

# BS in Materials Science & Engineering Curriculum

revised September 2021

Total credits: 127

General Requirements	Non-Technical Elective	MSE Core	MSE Elective	Engineering Elective	Tech Elect
<i>First Semester</i>			<i>Second Semester</i>		
APMA 1110	Single Variable Calculus	4	APMA 2120	Multivariate Calculus	4
CHEM 1410	Intro Chemistry I	3	CS 1110	Intro to Programming	3
CHEM 1411	Intro Chemistry I Lab	1	PHYS 1425	General Physics I	3
ENGR 1624	Intro to Engineering	4	PHYS 1429	General Physics I Workshop	1
STS 1500	Engineering, Technology, Society	3		Math/Science Elective 1 <sup>3</sup>	3
				HSS Elective 1 <sup>1</sup>	3
		<b>15</b>			<b>17</b>
<i>Third Semester</i>			<i>Fourth Semester</i>		
APMA 2130	Ordinary Differential Equations	4	APMA 3110	Statistics and Probability	3
PHYS 2415	General Physics II	3	MSE 3101	Materials Science Investigations:	3
PHYS 2419	General Physics II Workshop	1		MSE Elec 1 <sup>5</sup>	3
MSE 2090*	Intro to Materials Science	3		Eng Elec 1 <sup>6</sup>	3
MSE 2101	Materials Science Investigations: Propertie	3	STS 2xxx/3xxx	STS Elective <sup>2</sup>	3
	HSS Elective 2 <sup>1</sup>	3			
		<b>17</b>			<b>15</b>
<i>Fifth Semester</i>			<i>Sixth Semester</i>		
MSE 3050	Thermodynamics and Phase Equilibria of l	3	MSE 3070	Kinetics and Phase Transformations in Ma	3
MSE 3060	Structures and Defects of Materials	3	MSE 4320	Origins of Mechanical Behavior	3
MSE 3670	EMOP	3		MSE Elec 2 <sup>5</sup>	3
	Eng Elec 2 <sup>6</sup>	3		Tech Elect 1 <sup>4</sup>	3
	Math/Science Elective 2 <sup>3</sup>	3		HSS Elective 3 <sup>4</sup>	3
	Unrestricted Elec 1 <sup>7</sup>	3			
		<b>18</b>			<b>15</b>
<i>Seventh Semester</i>			<i>Eighth Semester</i>		
STS 4500	STS and Engineering Practice	3	STS 4600	The Engineer, Ethics and Profession	3
ENGR 4010	Interdisciplinary Engineering Design	3	ENGR 4020	Interdisciplinary Engineering Design	3
	MSE Elec 3 <sup>5</sup>	3		MSE Elec 5 <sup>5</sup>	3
	MSE Elec 4 <sup>5</sup>	3		Tech Elect 2 <sup>4</sup>	3
	Unrestricted Elec 2 <sup>7</sup>	3		Unrestricted Elec 3 <sup>7</sup>	3
		<b>15</b>			<b>15</b>

\* Note that MSE 2090 is offered fall and spring and many students will have taken it during 1st year; students who have taken 2090 should take 3050.

<sup>(1)</sup> HHS electives - 9 credits from chosen list in A122 Thornton Hall

<sup>(2)</sup> STS2X/3X: Any course that meets the Second Writing Requirement, as specified by the College of Arts & Sciences (CLAS), may be substituted.

<sup>(3)</sup> Math/Science Electives - For the first one, choose from PHYS 2620, CHEM 1420, BIOL 2100, BIOL 2200 or any APMA course over 2000 (APMA 3080 Linear Algebra recommended). For the second one CHEM 3410 or 3610 (Pchem) or any 3000 or higher APMA course (APMA 3140 Partial Differential Equations recommended).

<sup>(4)</sup> Technical Electives - Any 2000 or higher math, science or engineering courses, unless courses for non-science majors, duplicates required MSE course work, or duplicates another previously taken course. Only up to 2 research-for-credit courses permitted. ECE 3103 Solid State Devices (note pre-req ECE 2630) is recommended for students interested in EMOPS; CHEM 2410 Orgo 1 plus 2311 1cr Lab, CHEM 2420 Orgo 2 plus 2321 1cr lab, ChE Polymers 4449 (note pre-req CHE 3321 Transport, which also has pre-reqs), and BME 4414 Intro to Biomaterials (note pre-reqs: BME 2014 Cell/Molecular Bio and BME 2220 Biomechanics) recommended for students interested in soft materials; MAE/CE 2310 Statics & MAE/CE 2320 Strength of Materials recommended for students interested in structural materials.

<sup>(5)</sup> MSE Electives - choose 5 - from MSE 2200 Introduction to Additive Manufacturing and 3-D Printing, MSE 2500 Science of Cooking, MSE 3080 Corrosion, Batteries, and Fuel Cells, MSE/MAE 3610 Aerospace Materials (note pre-requisites of MAE/CE 2310 and 2320), MSE 4200 Additive Manufacturing of Metals, MSE 4055 Nanoscience, MSE 4210 Advanced Materials Processing, MSE 4270 Atomistic Simulations or MSE 4592 Special Topics.

<sup>(6)</sup> Engineering Electives - Chosen from any 2000-level or higher engineering course, with the following exceptions: no course in APMA, STS, or ENGR may be used as engineering electives; no course that counts as a Science Elective may be used as an engineering elective; and no course that fulfills the Engineering Business Minor may be used as an engineering elective.

<sup>(7)</sup> Unrestricted Electives - Chosen from any graded course in the University except mathematics courses below MATH 1310; courses that substantially duplicate any others offered for the degree, including PHYS 2010, PHYS 2020, CS 1010, CS 1020; any introductory programming course. APMA 1090 counts as a three credit unrestricted elective for students.