

# Materials Engineering Program - B.S.

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## First Year

1st Semester		Credits
CHEM 125	General Chemistry I	3
CHEM 125A	General Chemistry Lab I	1
FED 101	Fundamentals of Engineering Design	2
HUM 101	English Composition: Writing, Speaking, Thinking I	3
MATH 111	Calculus I	4
PHYS 111	Physics I	3
PHYS 111A	Physics I Lab	1
FRSH SEM	First-Year Seminar	0
<b>Term Credits</b>		<b>17</b>

## 2nd Semester

CHEM 126	General Chemistry II	3
HUM 102	English Composition: Writing, Speaking, Thinking II	3
MATH 112	Calculus II	4
PHYS 121	Physics II	3
PHYS 121A	Physics II Lab	1
<b>Term Credits</b>		<b>14</b>

## Second Year

### 1st Semester

MTEN 201	Introductory Principles of Materials Engineering	3
MECH 234	Engineering Mechanics	2
CHEM 243	Organic Chemistry I	3
PHYS 234	Physics III	3
MATH 211	Calculus III A	3
<b>Term Credits</b>		<b>14</b>

### 2nd Semester

MTEN 205	Mechanical Behavior of Materials	3
CS 115	Introduction to Computer Science in C++	3
History and Humanities GER 200 level ( <a href="http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-requirements/ger-200-level/">http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-requirements/ger-200-level/</a> )		3
ENGR 210	Career Planning Seminar for En	1
MATH 222	Differential Equations	4
<b>Term Credits</b>		<b>14</b>

## Third Year

### 1st Semester

MTEN 301	Thermodynamics of Materials	3
MTEN 310	Transport Phenomena in Materials I	3
MTEN 305	Materials Characterization Methods	4
ENG 352	Technical Writing	3
MATH 333	Probability and Statistics	3
<b>Term Credits</b>		<b>16</b>

### 2nd Semester

MTEN 311	Transport Phenomena in Materials II	3
MTEN 395	Materials Engineering Laboratory I	3
BME 304	Material Fundamentals of Biomedical Engineering	3
ME 438	Introduction to Physical Metallurgy	3
ENGR 301	Engineering Applications of Data Science	3
<b>Term Credits</b>		<b>15</b>

**Fourth Year****1st Semester**

MTEN 410	Soft Materials	3
MTEN 496	Materials Engineering Laboratory II	3
PHIL 334	Engineering Ethics and Technological Practice: Philosophical Perspectives on Engineering	3
Technical Elective <sup>1</sup>		3
Technical Elective <sup>1</sup>		3

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<b>Term Credits</b>	<b>15</b>
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**2nd Semester**

MTEN 450	Materials Engineering Design	3
MTEN 460	Materials Processing	3
IE 492	Engineering Management	3
Technical Elective <sup>1</sup>		3
Humanities and Social Science Senior Seminar GER ( <a href="http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-requirements/hss-capstone/">http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-requirements/hss-capstone/</a> )		3

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<b>Term Credits</b>	<b>15</b>
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<b>Total Credits</b>	<b>120</b>
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## Co-op Option Cycle A

**First Year****1st Semester**

		<b>Credits</b>
CHEM 125	General Chemistry I	3
CHEM 125A	General Chemistry Lab I	1
FED 101	Fundamentals of Engineering Design	2
HUM 101	English Composition: Writing, Speaking, Thinking I	3
MATH 111	Calculus I	4
PHYS 111	Physics I	3
PHYS 111A	Physics I Lab	1
FRSH SEM	First-Year Seminar	0

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<b>Term Credits</b>	<b>17</b>
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**2nd Semester**

CHEM 126	General Chemistry II	3
HUM 102	English Composition: Writing, Speaking, Thinking II	3
MATH 112	Calculus II	4
PHYS 121	Physics II	3
PHYS 121A	Physics II Lab	1

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<b>Term Credits</b>	<b>14</b>
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**Second Year****1st Semester**

MTEN 201	Introductory Principles of Materials Engineering	3
MECH 234	Engineering Mechanics	2
CHEM 243	Organic Chemistry I	3
PHYS 234	Physics III	3
MATH 211	Calculus III A	3

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<b>Term Credits</b>	<b>14</b>
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**2nd Semester**

MTEN 205	Mechanical Behavior of Materials	3
CS 115	Introduction to Computer Science in C++	3
History and Humanities GER 200 level ( <a href="http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-requirements/ger-200-level/">http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-requirements/ger-200-level/</a> )		3
ENGR 210	Career Planning Seminar for En	1

MATH 222	Differential Equations	4
<b>Term Credits</b>		<b>14</b>
<b>Third Year</b>		
<b>1st Semester</b>		
ENGR 310	Co-op Work Experience I	12
<b>Term Credits</b>		<b>12</b>
<b>2nd Semester</b>		
MTEN 301	Thermodynamics of Materials	3
MTEN 310	Transport Phenomena in Materials I	3
MTEN 305	Materials Characterization Methods	4
ENG 352	Technical Writing	3
MATH 333	Probability and Statistics	3
<b>Term Credits</b>		<b>16</b>
<b>Fourth Year</b>		
<b>1st Semester</b>		
ENGR 410	Co-op Work Experience II	12
<b>Term Credits</b>		<b>12</b>
<b>2nd Semester</b>		
MTEN 311	Transport Phenomena in Materials II	3
MTEN 395	Materials Engineering Laboratory I	3
BME 304	Material Fundamentals of Biomedical Engineering	3
ME 438	Introduction to Physical Metallurgy	3
ENGR 301	Engineering Applications of Data Science	3
<b>Term Credits</b>		<b>15</b>
<b>Fifth Year</b>		
<b>1st Semester</b>		
MTEN 410	Soft Materials	3
MTEN 496	Materials Engineering Laboratory II	3
PHIL 334	Engineering Ethics and Technological Practice: Philosophical Perspectives on Engineering <sup>1</sup>	3
Technical Elective <sup>1</sup>		3
Technical Elective <sup>1</sup>		3
<b>Term Credits</b>		<b>15</b>
<b>2nd Semester</b>		
MTEN 450	Materials Engineering Design	3
MTEN 460	Materials Processing	3
IE 492	Engineering Management	3
Technical Elective <sup>1</sup>		3
Humanities and Social Science Senior Seminar GER ( <a href="http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-requirements/hss-capstone/">http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-requirements/hss-capstone/</a> )		3
<b>Term Credits</b>		<b>15</b>
<b>Total Credits</b>		<b>144</b>

## Co-op Option Cycle B

<b>First Year</b>		<b>Credits</b>
<b>1st Semester</b>		
CHEM 125	General Chemistry I	3
CHEM 125A	General Chemistry Lab I	1
FED 101	Fundamentals of Engineering Design	2
HUM 101	English Composition: Writing, Speaking, Thinking I	3
MATH 111	Calculus I	4
PHYS 111	Physics I	3
PHYS 111A	Physics I Lab	1

FRSH SEM	First-Year Seminar	0
<b>Term Credits</b>		<b>17</b>
<b>2nd Semester</b>		
CHEM 126	General Chemistry II	3
HUM 102	English Composition: Writing, Speaking, Thinking II	3
MATH 112	Calculus II	4
PHYS 121	Physics II	3
PHYS 121A	Physics II Lab	1
<b>Term Credits</b>		<b>14</b>
<b>Second Year</b>		
<b>1st Semester</b>		
MTEN 201	Introductory Principles of Materials Engineering	3
MECH 234	Engineering Mechanics	2
CHEM 243	Organic Chemistry I	3
PHYS 234	Physics III	3
MATH 211	Calculus III A	3
<b>Term Credits</b>		<b>14</b>
<b>2nd Semester</b>		
MTEN 205	Mechanical Behavior of Materials	3
CS 115	Introduction to Computer Science in C++	3
History and Humanities GER 200 level ( <a href="http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-requirements/ger-200-level/">http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-requirements/ger-200-level/</a> )		3
ENGR 210	Career Planning Seminar for En	1
MATH 222	Differential Equations	4
<b>Term Credits</b>		<b>14</b>
<b>Third Year</b>		
<b>1st Semester</b>		
MTEN 301	Thermodynamics of Materials	3
MTEN 310	Transport Phenomena in Materials I	3
MTEN 305	Materials Characterization Methods	4
ENG 352	Technical Writing	3
MATH 333	Probability and Statistics	3
<b>Term Credits</b>		<b>16</b>
<b>2nd Semester</b>		
ENGR 310	Co-op Work Experience I	12
<b>Term Credits</b>		<b>12</b>
<b>Fourth Year</b>		
<b>1st Semester</b>		
MTEN 311	Transport Phenomena in Materials II	3
MTEN 395	Materials Engineering Laboratory I	3
BME 304	Material Fundamentals of Biomedical Engineering	3
ME 438	Introduction to Physical Metallurgy	3
ENGR 301	Engineering Applications of Data Science	3
<b>Term Credits</b>		<b>15</b>
<b>2nd Semester</b>		
ENGR 410	Co-op Work Experience II	12
<b>Term Credits</b>		<b>12</b>
<b>Fifth Year</b>		
<b>1st Semester</b>		
MTEN 410	Soft Materials	3
MTEN 496	Materials Engineering Laboratory II	3
PHIL 334	Engineering Ethics and Technological Practice: Philosophical Perspectives on Engineering	3

Technical Elective <sup>1</sup>		3
Technical Elective <sup>1</sup>		3
<b>Term Credits</b>		<b>15</b>
<b>2nd Semester</b>		
MTEN 450	Materials Engineering Design	3
MTEN 460	Materials Processing	3
IE 492	Engineering Management	3
Technical Elective <sup>1</sup>		3
Humanities and Social Science Senior Seminar GER ( <a href="http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-requirements/hss-capstone/">http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-requirements/hss-capstone/</a> )		3
<b>Term Credits</b>		<b>15</b>
<b>Total Credits</b>		<b>144</b>

Students must earn a 2.0 minimum GPA and must meet appropriate departmental regulations. These include an average GPA of 2.0 in all materials engineering courses.

- <sup>1</sup> Technical Electives: Students must complete 9 credits of technically oriented, subject-related courses approved by his or her advisor. At least 6 credits must be taken from the following: BME 300:699 or CE 300:699 or CHE 300:699 or ECE 300:699 or ME 300:699 with advisor approval. Other acceptable courses include, but are not limited to:
- (1) MTEN 491 Research and Independent Study I and MTEN 492 Research and Independent Study II
  - (2) Courses taken to satisfy Minor requirements
  - (3) Graduate level course taken within BS/MS or BS/PHD program
  - (4) Courses in ACCT 200:699 or BME 300:699 or CE 300:699 or CHE 300:699 or CHEM 300:699 or CPT 300:499 or ECE 200:699 or ENE 200:699 or ENGR 200:699 or ENTR 400:500 or EM 600:699 or EPS300:699 or EVSC300:699 or FIN 200:699 or HRM300:699 or MATH 300:699 or MGMT 300:699 or ME 300:699 or MRKT 300:499 or MTSE 300:699 or NANO 488 or OM 375 or PHB 600:699 or PHEN 500:699 or PHYS 200:699 (\*\*)

Note (\*\*) only one 200 level course is allowed in a case a 300 level course needs a 200 level course as a prerequisite.