BACHELOR OF SCIENCE IN MATERIALS SCIENCE AND ENGINEERING 2022-2023 DEGREE REQUIREMENTS – 129 Credit Hours			
FIRST YEAR - FALL	**PREREQUISITES**	**COURSE HRS**	**TOTAL SEM HRS**
MATH 1551 – Differential Calculus		2	
MATH 1553 – Linear Algebra		2	
CHEM 1211K - Chemical Principles I		4	
CS 1371 - Computing for Engineers		3	
ENGL 1101 - English Composition I		3	
MSE 1111 - Intro to MSE (1) **or** APPH 1040 – Sci. Found. of Health/APPH 1050 – Sci. of Phys. Activ & Health – Wellness/APPH 1060		1/2	15/16
FIRST YEAR - SPRING	**PREREQUISITES**	**COURSE HRS**	
MATH 1552 – Integral Calculus	MATH 1550 or MATH 1551 or MATH 15X1	4	
PHYS 2211 - General Physics I	MATH 1552	4	
CHEM 1212K - Chemical Principles II	CHEM 1310 or CHEM 1211K	4	
ENGL 1102 - English Composition II	ENGL 1101	3	
MSE 1111 - Intro to MSE (1) **or** APPH 1040 – Sci. Found. of Health/APPH 1050 – Sci. of Phys. Activ & Health - Wellness (2)		1/2	16/17
SECOND YEAR - FALL	**PREREQUISITES**	**COURSE HRS**	
CHEM 1315 - Survey of Organic Chemistry	CHEM 1310 or CHEM 1211K	3	
COE 2001 – Statics	(MATH 15X2 or 1552) and (PHYS 2211 or PHYS 2231)	2	
MATH 2551 – Multivariable Calculus	MATH 1555 or (MATH 1552 and MATH 1553) or (MATH 1552 and MATH 1554) or (MATH 1552 and MATH 1564)	4	
PHYS 2212 - General Physics II	PHYS 2211 or PHYS 2231	4	
MSE 2001 - Introduction to Engineering Materials	CHEM 1310 or CHEM 1211K	3	16
SECOND YEAR - SPRING	**PREREQUISITES**	**COURSE HRS**	
COE 3001 - Mechanics of Deformable Bodies	COE 2001 and (MATH 2552 or MATH 2562)	3	
MATH 2552 – Differential Equations	MATH 1555 or (MATH 1552 and MATH 1553) or (MATH 1552 and MATH 1554) or (MATH 1552 and MATH1564)	4	
ECON 2100/05/06 - Econ. Analysis and Policy Problems - Prin.		3	
MSE 2021 - Materials Characterization	MSE 2001	4	
MSE 3001 – Thermodynamics	MSE 2001 and MATH 2552 (with concurrency)	3	17
THIRD YEAR - FALL	**PREREQUISITES**	**COURSE HRS**	
ISyE 3025 -Essentials of Engineering Economy	ECON 2100/5/6	1	
SS – Hist/Pol Sci Requirement (US Perspectives, Constitution & History)[+]		3	
HUM - Humanities Elective[# =]		3	
MSE 4775 - Polymer Science & Engineering I	(CHEM 2312 or CHEM 1315) and MSE 2001 and (CHEM 3411 or ME 3322 or MSE 3001)	3	
MSE 3025 - Statistics and Numerical Methods	MSE 2001, CS 1371 and MATH 2552	3	
MSE 3210 - Transport Phenomena [(X)]	MATH 2551 and MATH 2552 and MSE 3001 (with concurrency)	3	16
THIRD YEAR - SPRING	**PREREQUISITES**	**COURSE HRS**	
ECE 3710 - Circuits and Electronics	PHYS 2212	2	
HUM - Humanities Elective[# =]		3	
MSE 3002 - Structural Transformations	MSE 3001 and MSE 3210	3	
MSE 3005 - Mechanical Behavior of Materials	MSE 2001 and COE 3001	3	
MSE 3021 - Materials Laboratory I	MSE 2021	2	
MSE Concentration Specific		3	16
FOURTH YEAR - FALL	**PREREQUISITES**	**COURSE HRS**	
MSE 4022 - Materials Laboratory II	MSE 2021	2	
MSE 4410 - Capstone Engineering Design I	Senior Standing	3	
MSE Concentration Specific		3	
MSE 3015 - Electrical, Optical, and Magnetic Properties	MSE 2001 and PHYS 2212	3	
SS – Social Science Elective[# =]		3	
ECE 3741 - Electrical Engineering Lab	ECE 3710	1	15
FOURTH YEAR - SPRING	**PREREQUISITES**	**COURSE HRS**	
MSE 4420 - Capstone Engineering Design II	MSE 4410	3	
MSE Concentration Specific		3	
MSE Concentration Specific		3	
SS - Social Science Elective[# =]		3	
Free Elective		2	
Free Elective		3	17

MSE Curriculum Concentration Courses

Biomaterials Concentration

Required Courses	Prerequisites
-BIOS 1107 Biological Principles (*4 hrs.)	BIOS 1107L (corequisite)
-MSE 4751 Introduction to Biomaterials	MSE 2001
Flexible Required Course (choose *one*)	
-MSE 4330 Fund. of Nanomaterials and Nanostructures	MSE 2001
-MSE 4335 Soft Nano/Bio Materials	MSE 2001
-MSE 4740 Biologically Inspired Design	PHYS 2211
-CHEM 3511 Survey of Biochemistry	CHEM 1315
Concentration Elective (choose *one*)	
-Another course from the Flexible Require Courses above, or	
-Any course from the Other Concentration Electives list	

Functional Materials Concentration

Required Courses	Prerequisites
-MSE 4002 Ceramic Materials	MSE 3002
-MSE 4004 Materials in Electronic Applications	MSE 3015
-MSE 4330 Fund. of Nanomaterials and Nanostructures	MSE 2001
Concentration Elective (choose *one*)	
-MSE 4754 Electronics Packaging Assembly, Reliability, Thermal Management	ECE 3710
-MSE 4755 Electronic Packaging Substrate Fabrication	MATH 2551 and MATH 2552 and CHEM 1211K and PHYS 2212
-MSE 4759 Electrochemical Energy Storage and Conversion	MSE 2001
-MSE 4766 Fabrication and Properties of Nanoscale Devices	MSE 3001
-PHYS 3143 Quantum Mechanics 1	PHYS 2212 and MATH 2552
-PHYS 4262 Solid State Physics	PHYS 3143
-Any course from the Other Concentration Electives list	

Polymer & Fiber Materials Concentration

Required Courses	Prerequisites
-MSE 3225 Rheology	MSE 3210
-MSE 3230 Polymer & Fiber Processing	MSE 3225 and MSE 4775
-MSE 4140 Polymer Physics	MSE 3001 and MSE 4775
Concentration Elective (choose *one*)	
-MSE 3220 Operations and Mgmt. Methods	MSE 3210 or MSE 4775
-MSE 4025 Fiber Product Manufacturing	MSE 4775
-MSE 4230 Industrial Controls in Manufacturing	ECE 3710
-MSE 4776 Polymer Science and Engineering II	MSE 4775
-Any course from the Other Concentration Electives list	

Structural Materials Concentration

Required Courses	Prerequisites
-MSE 4002 Ceramic Materials	MSE 3002-
MSE 4006 Processing & Applications of Engineering andAlloys MSE 3002	MSE 2021
-MSE 4790 Materials Selection and Design	COE 3001 or MSE 3005
Concentration Elective (choose *one*)	
-MSE 4010 Environmental Degradation	MSE 2001
-MSE 4791 Mechanical Behavior of Composites	MSE 3005
-MSE 4793 Composite Materials & Process.	(CHEM 1310 or CHEM 1211K) and PHYS 2212
-Any course from the Other Concentration Electives list	

Other Concentration Electives

Concentration electives can be replaced by one of the following options:

Courses	Prerequisites
-Any MSE courses <u>*except*</u> MSE 3300, MSE 3720, MSE 2698/2699/4698/4699	Varies by course
-ME 1670 Introduction to Engr. Graphics and Design**	None

-**If** a student *completes* the Research Option, they can use the combination of LMC 4701 (1 hr), LMC 4702 (1 hr) and MSE 2699/4699 (1 hr) to meet this requirement.

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*Because of this 4 hour required course, the Biomaterials Concentration requires only 4 hours of Free Elective credit total

**ME 1670 *cannot* be dropped after phase 2 registration closes without documented medical reasons

+Hist/Pol Sci Requirement (Constitution & History). Choose from: HIST 2111 or HIST 2112 or INTA 1200 or POL 1101 or PUBP 3000

=Ethics: any Georgia Tech course that carries the “ethics attribute”.

NOTE: The courses listed for Ethics may also meet Core Area C (Humanities) or Core Area E (Social Sciences) Requirements. Students may use these courses to meet areas (C and Ethics), or (E and Ethics) at the same time. Check Institute Catalog for attributes.