

Department of Materials Science and Engineering

Program of Materials Science and Engineering for International Students (2020)

I. Introduction

The major of Materials Science and Engineering is a discipline, which systematically studies fundamental theories and experiment skills for materials science and engineering as well as applies these knowledge/abilities for materials' syntheses, preparation, structure characterization/evaluation, and performance controlling in various broad fields based on the principles of materials science, chemistry, and physics. Materials Science and Engineering major is an integrated discipline for application science closely related to engineering technology.

Materials are the bases for human survival and development. In 1970s, people viewed information, materials and energy as the mainstay of social civilization. In 1980s, with the rise of high technologies, materials science, information technology, and biotechnology were listed as important symbols of new technology revolution. Nowadays, materials have become important parts of the national economy, national defense and people's livelihood.

II. Objectives and Learning Outcomes

Materials Science and Engineering (MSE) will cultivate high-quality science and technology talents with firm theory knowledge of Materials Science and Engineering, abilities of mastering frontier materials' R&D and characterization technology, and capabilities of utilizing English and computer technology very well for high-tech R&D in interdisciplinary fields. These trained students possess not only the capability for researching in their disciplines and related fields, for designing and developing new materials, for teaching and managing, but also for practice innovation, cooperation, and leadership. These graduates can not only engage in conventional material industrial production, new materials creation, and development of new processes and technologies, but also continue their postgraduate studies in Materials Science and Engineering and serve in the research, development and management in top-ranked corporations, scientific research institutes, colleges, and government.

III. Study Length and Degree Requirements

Study length: 4 years

Degree conferred: Bachelor of Materials Science and Engineering

The minimum credit requirement for graduation: 138credits (not including English courses);

Category	Module	Minimum Credit Requirement
General Education (GE) Required Courses (49 credits)	Science	29
	Physical Education	4
	Chinese Languages & Culture	16
General Education (GE) Elective Courses (10 credits)	Humanities	4
	Social Sciences	4
	Arts	2
	Science	0
Major Course (79 credits)	Major Foundational Courses	44
	Major Core Courses	13
	Major Elective Courses	8
	Research Projects, Internship and Undergraduate Thesis / Projects	14
Total (not including English courses)		138

* Percentage of the total= Credit requirements of each line / Total credit requirements.

IV. Discipline

Materials Science and Engineering

V. Main Courses

Fundamentals of Circuits and Electronics, Fundamentals of Materials Science and Engineering, Experiments for Fundamentals of Materials Science and Engineering, CAD Engineering Drawing, Crystallography, Physical Chemistry, Physical Chemistry Experiments, Mechanics of Materials B, Materials Chemistry, Probability and Statistics, Comprehensive Experiments of Materials I/ II, Experiments for Advanced Materials Science and Engineering I/ II, Physics of Materials, Material Characterization Techniques, Polymer materials, Metal Materials, Ceramic Materials.

VI. Practice-Based Courses

Main practical teaching includes: experiments, industrial practice (Summer break of Grade 3), thesis, undergraduates' innovation experiments (starting from Year 2, undergraduates with excellent scores can work in labs to conduct research under the guidance of their supervisors; research period can include Summer break), and various academic and overseas undergraduate competitions.

VII. Pre-requisites for Major Declaration

Major Declaration Time	Course Code	Course Name	Prerequisite
Declare major at the end of First Year	MA101B	Calculus I A	None
	MA102B	Calculus II A	MA101B
	MA107B	Linear Algebra B	None
	PHY103B	General Physics I B	None
	MSE102	Frontier Seminars in Materials Science and Engineering	None
	PHY105B	General Physics II B	PHY103B
	PHY104B	Experiments of Fundamental Physics	None
	CH101A	General Chemistry A	None
	Notes: At least 6 of the above courses will be completed in the first year, and the results should be qualified, and also the Frontier Seminars in Materials Science and Engineering must be completed.		
Declare major at the end of Second Year	MA101B	Calculus I A	None
	MA102B	Calculus II A	MA101B
	MA107B	Linear Algebra B	None
	MSE102	Frontier Seminars in Materials Science and Engineering	None
	PHY103B	General Physics I B	None
	PHY105B	General Physics II B	PHY103B
	PHY104B	Experiments of Fundamental Physics	None
	CH101A	General Chemistry A	None
	CS102B	Introduction to Programming B	None
	MSE001	Fundamentals of Materials Science and Engineering	PHY105B CH101A
	MSE002	Experiments for Fundamentals of Materials Science and Engineering	PHY105B CH101A
	Notes: 1. All of the above courses should be completed, and the results should be qualified. 2. At least earn 13 credits in the following courses: CAD Engineering Drawing, Fundamentals of Circuits and Electronics, Analog Circuit Laboratory, Crystallography, Probability and Statistics, Physical Chemistry, Physical Chemistry Experiments, Mechanics of Materials B, Polymer materials, Materials Characterization Techniques.		

VIII. Requirements for GE Required Courses

(I) Science Module

Course Code	Course Name	Credit	Lab Credits	Hours/week	Term	Language Instruction	Prerequisite	Dept
MA101B	Calculus I A	4		4	1/Fall	E	None	MATH
MA102B	Calculus II A	4		4	1/Spr	E	MA101B	MATH
MA107B	Linear Algebra B	4		4	1/Fall	E	None	MATH
PHY103B	General Physics I B	4		4	1/Fall	E	None	PHY
PHY105B	General Physics II B	4		4	1/Spr	E	PHY103B	PHY
CH101A	General Chemistry A	4		4	1/Spr or Fall	E	None	CHEM
CS102B	Introduction to Programming B	3	1	4	1/Spr or Fall	E	None	CSE
PHY104B	Experiments of Fundamental Physics	2	2	4	1/Spr or Fall	E	None	PHY
Total		29	3	32				

(II) Physical Education

Course Code	Course Name	Credits	Hours/week	Terms	Instruction language	Prerequisite	Dept.
GE131	Physic Education I	1	2	Fall	C	NA	PE Center
GE132	Physic Education II	1	2	Spr	C	NA	
GE231	Physic Education III	1	2	Fall	C	NA	
GE232	Physic Education IV	1	2	Spr	C	NA	
GE331	Physical Education V	0	/	Fall	C	NA	
GE332	Physical Education VI	0	/	Spr	C	NA	
GE431	Physical Education VII	0	/	Fall	C	NA	
GE432	Physical Education VIII	0	/	Spr	C	NA	
Total		4	8				

Note: All physical education courses are general required courses. For Semester 1-4, each course (GE131, GE132, GE231, GE232) counted as 1 credit; for semester 5-8, (GE331, GE332, GE431, GE432) are extracurriculum courses without no credits, details can be referred to Physical Education Curriculum Program of Sustech.

(III) Chinese Languages & Culture

Course Code	Course Name	Credit	Hours/week	Term	Language Instruction	Prerequisite	Dept
CLE008	Elementary Chinese I	2	4	1/Fall	B	NA	CLE
CLE009	Elementary Chinese II	2	4	1/Spr	B	CLE008	
CLE027	Intermediate Chinese I	2	4	2/Fall	B	CLE009	
CLE028	Intermediate Chinese II	2	4	2/Spr	B	CLE027	
CLE031	Advanced Chinese I	2	4	3/Fall	B	CLE028	
CLE032	Advanced Chinese II	2	4	3/Spr	B	CLE031	
CLE033	Chinese Culture	2	2	Spr/Fall	B/E	NA	CLE/ HUM / SSC
CLE034	Chinese History	2	2	Spr/Fall	B/E	NA	
Total		16	28				

(IV) English Language

Students will undertake the English Placement Test and be placed into three levels according to the result of the test and their performance in the National College Entrance Exam. Students at different levels are required to take the courses with a different credit value in total.

Level A: 6 credits; SUSTech English III, and English for Academic Purposes

Level B: 10 credits; SUSTech English II, SUSTech English III, and English for Academic Purposes

Level C: 14 credits; SUSTech English I, SUSTech English II, SUSTech English III, and English for Academic Purposes.

Course Code	Course Name	Credit	Hours/week	Language Instruction	Prerequisite	Dept
CLE021	SUSTech English I	4	4	E	NA	CLE
CLE022	SUSTech English II	4	4	E	CLE021	
CLE023	SUSTech English III	4	4	E	CLE022	
CLE030	English for Academic Purposes	2	2	E	CLE023	

IX Requirements for GE Elective Courses

Students are required to complete 4 credits for the Humanities Module and Social Sciences Module respectively, and 2 credits for the Music and Art Module. (Information about the available courses and the instruction language will be announced before the course selection session)

X. Major Course Arrangement

Table 1: Major Required Course (Foundational and Core Courses)

Course Category	Course Code	Course Name	Credit	Lab Credits	Hours/week	Term	take the course Advised term to	Instruction language	Prerequisite	Dept.
Major Foundational Courses	MSE102	Frontier Seminars in Materials Science and Engineering	1		1	Spr/ Fall	1/Fall	B	None	MSE
	ME102	CAD Engineering Drawing	3	1.5	4.5	Spr	1/Spr	E	None	ME
	MSE205	Fundamentals of Circuits and Electronics	3		3	Fall	2/Fall	E	MA102B MA107B PHY105B	MSE
	EE201-17L	Analog Circuit Laboratory	1	1	2	Fall	2/Fall	E	MSE205	EE
	MSE001	Fundamentals of Materials Science and Engineering*	3		3	Spr/ Fall	2/Fall	E	PHY105B CH101A	MSE
	MSE002	Experiments for Fundamentals of Materials Science and Engineering*	1	1	2	Spr/ Fall	2/Fall	E	PHY105B CH101A	MSE
	MSE203	Crystallography	2		2	Fall	2/Fall	E	MA102B MA107B PHY105B	MSE
	MA212	Probability and Statistics	3		3	Spr/ Fall	2/Fall	E	MA102B	MA
	MSE202	Physical Chemistry*	3		3	Spr	2/Spr	E	MA102B CH101A	MSE
	MSE204	Physical Chemistry Experiments*	1	1	2	Spr	2/Spr	E	MA102B CH101A	MSE
	MSE213	Mechanics of Materials B	3		3	Spr	2/Spr	E	MSE001 MSE002	MSE
	MSE306	Materials Characterization Techniques	3		3	Spr	2/Spr	E	MSE001 MSE002	MSE
	MSE301	Materials Chemistry	3		3	Fall	3/Fall	E	MSE001 MSE002	MSE
	MSE347	Seminars Frontiers of Modern Materials Science and Technology	1		1	Fall	3/Fall	B	MSE001 MSE002	MSE
	MSE307	Comprehensive Experiments of Materials I	4	4	8	Fall	3/Fall	E	MSE203 MSE213	MSE
	MSE345	Experiments for Advanced Materials Science and Engineering I	1	1	2	Fall	3/Fall	E	MSE002	MSE
	MSE346	Experiments for Advanced Materials Science and Engineering II	1	1	2	Spr	3/Spr	E	MSE345	MSE
	MSE304	Comprehensive Experiments of	4	4	8	Spr	3/Spr	E	MSE307	MSE

		Materials II								
MSE328	Physics of Materials	3		3	Spr	3/Spr	E	MSE001 MSE002 MSE203	MSE	
Total		44	14.5	58.5						
Notes: * Please choose MSE001 and MSE002 at the same semester; Please choose MSE202 and MSE204 at the same semester.										
Major Core Courses	Materials Chemistry Track									
	MSE210	General Organic Chemistry*	3		3	Spr	2/Spr	E	CH101A	MSE
	MSE212	Basic Experiments for Organic Chemistry*	1	1	2	Spr	2/Spr	E	CH101A	MSE
	MSE313	#Polymer Materials	3		3	Spr	2/Spr	E	MSE001 MSE002	MSE
	MSE315	#Physical Metallurgy	3		3	Fall	3/Fall	E	MSE001 MSE002	MSE
	MSE317	#Ceramic Materials	3		3	Fall	3/Fall	E	MSE001 MSE002	MSE
	MSE332	Fundamentals of Electrochemistry	3		3	Spr	3/Spr	E	MSE202	MSE
	MSE342	Crystal Chemistry	3		3	Spr	3/Spr	E	MSE001	MSE
	MSE338	Biomaterials*	2		2	Spr	3/Spr	E	MSE001	MSE
	MSE340	Experiments for Biomaterials*	2	2	4	Spr	3/Spr	E	MSE002	MSE
	Total		23	3	26					
	Materials Physics Track									
	MSE311	#Thermodynamics of Materials	3		3	Fall	3/Fall	E	MA102B MA107B MSE001 MSE002	MSE
	MSE313	#Polymer Materials	3		3	Spr	2/Spr	E	MSE001 MSE002	MSE
	MSE315	#Physical Metallurgy	3		3	Fall	3/Fall	E	MSE001 MSE002	MSE
	MSE317	#Ceramic Materials	3		3	Fall	3/Fall	E	MSE001 MSE002	MSE
	MSE338	Biomaterials*	2		2	Spr	3/Spr	E	MSE001	MSE
	MSE340	Experiments for Biomaterials*	2	2	4	Spr	3/Spr	E	MSE002	MSE
	MSE310	Semiconducting Materials, Devices and Technology	3		3	Spr	3/Spr	E	MSE001 MSE002	MSE
	MSE5001	Applied Quantum Mechanics	3		3	Fall	3/Fall	E	PHY105B	MSE
Total		22	2	24						
Notes: The major core courses are divided into tracks: Materials Physics Track and Materials Chemistry Track. Under the guidance of the research tutor, the students should choose at least 13 credits in one direction, and the courses in the other direction can be regarded as major elective courses' credits. # Please at least choose two from MSE313, MSE317, MSE315; MSE311 is a compulsory course for the students who choose Materials Physics Track. * Please choose MSE210 and MSE212 at the same semester; Please choose MSE338 and MSE340 at the same semester.										

Practice-Based Courses	MSE480	Projects of Science and Technology	2	2	16	Spr/ Fall	Spr/Fall	B	None	MSE
	MSE470-17	Industrial Practice	4	4	16	Smr	3/Smr	B	None	MSE
	MSE490	Thesis (Graduation Project)*	8	8	16	Spr	4/Spr	B	None	MSE
	Total		14	14	48					
Notes: *Students who have completed Comprehensive Design I&II (COE491 & COE492) are not required to take the MSE490 Thesis (Graduation Project).										

Table 2: Major Elective Courses

Course Code	Course Name	Credit	Lab Credits	Hours/week	Term	take the course Advised term to	Instruction language	Prerequisite	Dept.
BIO102B	Introduction to Life Science	3		3	Spr/Fall	2/3/Spr or Fall	E	None	BIO
MSE460	Introduction of Materials Science and Engineering	1	0.5	1.5	Smr	1/2/Smr	E	None	MSE
MSES101	Nanomaterials and its Fabrication Methods	1		1	Smr	1/2/Smr	B	None	MSE
MSES102	Introduction to Soft Matter	1		1	Smr	1/2/Smr	E	None	MSE
MSES104	Materials Characterization	1		1	Smr	1/2/Smr	E	PHY105B	MSE
MSE321	#Advanced Materials Research I	1	1	2	Spr/Fall	2Spr/3Fall	B	None	MSE
EE202-17	Digital Circuit	3		3	Spr	2/Spr	E	PHY105B	EE
EE202-17 L	Digital Circuit Laboratory	1	1	2	Spr	2/Spr	E	EE202-17	EE
MSES105	Nanoprobes in Material Science, Physics and Chemistry	2		2	Smr	2/Smr	E	None	MSE
MSES103	Introduction to Nanotechnology	1		1	Smr	2/Smr	E	None	MSE
MAE309	Principle of Transport Phenomena	3		3	Fall	3/Fall	E	MA102B	MAE
MSE325	Functional Polymers	3		3	Fall	3/Fall	B	None	MSE
MSE327	Photonic Materials and Metamaterials	3		3	Fall	3/Fall	E	PHY105B	MSE
MSE413	3D Printing and Lase-based Additive Manufacturing	3		3	Fall	3/Fall	E	None	MSE
MSE334	Introduction to Energy Materials	2		2	Spr	3/Spr	E	MSE001	MSE
MSE322	Composite Materials	3		3	Spr	3/Spr	E	MSE213	MSE
MSE318	#Advanced Materials Research II	1	1	2	Spr	3/Spr	B	MSE321	MSE
MSE320	Introduction to Photovoltaics and Photo-thermal	3		3	Spr	3/Spr	E	MSE205(or EE201-17)	MSE
MSE330-16	Powder Metallurgy an 3D Printing of Metallic Materials	3		3	Spr	3/Spr	E	MSE315	MSE
MSE5025	Materials Science and Artificial Intelligence	3		3	Spr	3/Spr	E	PHY105B	MSE
MSE343	Computational Materials Science	3	1	4	Spr	3/Spr	E	MSE203	MSE
MSE401	#Advanced Materials Research III	1	1	2	Fall	4/Fall	B	MSE318	MSE
MSE407	Advanced Thin Film Technology	3		3	Fall	4/Fall	E	MSE001	MSE
ME103	Awareness Practical of Manufacturing Engineering	3	2	5	Fall	4/Fall	B	None	ME
EE419	Biosensors	3	1	4	Fall	4/Fall	E	None	EE

PHY429	Advanced Electron Microscopy	3	1	4	Fall	4/Fall	B	PHY321-15	PHY
Total		58	9.5	67.5					
Notes: At least 8 credits are required; #MSE321、MSE318、MSE401 are compulsory courses.									

Table 3: Overview of Practice-Based Courses

Course Code	Course Name	Credit	Lab Credits	Hours/week	Term	take the course Advised term to	Instruction language	Prerequisite	Dept.
ME102	CAD Engineering Drawing	3	1.5	4.5	Spr	1/Spr	E	None	ME
EE201-17L	Analog Circuit Laboratory	1	1	2	Fall	2/Fall	E	MSE205	EE
MSE002	Experiments for Fundamentals of Materials Science	1	1	2	Spr/Fall	2/Fall	E	PHY105B CH101A	MS E
MSE204	Physical Chemistry Experiments	1	1	2	Spr	2/Spr	E	None	MS E
MSE321	Advanced Materials Research I	1	1	2	Spr/Fall	2Spr/3Fall	B	None	MS E
EE202-17L	Digital Circuit Laboratory	1	1	2	Spr	2/Spr	C	EE202-17	EE
MSE212	Basic Experiments for Organic Chemistry	1	1	2	Spr	2/Spr	E	CH101A	MS E
MSE460	Introduction of Materials Science and Engineering	1	0.5	1.5	Smr	1/2/Smr	E	None	MS E
MSE307	Comprehensive Experiments of Materials I	4	4	8	Fall	3/Fall	E	MSE203 MSE213	MS E
MSE345	Experiments for Advanced Materials Science and Engineering I	1	1	2	Fall	3/Fall	E	MSE002	MS E
MSE346	Experiments for Advanced Materials Science and Engineering II	1	1	2	Spr	3/Spr	E	MSE345	MS E
MSE340	Experiments for Biomaterials	2	2	4	Spr	3/Spr	E	MSE002	MS E
MSE318	Advanced Materials Research II	1	1	2	Spr	3/Spr	B	MSE321	MS E
MSE304	Comprehensive Experiments of Materials II	4	4	8	Spr	3/Spr	E	MSE307	MS E
MSE343	Computational Materials Science	3	1	4	Spr	3/Spr	E	MSE203	MS E
MSE401	Advanced Materials Research III	1	1	2	Fall	4/Fall	B	MSE318	MS E
EE419	Biosensors	3	1	4	Fall	4/Fall	E	None	EE
PHY429	Advanced Electron Microscopy	3	1	4	Fall	4/Fall	B	PHY321-15	PH Y
MSE470-17	Industrial Practice	4	4	16	Smr	3/Smr	B	None	MS E
MSE480	Projects of Science and Technology	2	2	16	Spr/Fall	Spr/Fall	B	None	MS E
MSE490	Thesis (Graduation Project)	8	8	16	Spr	4/Spr	B	None	MS E
Total		47	39	106					

Table 4: Overview of Course Hours and Credits**Materials Chemistry Track**

Course Category	Total Course Hours	Total Credits	Credit Requirements	Percentage of the Total*
General Education (GE) Required Courses (not including English courses)	1088	49	49	35.51%
General Education (GE) Elective Courses			10	7.25%
Major Foundational Courses	944	44	44	31.88%
Major Core Courses	416	23	13	9.42%
Major Elective Courses	1080	55	8	5.80%
Research Projects, Internship and Undergraduate Thesis/Projects	768	14	14	10.14%
Total (not including English courses)	4296	185	138	

* Percentage of the total= Credit requirements of each line / Total credit requirements.

Materials Physics Track

Course Category	Total Course Hours	Total Credits	Credit Requirements	Percentage of the Total*
General Education (GE) Required Courses (not including English courses)	1088	49	49	35.51%
General Education (GE) Elective Courses			10	7.25%
Major Foundational Courses	944	44	44	31.88%
Major Core Courses	384	22	13	9.42%
Major Elective Courses	1080	55	8	5.80%
Research Projects, Internship and Undergraduate Thesis/Projects	768	14	14	10.14%
Total (not including English courses)	4296	185	138	

* Percentage of the total= Credit requirements of each line / Total credit requirements.

Curriculum Structure of Materials Chemistry Track

General Education Required Courses (49 credits)

Calculus I A
 Calculus II A
 Linear Algebra B
 General Physics I B
 General Physics II B
 General Chemistry A
 Introduction to Programming B
 Experiments of Fundamental Physics
 Physical Education I
 Physical Education II
 Physical Education III
 Physical Education IV
 Elementary Chinese I
 Elementary Chinese II
 Intermediate Chinese I
 Intermediate Chinese II
 Advanced Chinese I
 Advanced Chinese II
 Chinese Culture
 Chinese History

Major Foundational Required Courses (44 credits)

Frontier Seminars in Materials Science and Engineering
 CAD Engineering Drawing
 Fundamentals of Circuits and Electronics
 Analog Circuit Laboratory
 Fundamentals of Materials Science and Engineering
 Experiments for Fundamentals of Materials Science and Engineering
 Crystallography
 Probability and Statistics
 Physical Chemistry
 Physical Chemistry Experiments
 Mechanics of Materials B
 Materials Characterization Techniques
 Materials Chemistry
 Seminars Frontiers of Modern Materials Science and Technology
 Comprehensive Experiments of Materials I
 Experiments for Advanced Materials Science and Engineering I
 Experiments for Advanced Materials Science and Engineering II
 Comprehensive Experiments of Materials II
 Physics of Materials

Practice-Based Required Courses (14 credits)

Industrial Practice
 Projects of Science and Technology
 Thesis (Graduation Project)*

* Students who have completed Comprehensive Design I&II are not required to take the Thesis (Graduation Project).

Major Core Courses (at least 13 credits)

General Organic Chemistry
 Basic Experiments for Organic Chemistry
 Polymer Materials
 Physical Metallurgy
 Ceramic Materials
 Fundamentals of Electrochemistry
 Crystal Chemistry
 Biomaterials
 Experiments for Biomaterials

at least choose two

Major Elective Courses (at least 8 credits)

Introduction to Life Science
 Advanced Materials Research I/II/III (Compulsory Courses)
 Introduction of Materials Science and Engineering
 Nanomaterials and its Fabrication Methods
 Introduction to Soft Matter
 Materials Characterization
 Nanoprobes in Material Science, Physics and Chemistry
 Introduction to Nanotechnology
 Principle of Transport Phenomena
 Functional Polymers
 Photonic Materials and Metamaterials
 3D Printing and Laser-based Additive Manufacturing
 Introduction to Energy Materials
 Composite Materials
 Introduction to Photovoltaics and Photo-thermal
 Powder Metallurgy and 3D Printing of Metallic Materials
 Materials Genomics
 Computational Materials Science
 Advanced Thin Film Technology
 Awareness Practical of Manufacturing Engineering
 Biosensors
 Advanced Electron Microscopy
 Digital Circuit
 Digital Circuit Laboratory

The minimum credit requirement for graduation: 138 credits (including 10 credits for GE Elective Courses, not including English courses)

Curriculum Structure of Materials Physics Track

General Education Required Courses (49 credits)

Calculus I A
 Calculus II A
 Linear Algebra B
 General Physics I B
 General Physics II B
 General Chemistry A
 Introduction to Programming B
 Experiments of Fundamental Physics
 Physical Education I
 Physical Education II
 Physical Education III
 Physical Education IV
 Elementary Chinese I
 Elementary Chinese II
 Intermediate Chinese I
 Intermediate Chinese II
 Advanced Chinese I
 Advanced Chinese II
 Chinese Culture
 Chinese History

Major Foundational Required Courses (44 credits)

Frontier Seminars in Materials Science and Engineering
 CAD Engineering Drawing
 Fundamentals of Circuits and Electronics
 Analog Circuit Laboratory
 Fundamentals of Materials Science and Engineering
 Experiments for Fundamentals of Materials Science and Engineering
 Crystallography
 Probability and Statistics
 Physical Chemistry
 Physical Chemistry Experiments
 Mechanics of Materials B
 Materials Characterization Techniques
 Materials Chemistry
 Seminars Frontiers of Modern Materials Science and Technology
 Comprehensive Experiments of Materials I
 Experiments for Advanced Materials Science and Engineering I
 Experiments for Advanced Materials Science and Engineering II
 Comprehensive Experiments of Materials II
 Physics of Materials

Practice-Based Required Courses (14 credits)

Industrial Practice
 Projects of Science and Technology
 Thesis (Graduation Project)*

* Students who have completed Comprehensive Design I&II are not required to take the Thesis (Graduation Project).

Major Core Courses (at least 13 credits)

Thermodynamics of Materials (Compulsory Course)
 Semiconducting Materials, Devices and Technology
 Polymer Materials
 Physical Metallurgy } at least choose two
 Ceramic Materials
 Applied Quantum Mechanics
 Biomaterials
 Experiments for Biomaterials

Major Elective Courses (at least 8 credits)

Introduction to Life Science
 Advanced Materials Research I/II/III (Compulsory Courses)
 Introduction of Materials Science and Engineering
 Nanomaterials and its Fabrication Methods
 Introduction to Soft Matter
 Materials Characterization
 Nanoprobes in material science, physics and chemistry
 Introduction to Nanotechnology
 Principle of Transport Phenomena
 Functional Polymers
 Photonic Materials and Metamaterials
 3D Printing and Lase-based Additive Manufacturing
 Introduction to Energy Materials
 Composite Materials
 Introduction to Photovoltaics and Photo-thermal
 Powder metallurgy an 3D printing of metallic materials
 Materials Genomics
 Computational Materials Science
 Advanced Thin Film Technology
 Awareness Practical of Manufacturing Engineering
 Biosensors
 Advanced Electron Microscopy
 Digital Circuit
 Digital Circuit Laboratory

The minimum credit requirement for graduation: 138 credits (including 10 credits for GE Elective Courses, not including English courses)