

## MATERIALS SCIENCE AND ENGINEERING CURRICULUM 14MSE-2151

### FRESHMAN YEAR

<u>Fall Semester</u>	<u>Cr.</u>	<u>Spring Semester</u>	<u>Cr.</u>
CH 101 Chemistry, A Molecular Science <sup>1</sup>	3	CH 201 Chemistry, A Quantitative Science	3
CH 102 General Chemistry Lab. <sup>1</sup>	1	CH 202 Quantitative Chemistry Lab.	1
E 101 Intro. to Engr. & Problem Solving <sup>2</sup>	1	MA 241 Calculus II <sup>1</sup>	4
E 115 Intro. to Computing Environment <sup>2</sup>	1	PY 205 Physics for Engineers & Scientists I <sup>1</sup>	3
ENG 101 Academic Writing and Research <sup>2</sup>	4	PY 206 Physics for Engrs. & Scientists I Lab <sup>1</sup>	1
MA 141 Calculus I <sup>1</sup>	4	HES *** Fitness and Wellness Course*	1
EC 205 Economics (or EC 201 or ARE 201)*	<u>3</u>	*** ** GEP Requirement*	<u>3</u>
	17		16

### SOPHOMORE YEAR

<u>Fall Semester</u>	<u>Cr.</u>	<u>Spring Semester</u>	<u>Cr.</u>
MSE 201 Structure & Prop. of Engr. Materials <sup>1</sup>	3	MSE 255 Exp. Meth. Struct. Analysis of Matls.	2
ST 370 Probability and Statistics for Engrs.	3	MSE 260 Math. Methods for Materials Engrs.	3
MA 242 Calculus III	4	MSE 270 MSE Seminar	1
PY 208 Physics for Engineers & Scientists II	3	CH 220 Introductory Organic Chemistry	4
PY 209 Physics for Engrs. & Scientists II Lab	1	MA 341 Applied Differential Equations I	3
HES *** Physical Ed./Healthy Living Elective*	<u>1</u>	*** ** GEP Requirement*	<u>3</u>
	15		16

### JUNIOR YEAR

<u>Fall Semester</u>	<u>Cr.</u>	<u>Spring Semester</u>	<u>Cr.</u>
MSE 300 Structure of Materials at Nanoscale	3	MSE 355 Elect. Mag. & Opt. Prop. of Materials	3
MSE 301 Intro. to Thermodynamics of Matls.	3	MSE 360 Kinetic Processes in Materials	3
MSE 320 Intro. to Defects in Solids	3	MSE 370 Microstructure of Inorganic Materials	3
MSE 335 Exp. Meth. Analysis of Matls. Prop.	2	MSE 380 Microstructure of Organic Materials	3
*** ** GEP Requirement*	3	*** ** Engineering Elective <sup>3,4,5</sup>	<u>3</u>
*** ** Technical Elective <sup>3,4,5</sup>	<u>3</u>		15
	17		

### SENIOR YEAR

<u>Fall Semester</u>	<u>Cr.</u>	<u>Spring Semester</u>	<u>Cr.</u>
MSE 420 Mechanical Properties of Materials	3	MSE 470 Mat. Sci. & Eng. Design Project	3
MSE 423 Intro. to Materials Eng. Design	1	MSE 480 Materials Forensics and Degradation	3
ENG 331 Technical Writing (or ENG 333)	3	*** ** Technical Elective <sup>3,4,5</sup>	3
*** ** MSE processing elective <sup>3,6</sup>	3	*** ** GEP Requirement*	3
*** ** Technical Elective <sup>3,4,5</sup>	3	*** ** Ethics Elective (GEP Requirement*) <sup>7</sup>	<u>2-3</u>
*** ** GEP Requirement*	<u>3</u>		14-15
	16		

**Minimum total credit hours required for graduation: 126<sup>L,J,K</sup>**

#### Major/Program requirements and footnotes:

1. Minimum grade of C required.
2. Minimum grade of C- required.
3. Choose from departmental approved list.
4. Only 1 advisor approved MSE 490 (special topics) course may be used to fulfill an engineering or technical elective.
5. Additional engineering and technical electives may be approved by the MSE Director of Undergraduate Programs.
6. Choose a course from the following list: MSE 440, MSE 445, MSE 455, MSE 456 or MSE 460. This elective may be taken in the spring or fall semester by swapping it with a Technical Elective.
7. Ethics course must be chosen from the following list: IDS 201, STS 302, STS 304, STS/PHI 325, PHI 214,

**\*General Education Program (GEP) requirements and GEP Footnotes:**

To complete the requirements for graduation and the General Education Program, the following category credit hours and co-requisites must be satisfied. University approved GEP course lists for each of the following categories can be found at

<http://www.ncsu.edu/uap/academic-standards/gep/courselists/index.html>.

- A. Mathematical Sciences** (6 credit hours – one course with MA or ST prefix)  
*Fulfilled as part of the Major requirements.*
- B. Natural Sciences** (7 credit hours – include one laboratory course or course with a lab)  
*Fulfilled as part of the Major requirements.*
- C. Humanities** (6 credit hours selected from two different disciplines/course prefixes)  
*Choose from the University approved GEP Humanities course list .*
- D. Social Sciences** (6 credit hours selected from two different disciplines/course prefixes)  
*Choose 3 credits from the University approved GEP Social Sciences course list in a discipline other than Economics. Economics 205 (or EC 201 or ARE 201), taken as part of the Major requirements, satisfies 3 credit hours needed to fulfill the GEP Social Sciences requirement.*
- E. Physical Education/Healthy Living** (2 credit hours – at least one 100-level Fitness and Wellness Course)  
*Choose from the University approved GEP Physical Education/Healthy Living course list.*
- F. Additional Breadth** - (3 credit hours to be selected from the following checked University approved GEP course lists)  
*Choose one course from Humanities, Social Sciences, or Visual & Performing Arts*
- G. Interdisciplinary Perspectives** (5-6 credit hours)  
*Choose from the University approved GEP Interdisciplinary Perspectives course list.*
- H. Introduction to Writing** (4 credit hours satisfied by completing ENG 101 with a C- or better )

The following **Co-Requisites** must be satisfied to complete the General Education Program requirements:

**I. U.S. Diversity** (USD)

*Choose from the University approved GEP U.S. Diversity course list or choose a course identified on the approved GEP course lists as meeting the U.S. Diversity (USD) co-requisite.*

**J. Global Knowledge** (GK)

*Choose from the University approved GEP Global Knowledge course list or choose a course identified on the approved GEP course lists as meeting the Global Knowledge (GK) co-requisite.*

**K. Foreign Language proficiency:** Proficiency at the FL\_102 level is required for graduation.

<b>MSE Processing Electives</b>	<b>Engineering Electives<sup>4,5</sup></b>	<b>Technical Electives<sup>4,5</sup></b>
MSE 440 Proc. of Metallic Materials MSE 445 Ceramics Processing MSE 455 Polymer Tech. and Eng. MSE 456 Composite Materials MSE 460 Microelectronic Materials	<b>All MSE Processing Electives</b> MSE (NE) 409 Nuclear Materials MSE 490 Special Topics in MSE MSE 465 Intro to Nanomaterials MSE 485 Biomaterials CE 214 or MAE 206 Statics CE 215 or MAE 208 Engr. Dynamics CE 313 or MAE 314 Solid Mechanics ECE 331 Intro to Circuits ISE 311 Engineering Economic Analysis NE 202 Radiation Sources Lab (4 hrs) TE 205 Analog & Digital Circuits (4 hrs)	<b>All MSE Processing Electives</b> <b>All Engineering Electives</b> BCH 451 Principles of Biochem. CH 223 Organic Chemistry CH 315 Quantitative Analysis CH 401 Inorganic Chemistry CH 431 Physical Chem. I CH 437 Physical Chem. For Engineers MA 305 Elementary Linear Algebra MA 351 Intro. to Discrete Math. Models MA 401 Applied Differential Eqs. II MA 402 Comp. Math: Models, Meth. Analysis MA 405 Intro. to Lin. Alg. & Matrices PY 328 Astrophysics PY 407 Modern Physics PY 411/412 Mechanics I & II PY 414/415 Electromagnetism I & II PY (MEA) 463 Fluid Physics