| BACHELOR OF SCIENCE IN MATERIALS SCIENCE AND ENGINEERING 2025-2026 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**<br>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**<br>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<br>(MATH 1552 and MATH 1553) or<br>(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<br>(MATH 1552 and MATH 1553) or<br>(MATH 1552 and MATH 1554) or<br>(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<br>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<br>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 (with concurrency) | 3 | |
| MSE 3015 – Electrical, Optical, and Magnetic Properties | MSE 2001 and PHYS 2212 | 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 4105 – Deformation and Fracture of Materials*** | 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 | |

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## 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 | |

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## 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 | |

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## 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

*****students cannot receive credit for both MSE 3005 and MSE 4105

+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.