

Materials Engineering Program - B.S.

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
ENGL 101	English Composition: Introduction to Academic Writing	3
MATH 111	Calculus I	4
PHYS 111	Physics I	3
PHYS 111A	Physics I Lab	1
FYS SEM	First-Year Student Seminar	0
Term Credits		17

2nd Semester

CHEM 126	General Chemistry II	3
ENGL 102	English Composition: Introduction to Writing for Research	3
MATH 112	Calculus II	4
PHYS 121	Physics II	3
PHYS 121A	Physics II Lab	1
MTEN 101	Introduction to Materials Engineering	1
Term Credits		15

Second Year

1st Semester

MTEN 201	Introductory Principles of Materials Engineering	3
MECH 234	Engineering Mechanics	2
CS 115	Introduction to Computer Science I in C++	3
MATH 211	Calculus III A	3
History and Humanities GER 200 level (http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-requirements/ger-200-level/)		3
Term Credits		14

2nd Semester

MTEN 205	Mechanical Behavior of Materials	4
ENGR 211	Professional Skills for Engineers I	1
MATH 222	Differential Equations	4
Technical Elective ¹		3
Term Credits		12

Third Year

1st Semester

MTEN 301	Thermodynamics of Materials	3
MTEN 305	Materials Characterization Methods	4
MTEN 309	Electronic, Optical, Magnetic and Thermal Properties of Materials	4
COM 313	Technical Writing	3
MATH 333	Probability and Statistics	3
Term Credits		17

2nd Semester

MTEN 311	Kinetics of Materials	3
MTEN 395	Materials Engineering Laboratory	4
ME 438	Introduction to Physical Metallurgy	3
ENGR 301	Engineering Applications of Data Science	3
Technical Elective ¹		3
Term Credits		16

Fourth Year**1st Semester**

MTEN 410	Soft Materials	3
MTEN 449	Materials Engineering Design I	4
PHIL 334	Engineering Ethics and Technological Practice: Philosophical Perspectives on Engineering	3
Technical Elective ¹		3
Technical Elective ¹		3
Term Credits		16

2nd Semester

MTEN 450	Materials Engineering Design II	4
MTEN 460	Materials Processing	3
IE 492	Engineering Management	3
Humanities and Social Science Senior Seminar GER (http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-requirements/hss-capstone/)		3
Term Credits		13
Total Credits		120

Thesis Option

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
ENGL 101	English Composition: Introduction to Academic Writing	3
MATH 111	Calculus I	4
PHYS 111	Physics I	3
PHYS 111A	Physics I Lab	1
FYS SEM	First-Year Student Seminar	0
Term Credits		17

2nd Semester

CHEM 126	General Chemistry II	3
ENGL 102	English Composition: Introduction to Writing for Research	3
MATH 112	Calculus II	4
PHYS 121	Physics II	3
PHYS 121A	Physics II Lab	1
MTEN 101	Introduction to Materials Engineering	1
Term Credits		15

Second Year**1st Semester**

MTEN 201	Introductory Principles of Materials Engineering	3
MECH 234	Engineering Mechanics	2
CS 115	Introduction to Computer Science I in C++	3
MATH 211	Calculus III A	3
History and Humanities GER 200 level (http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-requirements/ger-200-level/)		3
Term Credits		14

2nd Semester

MTEN 205	Mechanical Behavior of Materials	4
ENGR 211	Professional Skills for Engineers I	1
MATH 222	Differential Equations	4
MTEN 480	Undergraduate Research Thesis I	3
Term Credits		12

Third Year**1st Semester**

MTEN 301	Thermodynamics of Materials	3
MTEN 305	Materials Characterization Methods	4
MTEN 309	Electronic, Optical, Magnetic and Thermal Properties of Materials	4
MTEN 481	Undergraduate Research Thesis II	3
COM 313	Technical Writing	3
MATH 333	Probability and Statistics	3
Term Credits		20

2nd Semester

MTEN 311	Kinetics of Materials	3
MTEN 395	Materials Engineering Laboratory	4
MTEN 482	Undergraduate Research Thesis III	3
ME 438	Introduction to Physical Metallurgy	3
ENGR 301	Engineering Applications of Data Science	3
Term Credits		16

Fourth Year**1st Semester**

MTEN 410	Soft Materials	3
MTEN 449	Materials Engineering Design I	4
MTEN 483	Undergraduate Research Thesis IV	3
PHIL 334	Engineering Ethics and Technological Practice: Philosophical Perspectives on Engineering	3
Term Credits		13

2nd Semester

MTEN 450	Materials Engineering Design II	4
MTEN 460	Materials Processing	3
IE 492	Engineering Management	3
Humanities and Social Science Senior Seminar GER (http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-requirements/hss-capstone/)		3
Term Credits		13

Total Credits **120**

Co-op Option Cycle A

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
ENGL 101	English Composition: Introduction to Academic Writing	3
MATH 111	Calculus I	4
PHYS 111	Physics I	3
PHYS 111A	Physics I Lab	1
FYS SEM	First-Year Student Seminar	0
Term Credits		17

2nd Semester

CHEM 126	General Chemistry II	3
ENGL 102	English Composition: Introduction to Writing for Research	3
MATH 112	Calculus II	4
PHYS 121	Physics II	3
PHYS 121A	Physics II Lab	1
MTEN 101	Introduction to Materials Engineering	1
Term Credits		15

Second Year**1st Semester**

MTEN 201	Introductory Principles of Materials Engineering	3
MECH 234	Engineering Mechanics	2
CS 115	Introduction to Computer Science I in C++	3
MATH 211	Calculus III A	3
History and Humanities GER 200 level (http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-requirements/ger-200-level/)		3
Term Credits		14

2nd Semester

MTEN 205	Mechanical Behavior of Materials	4
ENGR 211	Professional Skills for Engineers I	1
MATH 222	Differential Equations	4
Technical Elective ¹		3
Term Credits		12

Third Year**1st Semester**

ENGR 310	Co-op Work Experience I	12
Term Credits		12

2nd Semester

MTEN 301	Thermodynamics of Materials	3
MTEN 305	Materials Characterization Methods	4
MTEN 309	Electronic, Optical, Magnetic and Thermal Properties of Materials	4
COM 313	Technical Writing	3
MATH 333	Probability and Statistics	3
Term Credits		17

Fourth Year**1st Semester**

ENGR 410	Co-op Work Experience II	12
Term Credits		12

2nd Semester

MTEN 311	Kinetics of Materials	3
MTEN 395	Materials Engineering Laboratory	4
ME 438	Introduction to Physical Metallurgy	3
ENGR 301	Engineering Applications of Data Science	3
Technical Elective ¹		3
Term Credits		16

Fifth Year**1st Semester**

MTEN 410	Soft Materials	3
MTEN 449	Materials Engineering Design I	4
PHIL 334	Engineering Ethics and Technological Practice: Philosophical Perspectives on Engineering ¹	3
Technical Elective ¹		3
Technical Elective ¹		3
Term Credits		16

2nd Semester

MTEN 450	Materials Engineering Design II	4
MTEN 460	Materials Processing	3
IE 492	Engineering Management	3

Humanities and Social Science Senior Seminar GER (<http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-requirements/hss-capstone/>) 3

Term Credits 13

Total Credits 144

Co-op Option Cycle B

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
ENGL 101	English Composition: Introduction to Academic Writing	3
MATH 111	Calculus I	4
PHYS 111	Physics I	3
PHYS 111A	Physics I Lab	1
FYS SEM	First-Year Student Seminar	0

Term Credits 17

2nd Semester

CHEM 126	General Chemistry II	3
ENGL 102	English Composition: Introduction to Writing for Research	3
MATH 112	Calculus II	4
PHYS 121	Physics II	3
PHYS 121A	Physics II Lab	1
MTEN 101	Introduction to Materials Engineering	1

Term Credits 15

Second Year

1st Semester

MTEN 201	Introductory Principles of Materials Engineering	3
MECH 234	Engineering Mechanics	2
CS 115	Introduction to Computer Science I in C++	3
MATH 211	Calculus III A	3
History and Humanities GER 200 level (http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-requirements/ger-200-level/)		3

Term Credits 14

2nd Semester

MTEN 205	Mechanical Behavior of Materials	4
ENGR 211	Professional Skills for Engineers I	1
MATH 222	Differential Equations	4
Technical Elective ¹		3

Term Credits 12

Third Year

1st Semester

MTEN 301	Thermodynamics of Materials	3
MTEN 305	Materials Characterization Methods	4
MTEN 309	Electronic, Optical, Magnetic and Thermal Properties of Materials	4
COM 313	Technical Writing	3
MATH 333	Probability and Statistics	3

Term Credits 17

2nd Semester

ENGR 310	Co-op Work Experience I	12
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Term Credits 12

Fourth Year**1st Semester**

MTEN 311	Kinetics of Materials	3
MTEN 395	Materials Engineering Laboratory	4
ME 438	Introduction to Physical Metallurgy	3
ENGR 301	Engineering Applications of Data Science	3
Technical Elective ¹		3
Term Credits		16

2nd Semester

ENGR 410	Co-op Work Experience II	12
Term Credits		12

Fifth Year**1st Semester**

MTEN 410	Soft Materials	3
MTEN 449	Materials Engineering Design I	4
PHIL 334	Engineering Ethics and Technological Practice: Philosophical Perspectives on Engineering	3
Technical Elective ¹		3
Technical Elective ¹		3
Term Credits		16

2nd Semester

MTEN 450	Materials Engineering Design II	4
MTEN 460	Materials Processing	3
IE 492	Engineering Management	3
Humanities and Social Science Senior Seminar GER (http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-requirements/hss-capstone/)		3
Term Credits		13
Total Credits		144

Co-op Option Cycle A with Thesis Option

First Year**1st Semester**

CHEM 125	General Chemistry I	3
CHEM 125A	General Chemistry Lab I	1
FED 101	Fundamentals of Engineering Design	2
ENGL 101	English Composition: Introduction to Academic Writing	3
MATH 111	Calculus I	4
PHYS 111	Physics I	3
PHYS 111A	Physics I Lab	1
FYS SEM	First-Year Student Seminar	0
Term Credits		17

2nd Semester

CHEM 126	General Chemistry II	3
ENGL 102	English Composition: Introduction to Writing for Research	3
MATH 112	Calculus II	4
PHYS 121	Physics II	3
PHYS 121A	Physics II Lab	1
MTEN 101	Introduction to Materials Engineering	1
Term Credits		15

Second Year**1st Semester**

MTEN 201	Introductory Principles of Materials Engineering	3
MECH 234	Engineering Mechanics	2

CS 115	Introduction to Computer Science I in C++	3
MATH 211	Calculus III A	3
History and Humanities GER 200 level (http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-requirements/ger-200-level/)		3
Term Credits		14
2nd Semester		
MTEN 205	Mechanical Behavior of Materials	4
ENGR 211	Professional Skills for Engineers I	1
MATH 222	Differential Equations	4
MTEN 480	Undergraduate Research Thesis I	3
Term Credits		12
Third Year		
1st Semester		
ENGR 310	Co-op Work Experience I	12
Term Credits		12
2nd Semester		
MTEN 301	Thermodynamics of Materials	3
MTEN 305	Materials Characterization Methods	4
MTEN 309	Electronic, Optical, Magnetic and Thermal Properties of Materials	4
MTEN 481	Undergraduate Research Thesis II	3
COM 313	Technical Writing	3
MATH 333	Probability and Statistics	3
Term Credits		20
Fourth Year		
1st Semester		
ENGR 410	Co-op Work Experience II	12
Term Credits		12
2nd Semester		
MTEN 311	Kinetics of Materials	3
MTEN 395	Materials Engineering Laboratory	4
MTEN 482	Undergraduate Research Thesis III	3
ME 438	Introduction to Physical Metallurgy	3
ENGR 301	Engineering Applications of Data Science	3
Term Credits		16
Fifth Year		
1st Semester		
MTEN 410	Soft Materials	3
MTEN 449	Materials Engineering Design I	4
MTEN 483	Undergraduate Research Thesis IV	3
PHIL 334	Engineering Ethics and Technological Practice: Philosophical Perspectives on Engineering ¹	3
Term Credits		13
2nd Semester		
MTEN 450	Materials Engineering Design II	4
MTEN 460	Materials Processing	3
IE 492	Engineering Management	3
Humanities and Social Science Senior Seminar GER (http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-requirements/hss-capstone/)		3
Term Credits		13
Total Credits		144

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
ENGL 101	English Composition: Introduction to Academic Writing	3
MATH 111	Calculus I	4
PHYS 111	Physics I	3
PHYS 111A	Physics I Lab	1
FYS SEM	First-Year Student Seminar	0
Term Credits		17

2nd Semester

CHEM 126	General Chemistry II	3
ENGL 102	English Composition: Introduction to Writing for Research	3
MATH 112	Calculus II	4
PHYS 121	Physics II	3
PHYS 121A	Physics II Lab	1
MTEN 101	Introduction to Materials Engineering	1
Term Credits		15

Second Year**1st Semester**

MTEN 201	Introductory Principles of Materials Engineering	3
MECH 234	Engineering Mechanics	2
CS 115	Introduction to Computer Science I in C++	3
MATH 211	Calculus III A	3
History and Humanities GER 200 level (http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-requirements/ger-200-level/)		3
Term Credits		14

2nd Semester

MTEN 205	Mechanical Behavior of Materials	4
ENGR 211	Professional Skills for Engineers I	1
MATH 222	Differential Equations	4
MTEN 480	Undergraduate Research Thesis I	3
Term Credits		12

Third Year**1st Semester**

MTEN 301	Thermodynamics of Materials	3
MTEN 305	Materials Characterization Methods	4
MTEN 309	Electronic, Optical, Magnetic and Thermal Properties of Materials	4
MTEN 481	Undergraduate Research Thesis II	3
COM 313	Technical Writing	3
MATH 333	Probability and Statistics	3
Term Credits		20

2nd Semester

ENGR 310	Co-op Work Experience I	12
Term Credits		12

Fourth Year**1st Semester**

MTEN 311	Kinetics of Materials	3
MTEN 395	Materials Engineering Laboratory	4
MTEN 482	Undergraduate Research Thesis III	3
ME 438	Introduction to Physical Metallurgy	3

ENGR 301	Engineering Applications of Data Science	3
Term Credits		16
2nd Semester		
ENGR 410	Co-op Work Experience II	12
Term Credits		12
Fifth Year		
1st Semester		
MTEN 410	Soft Materials	3
MTEN 449	Materials Engineering Design I	4
MTEN 483	Undergraduate Research Thesis IV	3
PHIL 334	Engineering Ethics and Technological Practice: Philosophical Perspectives on Engineering	3
Term Credits		13
2nd Semester		
MTEN 450	Materials Engineering Design II	4
MTEN 460	Materials Processing	3
IE 492	Engineering Management	3
Humanities and Social Science Senior Seminar GER (http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-requirements/hss-capstone/)		3
Term Credits		13
Total Credits		144

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.

- ¹ Technical Electives: Students must complete 12 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.