## 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		15
1st Semester		
MTEN 201	Introductory Principles of Materials Engineering	3
MECH 234		2
CS 115	Engineering Mechanics	3
MATH 211	Introduction to Computer Science I in C++ Calculus III A	
		3
requirements/ger-2	nities GER 200 level (http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education- 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		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		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	<sup>1</sup>	3
Technical Elective	<sup>1</sup>	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/ 3 general-education-requirements/hss-capstone/) **Term Credits** 13 120

**Total Credits** 

Thesis Option

	Term Credits	14
History and Human requirements/ger-2	nities GER 200 level (http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education- 200-level/)	:
MATH 211	Calculus III A	:
CS 115	Introduction to Computer Science I in C++	:
MECH 234	Engineering Mechanics	:
1st Semester MTEN 201	Introductory Principles of Materials Engineering	:
Second Year		
	Term Credits	1
MTEN 101	Introduction to Materials Engineering	
PHYS 121A	Physics II Lab	
PHYS 121	Physics II	;
MATH 112	Calculus II	
ENGL 102	English Composition: Introduction to Writing for Research	:
CHEM 126	General Chemistry II	:
2nd Semester		
	Term Credits	1
FYS SEM	First-Year Student Seminar	(
PHYS 111A	Physics I Lab	
PHYS 111	Physics I	:
MATH 111	Calculus I	
ENGL 101	English Composition: Introduction to Academic Writing	:
FED 101	Fundamentals of Engineering Design	:
CHEM 125A	General Chemistry Lab I	
CHEM 125	General Chemistry I	
1st Semester		Credit
First Year		

	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
	Social Science Senior Seminar GER (http://catalog.njit.edu/undergraduate/academic-policies-procedures/ n-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 Humanit requirements/ger-20	ties GER 200 level (http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education- 0-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 <sup>1</sup>		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 <sup>1</sup>		3
	Term Credits	16
Fifth Year		10
1st Semester		
MTEN 410	Soft Materials	2
MTEN 449	Materials Engineering Design I	3
PHIL 334	Engineering Ethics and Technological Practice: Philosophical Perspectives on Engineering <sup>1</sup>	
Technical Elective <sup>1</sup>	Engineering Earles and Technological Fractice. Frinosophilical Perspectives on Engineering	3
Technical Elective <sup>1</sup>		
	Torm Cradita	3
Ond Compation	Term Credits	16
2nd Semester	Natoriala Engineering Degign II	
MTEN 450	Materials Engineering Design II	4
MTEN 460	Materials Processing	3
IE 492	Engineering Management	3

3

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

	Term Credits	1:
	Total Credits	144
Co-op Option Cyc	le B	
First Year		
1st Semester		Credits
CHEM 125	General Chemistry I	3
CHEM 125A	General Chemistry Lab I	
FED 101	Fundamentals of Engineering Design	2
ENGL 101	English Composition: Introduction to Academic Writing	
MATH 111	Calculus I	2
PHYS 111	Physics I	3
PHYS 111A	Physics I Lab	
FYS SEM	First-Year Student Seminar	(
	Term Credits	17
2nd Semester		
CHEM 126	General Chemistry II	3
ENGL 102	English Composition: Introduction to Writing for Research	:
MATH 112	Calculus II	2
PHYS 121	Physics II	:
PHYS 121A	Physics II Lab	
MTEN 101	Introduction to Materials Engineering	
	Term Credits	1
Second Year		
1st Semester		
MTEN 201	Introductory Principles of Materials Engineering	:
MECH 234	Engineering Mechanics	2
CS 115	Introduction to Computer Science I in C++	(
MATH 211	Calculus III A	:
	nities GER 200 level (http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-	;
requirements/ger-		
	Term Credits	14
2nd Semester		
MTEN 205	Mechanical Behavior of Materials	4
ENGR 211	Professional Skills for Engineers I	
MATH 222	Differential Equations	4
Technical Elective		
	Term Credits	12
Third Year		
1st Semester		
MTEN 301	Thermodynamics of Materials	
MTEN 305	Materials Characterization Methods	2
MTEN 309	Electronic, Optical, Magnetic and Thermal Properties of Materials	2
COM 313	Technical Writing	ć
MATH 333	Probability and Statistics	:
	Term Credits	17
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
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		3
Technical Elective		3
	Term Credits	16
2nd Semester		
MTEN 450	Materials Engineering Design II	4
MTEN 460	Materials Processing	3
		0
IE 492	Engineering Management	3
Humanities and So	Engineering Management cial Science Senior Seminar GER (http://catalog.njit.edu/undergraduate/academic-policies-procedures/ requirements/hss-capstone/)	3

144

**Total Credits** 

Co-op Option Cycle A with 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
	nities GER 200 level (http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-	3
requirements/ger-		-
	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 <sup>1</sup>	3
	Term Credits	13
2nd Semester		10
MTEN 450	Materials Engineering Design II	4
MTEN 460	Materials Engineering Design in	3
IE 492	Engineering Management	3
	bocial Science Senior Seminar GER (http://catalog.njit.edu/undergraduate/academic-policies-procedures/	3
	-requirements/hss-capstone/)	5
-	Term Credits	13
	Total Credits	144
		144

Co-op Option Cycle B with 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		15
1st Semester		
MTEN 201	Introductory Drinciples of Materials Engineering	2
	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
requirements/ger-2	nities GER 200 level (http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-	3
	Term Credits	14
2nd Semester		14
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		12
1st Semester		
MTEN 301	Thermodynamics of Metaziala	2
MTEN 305	Thermodynamics of Materials Materials Characterization Methods	3
		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		10
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
	Social Science Senior Seminar GER (http://catalog.njit.edu/undergraduate/academic-policies-procedures/ n-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.

<sup>1</sup> 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.