM EFFECTIVE DATE</b>	Spring 2021

**PROGRAM DESCRIPTION**

A brief description of the graduate program.

Students with an interest in the characterization, selection and processing of engineering materials, and in materials problems related to engineering design may work toward a MS in Materials Science.
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**COMMON BACHELOR DEGREE PROGRAM PATHWAYS**

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.

Aerospace & Mechanical Engineering	Chemical Engineering
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**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
MASC 110L	Materials Science	Recommended	4
MASC 310	Materials Behavior and Processing	Recommended	4
MASC 350	Nanostructured Materials: Design, Synthesis, and Processing	Recommended	4
CHE 475	Physical Properties of Polymers	Recommended	4

**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
CHE 475	Physical Properties of Polymers	4
MASC 455	Computational Materials I: Introduction to Atomistic Simulation	4
MASC 456	Computational Materials II: Properties and Processing Simulations	4
MASC 483	Machine Learning	4
MASC 490	Directed Research	1-4

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**CORE GRADUATE PROGRAM REQUIREMENTS (12 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.*

<b>Dept. Prefix - Course #</b>	<b>Course Title</b>	<b>Units</b>
MASC 501	Solid State	4
MASC 502	Advanced Solid State	3
MASC 503	Thermodynamics of Materials	4
MASC 504	Diffusion and Phase Equilibria	4
MASC 505	Crystals and Anisotropy	3
MASC 506	Semiconductor Physics	4
MASC 511	Materials Preparation	4
MASC 514	Processing of Advanced Semiconductor Devices	3
MASC 520	Mathematical Methods for Deep Learning	4
MASC 523	Principles of Electrochemical Engineering	3
MASC 524	Techniques and Mechanisms in Electrochemistry	3
MASC 534	Materials Characterization	3
MASC 535	Transmission Electron Microscopy	4
MASC 539	Engineering Quantum Mechanics	4
MASC 548	Rheology of Liquids and Solids	3
MASC 551	Mechanical Behavior of Engineering Materials	4
MASC 559	Creep	3
MASC 560	Fatigue and Fracture	3
MASC 561	Dislocation Theory and Applications	4
MASC 562	Failure Analysis	3
MASC 564	Composite Processing	3
MASC 570	Introduction to Photovoltaic Solar Energy Conversion	3
MASC 575	Basics of Atomistic Simulation of Materials	4
MASC 576	Molecular Dynamics Simulations of Materials and Processes	4
MASC 583	Materials Selection	4
MASC 584	Fracture Mechanics and Mechanisms	3
MASC 599	Special Topics	2-4
MASC 601	Advanced Semiconductor Device Physics	4
MASC 606	Nonequilibrium Processes in Semiconductors	3
MASC 610	Molecular Beam Epitaxy	3

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**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.

16	<b>TOTAL ELECTIVE UNITS REQUIRED FOR THE TRADITIONAL GRADUATE DEGREE</b>
7	<b>TOTAL ELECTIVE UNITS REQUIRED FOR THE PROGRESSIVE GRADUATE DEGREE</b>

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**TOTAL UNIT COUNTS AND REQUIRED GRADUATE UNITS**

28	<b>TOTAL UNITS REQUIRED FOR THE TRADITIONAL GRADUATE DEGREE</b>
9	<b>TOTAL GRADUATE UNITS THAT MAY BE WAIVED (IF ANY)</b>
19	<b>MINIMUM NUMBER OF GRADUATE UNITS THAT MUST BE AT THE 500 LEVEL OR ABOVE</b>

**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.

Students can choose from list of core classes as long as they complete a minimum of 12 units of core classes. Students can take a minimum of 7 elective units for the Progressive Degree. Please refer to elective list from the MFD Student Affairs Office.

Undergraduate courses used to reduce graduate units: Students can pick from UG course list but only 9 units can be applied to discount 28-unit total towards the PDP Materials Science degree.

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Kelly Goulis	7/8/2021
<b>Authorizing Dean's Name</b>	<b>Date Approved</b>
Senior Associate Dean, Viterbi School of Engineering	
<b>Authorizing Dean's Title</b>	