PH.D. IN MATERIALS SCIENCE AND ENGINEERING

Requirements Effective Fall 2024

Code	Title	Credits
Core Courses		
MSE 501	Materials Technology Transfer	1
MSE 502A	Materials Science and Engineering Methods: Materials Structure and Scattering	1
MSE 502B	Materials Science and Engineering Methods: Computational Materials Methods	1
MSE 503	Mechanical Behavior of Materials	3
MSE 504	Thermodynamics of Materials	3
MSE 793A	Professional Development Seminar: MSE, Diversity, Equity, and Inclusion	1
MSE 793B	Professional Development Seminar: Materials and Society	1
MSE 793C	Professional Development Seminar: Materials Science Engineering Careers	1
MSE 799	Dissertation [1]	6
Select at least one course from the following:		1
MSE 502C	Materials Science and Engineering Methods: Materials Microscopy	
MSE 502D	Materials Science and Engineering Methods: Materials Spectroscopy	
MSE 502E	Materials Science and Engineering Methods: Bulk Properties and Performance	
MSE 502F	Materials Science and Engineering Methods: Experimental Methods for Materials Research	
Select one course from the following:		3
CHEM 511	Solid State Chemistry	
CHEM 517	Chemistry of Electronic Materials	
ECE 574	Optical Properties in Solids (Select 1)	
PH 531	Introductory Condensed Matter Physics	
Specialty Courses		**6**
Select at least 6 credits: [2]		
BIOM 570/ MECH 570	Bioengineering	
BIOM 592	Seminar	
CBE 501	Chemical Engineering Thermodynamics	
CBE 514	Polymer Science and Engineering	
CHEM 515	Polymer Chemistry	
CHEM 550A	Materials Chemistry: Hard Materials	
CHEM 550B	Materials Chemistry: Soft Materials	
CHEM 550C	Materials Chemistry: Nanomaterials	
CHEM 567	Crystallographic Computation	
CHEM 569	Chemical Crystallography	
CHEM 577	Surface Chemistry	
CIVE 560	Advanced Mechanics of Materials	
CIVE 565	Finite Element Method	
CIVE 662	Foundations of Solid Mechanics	
CIVE 664	Mechanics of Fatigue and Fracture	
ECE 505	Nanostructures Fundamentals and Applications	
ECE 569/ MECH 569	Micro-Electro-Mechanical Devices	
ECE 673	Thin Film Growth	
GRAD 544	Ethical Conduct of Research	
MATH 535	Foundations of Applied Mathematics	
MATH 550/ ENGR 550	Numerical Methods in Science and Engineering	
MATH 560	Linear Algebra	
MATH 561	Numerical Analysis I	
MATH 750	Numerical Methods and Models I	
MECH 525/ BIOM 525	Cell and Tissue Engineering	
MECH 530	Advanced Composite Materials	
MECH 531/ BIOM 531	Materials Engineering	
MECH 532/ BIOM 532	Materials Issues in Mechanical Design	
MECH 573/ BIOM 573	Structure and Function of Biomaterials	
MECH 628	Applied Fracture Mechanics	
MSE 505	Kinetics of Materials	
PH 631	Modern Topics in Condensed Matter Physics	
PH 731	Condensed Matter Theory	
Research and Teaching		
The Ph.D. requires a minimum of 72 credit hours, some of which may be fulfilled with the following:		
MSE 651	Special Topics in Materials Science	
MSE 695	Independent Study	
MSE 784	Supervised College Teaching	
MSE 795	Independent Study	
Program Total Credits		**72**

A minimum of 72 credits are required to complete this program.

1. Complete a minimum of 6 credits of MSE 799.
2. CHEM 511, CHEM 517, ECE 574, and PH 531 can be used as specialty courses, if not used to fulfill core requirements.