

Program Director's Signature:

Date:

Department Chair's Signature:

Date:

Department of Materials Science and Engineering

Program of Materials Science and Engineering (2019)

I. Introduction

The materials science and engineering are based on physics and chemistry, learning the basic theories and practical skills related to materials, and applying them to the disciplines of synthesis, preparation, structure, performance and application of materials. The Materials Science and Engineering at SUSTech focuses on the development of materials processing and manufacturing, energy and environmental materials, functional materials, biological and medical materials and electronic information materials. The undergraduate training program at the Department of Materials Science and Engineering is the student-centered, all-round integrated education model of knowledge, quality, and ability, and promotes research-based teaching to form a teaching process in which teachers and students seek truth together. In accordance with the three-level teaching platform of "professional foundation, professional foundation and professional direction" of materials, the curriculum construction will be carried out at different levels; the basic courses will be driven by the curriculum construction of materials science and engineering, physical chemistry and material chemistry; The construction of major core courses will be guided by the social demand and the goal of talent cultivation, and comprehensive professional elective courses will be provided for expanding the professional knowledge of senior undergraduates.

II. Objectives and Learning Outcomes

(I). Objectives

Materials Science and Engineering will cultivate high-quality science and technology talents who have firm theory knowledge of materials science and engineering and a sense of innovation and humanities and social sciences. These graduates are expected to engage in researching and development of materials, teaching, production and management in the field of materials processing and manufacturing, energy and environmental materials, biological and medical materials and electronic information materials.

I). Knowledge: Master the basic knowledge of materials science, material engineering, material analysis methods, and the necessary engineering basic knowledge.

II). Abilities: Be able to use the basic knowledge of materials science and engineering to conduct material design and preparation process design, improve material performance, quality and life, and develop new materials and new processes.

III). Engineering: Engage in research and development of materials, teaching, production and management in the field of materials processing and manufacturing, energy and environmental materials, biological and medical materials and electronic information materials.

IV). Other Qualities: Have a sense of innovation and teamwork, have a humanities and social science literacy and a sense of social responsibility; understand the country's guidelines, policies and

regulations related to the materials design, manufacturing, research and development etc., have a sustainable development concept and follow engineering ethics.

(II). Learning Outcomes

I). An ability to apply engineering knowledge

An ability to use mathematics, natural science, engineering fundamentals and professional knowledge to solve complex engineering problems in materials and related fields.

II). An ability to analyze engineering problems

An ability to identify, formulate, and analyze the complex materials engineering problems using the basic principles of mathematics, natural science and engineering science and obtain the effective conclusions through the literature research.

III). An ability to design / solve problems

An ability to design solutions of complex materials engineering problems creatively; to design systems, components or processes to meet desired needs within realistic constraints such as social, health, safety, law, culture and environment.

IV). An ability to study engineering problems

An ability to study complex materials engineering problems based on scientific principles adopting scientific methods, including designing experiments as well as analyzing and interpreting data, and finally drawing reasonable and effective conclusions after the comprehensive analysis.

V). An ability to use modern tools

An ability to develop, select and use appropriate technology, resources, modern engineering tools and information technology tools during dealing with complex materials engineering problems, including the prediction and simulation of complex engineering problems, and recognition of their limitations.

VI). An ability to analyze and evaluate the relationship between engineering and society.

An ability to analyze and evaluate the effect of engineering on social, health, safety, law and culture reasonably based on engineering knowledge and understand the responsibilities of engineers.

VII). Being awareness of environmental protection and sustainable development.

An ability to understand and evaluate the effect of engineering practice of complex materials engineering problems on environmental and social sustainable development.

VIII). Abiding by professional standers and ethics

Having the quality of humanities and social science literacy, social responsibility and law-abiding; an ability to understand and comply with engineering ethics and regulation and fulfill the responsibility.

IX). An ability to function on multidisciplinary teams

Having healthy psychological quality, innovative and pragmatic spirit and quality of team cooperation; an ability to function as individual person, team members and team leader on multidisciplinary teams.

X). An ability to communicate effectively

An ability to communicate with the industry peers and the public about the complex materials engineering problems, including writing reports and designing documents, presentations, or responding to instructions; to possess a certain international perspective, can communicate and exchange opinions under the cross cultural background.

XI). An ability of project management skills

An ability to understand and master the principles of engineering management and economic decision-making methods, and apply them in multi-disciplines.

XII). A recognition of the need for, and an ability to engage in life-long learning.

III. Study Length and Graduation Requirements

Study length: 4 years

Degree conferred: Bachelor of Materials Science and Engineering

The minimum credit requirement for graduation: 143 credits (not including English courses);

Category	Module	Minimum Credit Requirement
General Education (GE) Required Courses (55 credits)	Science	29
	Military Training and Physical Education	8
	Ideological and Political Education	16
	Writing and Communication Skills	2
General Education (GE) Elective Courses (10 credits)	Humanities	4
	Social Sciences	4
	Arts	2
	Science	0
Major Course (78 credits)	Major Foundational Courses	44
	Major Core Courses	13
	Major Elective Courses	7
	Research Projects, Internship and Undergraduate Thesis / Projects	14
Total (not including English courses)		143

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-1/2, Experiments for Advanced Materials Science and Engineering-1/2, 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 (see Table 3).

VII. Pre-requisites for Major Declaration

Major Declaration Time	Course Code	Course Name	Prerequisite
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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
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MA101B	Calculus I A	4		4	Spr/Fall	1/Fall	None	MATH
MA102B	Calculus II A	4		4	Spr/Fall	1/Spr	MA101B	MATH
MA107B	Linear Algebra B	4		4	Spr/Fall	1/Fall	None	MATH
PHY103B	General Physics I B	4		4	Spr/Fall	1/Fall	None	PHY
PHY105B	General Physics II B	4		4	Spr/Fall	1/Spr	PHY103B	PHY
CH101A	General Chemistry A	4		4	Spr/Fall	1/Spr or Fall	None	CHEM
CS102B	Introduction to Programming B	3	1	4	Spr/Fall	1/Spr or Fall	None	CSE
PHY104B	Experiments of Fundamental Physics	2	2	4	Spr/Fall	1/Spr or Fall	None	PHY
Total		29	3	32				

(II) Military Training and Physical Education

Course Code	Course Name	Credit	Lab Credits	Hours/week	Term	Language Instruction	Prerequisite	Dept
GE102	Military Theory	2						
GE104	Military Skills	2						
GE131	Physical Education I	1		2	1/Fall	C	NA	PE Center
GE132	Physical Education II	1		2	1/Spr	C	NA	
GE231	Physical Education III	1		2	2/Fall	C	NA	
GE232	Physical Education IV	1		2	2/Spr	C	NA	
Total		8		8				

(III) Ideological and Political Education

Course Code	Course Name	Credit	Lab Credits	Hours/week	Term	Language Instruction	Prerequisite	Dept
IPE105	Situation and Policy	2		2	Fall/Spr	C		IPE Center
IPE103	The Outline of Modern and Contemporary History of China	2		2	Fall/Spr	C		
IPE101	Cultivation of Ethic Thought and Fundamentals of Law	2		2	Fall/Spr	C		

IPE104	Mao Zedong Thought and Introduction to the Theoretical System of Socialism with Chinese Characteristic	3		3	Fall/Spr	C		
IPE102	The Basic Principles of Marxism	2		2	Fall/Spr	C		
IPE107	Practice Course of the Basic Principles of Marxism	1	1	2	Fall/Spr/Summer	C		
IPE108	Practice Course of Introduction to Mao Zedong Thought and Theoretical System of Socialism with Chinese Characteristic	3	3	6	Fall/Spr/Summer	C		
IPE106	Practice Course of Cultivation of Ethics and Fundamentals of Law	1	1	2	Fall/Spr/Summer	C		
Total		16	5	21				

(IV) Writing and Communication Skills by Chinese

课程编号	课程名称 (中英文名)	学分	其中实验学分	周学时	开课学期	建议修课学期	先修课程	开课院系
HUM032	Writing and Communication Skills	2		2	Fall/Spr	1/Fall/Spr	None	HUM Center
Total		2		2				

(V) English Language

All students are required to undertake the English Placement Test before selecting courses, based on which students will be assigned to 3 levels to be ready for the courses with English as the instruction language.

SUSTech English III , English for Academic Purposes for Level A.

SUSTech English II, SUSTech English III, English for Academic Purposes for Level B.

SUSTech English I, SUSTech English II, SUSTech English III, English for Academic for Level C.

Course Code	Course Name	Credit	Hours/week	Instruction Language	Prerequisite
CLE021	SUSTech English I	4	4	E	NA
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)

Category Course	Course Code	Course Name	Credits	Lab Credits	Hours/week	Terms	course to take the Advised term	language Instruction	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	5	Spr	1/Spr	C	None	ME
	MSE205	Fundamentals of Circuits and Electronics	3		3	Fall	2/Fall	C	MA102B MA107B PHY105 B	MSE
	EE201-1 7L	Analog Circuit Laboratory	1	1	2	Fall	2/Fall	C	MSE205	EE
	MSE001	Fundamentals of Materials Science and Engineering*	3		3	Spr/ Fall	2/Fall	E	PHY105 B CH101A	MSE
	MSE002	Experiments for Fundamentals of Materials Science and Engineering*	1	1	2	Spr/ Fall	2/Fall	E	PHY105 B CH101A	MSE
	MSE203	Crystallography	2		2	Fall	2/Fall	B	MA102B MA107B PHY105 B	MSE
	MA212	Probability and Statistics	3		3	Spr/ Fall	2/Fall	B	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-1	4	4	8	Fall	3/Fall	E	MSE203 MSE213	MSE
	MSE345	Experiments for Advanced Materials Science and Engineering 1	1	1	2	Fall	3/Fall	E	MSE002	MSE
	MSE346	Experiments for Advanced Materials Science and	1	1	2	Spr	3/Spr	E	MSE345	MSE

		Engineering 2									
MSE304		Comprehensive Experiments of Materials-2	4	4	8	Spr	3/Spr	E	MSE307	MSE	
MSE328		Physics of Materials	3		3	Spr	3/Spr	E	MSE001 MSE002 MSE203	MSE	
Total			44	14.5	59						
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
	MSE344		Applied Quantum Mechanics	3		3	Fall	3/Fall	B	PHY105 B	MSE
Total			22	2	24						

<p>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.</p> <p># Please at least choose two from MSE313 , MSE317 , MSE315; MSE311 is a compulsory course for the students who choose Materials Physics Track.</p> <p>* Please choose MSE210 and MSE212 at the same semester; Please choose MSE338 and MSE340 at the same semester.</p>											
Practice-Based Courses	MSE470-17	Industrial Practice	4	4	16	Summer	3/Summer	B	None	MSE	
	MSE480	Projects of Science and Technology	2	2	16	Spr/Fall	Spr/Fall	B	None	MSE	
	MSE490	Thesis (Graduation Project)*	8	8	16	Spr	4/Spr	B	None	MSE	
	Total		14	14	48						
	<p>Notes: * Students who have completed Comprehensive Design I&II (COE491 & COE492) are not required to take the MSE490 Thesis (Graduation Project).</p>										

Table 2: Major Elective Courses

Course Code	Course Name	Credits	Lab Credits	Hours/week	Terms	course to take the Advised term	language Instruction	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	Summer	1/2/Summer	E	None	MSE
MSES101	Nanomaterials and its Fabrication Methods	1		1	Summer	1/2/Summer	B	None	MSE
MSES102	Introduction to Soft Matter	1		1	Summer	1/2/Summer	E	None	MSE
MSES104	Materials Characterization	1		1	Summer	1/2/Summer	E	PHY105B	MSE
MSE321	#Advanced Materials Research 1	1	1	2	Spr/Fall	2Spr/3Fall	B	None	MSE
EE202-17	Digital Circuit	3		3	Spr	2/Spr	C	PHY105B	EE
EE202-17L	Digital Circuit Laboratory	1	1	2	Spr	2/Spr	C	EE202-17	EE
MSE450	Distinguish Lectures for Innovation and Entrepreneurship in Materials Science and Engineering	1		1	Summer	2/Summer	B	None	MSE
MSES105	Nanoprobes in Material Science, Physics and Chemistry	2		2	Summer	2/Summer	E	None	MSE
MSES103	Introduction to Nanotechnology	1		1	Summer	2/Summer	E	None	MSE

MAE309	Principle of Transport Phenomena	3		3	Fall	3/Fall	中	MA102B	MAE
MSE325	Functional Polymers	3		3	Fall	3/Fall	E	None	MSE
MSE327	Photonic Materials and Metamaterials	3		3	Fall	3/Fall	E	PHY105B	MSE
MSE413	3D Printing and Laser-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 2	1	1	2	Spr	3/Spr	B	MSE321	MSE
MSE320	Introduction to Photovoltaics and Photo-thermal	3		3	Spr	3/Spr	B	MSE205(or EE201)	MSE
MSE330	Powder Metallurgy and 3D Printing of Metallic Materials	3		3	Spr	3/Spr	E	MSE315	MSE
MSE348	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 3	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		59	9.5	68.5					
<p>Notes: At least 7 credits ; #MSE321、 MSE318、 MSE401 are compulsory courses.</p>									

Table 3: Overview of Practice-Based Courses

Course Code	Course Name	Credits	Lab Credits	Hours/week	Terms	course to take the Advised term	language Instruction	Prerequisite	Dept.
ME102	CAD Engineering Drawing	3	1.5	5	Spr	1/Spr	C	None	ME
EE201-17L	Analog Circuit Laboratory	1	1	2	Fall	2/Fall	C	MSE205	EE
MSE002	Experiments for Fundamentals of Materials Science	1	1	2	Spr/Fall	2/Fall	E	PHY105B CH101A	MSE
MSE204	Physical Chemistry Experiments	1	1	2	Spr	2/Spr	E	None	MSE
MSE321	Advanced Materials Research 1	1	1	2	Spr/Fall	2Spr/3Fall	B	None	MSE
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	MSE
MSE460	Introduction of Materials Science and Engineering	1	0.5	1.5	Summer	1/2/Summer	E	None	MSE
MSE307	Comprehensive Experiments of Materials-1	4	4	8	Fall	3/Fall	E	MSE203 MSE213	MSE
MSE345	Experiments for Advanced Materials Science and Engineering 1	1	1	2	Fall	3/Fall	E	MSE002	MSE
MSE346	Experiments for Advanced Materials Science and Engineering 2	1	1	2	Spr	3/Spr	E	MSE345	MSE
MSE340	Experiments for Biomaterials	2	2	4	Spr	3/Spr	E	MSE002	MSE
MSE318	Advanced Materials Research 2	1	1	2	Spr	3/Spr	B	MSE321	MSE
MSE304	Comprehensive Experiments of Materials-2	4	4	8	Spr	3/Spr	E	MSE307	MSE
MSE470-17	Industrial Practice	4	4	16	Summer	3/Summer	B	None	MSE
MSE343	Computational Materials Science	3	1	4	Spr	3/Spr	E	MSE203	MSE
MSE401	Advanced Materials Research 3	1	1	2	Fall	4/Fall	B	MSE318	MSE
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
MSE480	Projects of Science and Technology	2	2	16	Spr/Fall	Spr/Fall	B	None	MSE

MSE490	Thesis (Graduation Project)	8	8	16	Spr	4/Spr	B	None	MSE
Total		47	39	106.5					

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)	1008	55	55	38.4%
General Education (GE) Elective Courses	/	/	10	7.0%
Major Foundational Courses	944	44	44	30.8%
Major Core Courses	416	23	13	9.1%
Major Elective Courses	1096	56	7	4.9%
Research Projects, Internship and Undergraduate Thesis/Projects	768	14	14	9.8%
Total (not including English courses)	4232	192	143	

* 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)	1008	55	55	38.4%
General Education (GE) Elective Courses	/	/	10	7.0%
Major Foundational Courses	944	44	44	30.8%
Major Core Courses	384	22	13	9.1%
Major Elective Courses	1096	56	7	4.9%
Research Projects, Internship and Undergraduate Thesis/Projects	768	14	14	9.8%
Total (not including English courses)	4232	192	143	

Curriculum Structure of Materials Chemistry Track

General Education Required Courses (55 credits)

Calculus A I/II
 Linear Algebra B
 General Physics B I/II
 General Chemistry A
 Introduction to Programming B
 Experiments of Fundamental Physics
 Writing and Communication Skills
 Situation and Policy
 The Outline of Modern and Contemporary History of China
 Cultivation of Ethic Thought and Fundamentals of Law
 Mao Zedong Thought and Introduction to the Theoretical System of Socialism with Chinese Characteristic
 The Basic Principles of Marxism
 Practice Course of the Basic Principles of Marxism
 Practice Course of Introduction to Mao Zedong Thought and Theoretical System of Socialism with Chinese Characteristic
 Practice Course of Cultivation of Ethics and Fundamentals of Law
 Physical Education I/II/III/IV
 Military Theory
 Military Skills

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-1
 Experiments for Advanced Materials Science and Engineering-1
 Experiments for Advanced Materials Science and Engineering-2
 Comprehensive Experiments of Materials-2
 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 7 credits)

Introduction to Life Science
 Advanced Materials Research 1/2/3 (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 Science and Artificial Intelligence
 Computational Materials Science
 Advanced Thin Film Technology
 Awareness Practical of Manufacturing Engineering
 Biosensors
 Advanced Electron Microscopy
 Digital Circuit
 Digital Circuit Laboratory
 Distinguish Lectures for Innovation and Entrepreneurship in Materials Science and Engineering

The minimum credit requirement for graduation: 143 credits (including 10 credits for GE Elective Courses, not including English courses)

Recommended Plan for Courses Selection of Materials Science and Engineering Program (not including English courses)

Declare major at the end of First Year

	First Year	Credits	Second Year	Credits	Third Year	Credits	Fourth Year	Credits
Fall	Calculus I A	4	Fundamentals of Circuits and Electronics	3	Seminars Frontiers of Modern Materials Science and Technology	1	Advanced Materials Research-3	1
	Linear Algebra B	4	Analog Circuit Laboratory	1	Materials Chemistry	3	Practice-Based Courses	2
	General Physics I B	4	Fundamentals of Materials Science and Engineering	3	Comprehensive Experiments of Materials-1	4	Total	3
	Frontier Seminars in Materials Science and Engineering	1	Experiments for Fundamentals of Materials Science and Engineering	1	Experiments for Advanced Materials Science and Engineering-1	1		
	Cultivation of Ethic Thought and Fundamentals of Law	2	Crystallography	2	Physical Metallurgy	3		
	Physical Education I	1	Introduction to Programming B	3	Ceramic Materials	3		
	Total	16	Probability and Statistics	3	Total	15		
			The Basic Principles of Marxism	2				
			Physical Education III	1				
			Total	19				
Spring	Calculus II A	4	Physical Chemistry	3	Comprehensive Experiments of Materials-2	4	Thesis (Graduation Project)	8
	General Physics II B	4	Physical Chemistry Experiments	1	Physics of Materials	3	Total	8
	General Chemistry A	4	Mechanics of Materials B	3	Experiments for Advanced Materials Science	1		
	Experiments of Fundamental Physics	2	Materials Characterization Techniques	3	Advanced Materials Research-2	1		
	Writing and Communication Skills	2	Polymer Materials	3	Advanced Chinese II	2		
	The Outline of Modern and Contemporary History of China	2	Advanced Materials Research-1	1	Crystal Chemistry (optional)	3		
Physical Education II	1	General Organic Chemistry (optional)	3	Biomaterials (optional)	2			

	Total	19	Basic Experiments for Organic Chemistry (optional)	1	Experiments for Biomaterials (optional)	2		
			Mao Zedong Thought and Introduction	3	Fundamentals of Electrochemistry	3		
			Physical Education IV	1	Total	21		
			Total	22				
Summer	Practice Course of Cultivation of Ethics and Fundamentals of Law	1	Practice Course of the Basic Principles of Marxism	1	Industrial Practice	4		
	CAD Engineering Drawing	3	Practice Course of Introduction to Mao Zedong Thought and Theoretical System of Socialism with Chinese Characteristic	3	Total	4		
	Total	4	Total	4				

Recommended Plan for Courses Selection of Materials Science and Engineering Program (not including English courses)

Declare major at the end of Second Year

	First Year	Credits	Second Year	Credits	Third Year	Credits	Fourth Year	Credits
Fall	Calculus I A	4	Fundamentals of Circuits and Electronics	3	Seminars Frontiers of Modern Materials Science and Technology	1	Advanced Materials Research-3	1
	Linear Algebra B	4	Analog Circuit Laboratory	1	Materials Chemistry	3	Practice-Based Courses	2
	General Physics I B	4	Fundamentals of Materials Science and Engineering	3	Comprehensive Experiments of Materials-1	4	Total	3
	Frontier Seminars in Materials Science and Engineering	1	Experiments for Fundamentals of Materials Science and Engineering	1	Experiments for Advanced Materials Science and Engineering-1	1		
	Cultivation of Ethic Thought and Fundamentals of Law	2	Crystallography	2	Advanced Materials Research-1	1		
	Physical Education I	1	Introduction to Programming B	3	Physical Metallurgy	3		
	Total	16	Probability and Statistics	3	Ceramic Materials	3		
			The Basic Principles of Marxism	2				
			Physical Education III	1	Total	16		
			Total	19				
Spring	Calculus II A	4	Physical Chemistry	3	Comprehensive Experiments of Materials-2	4	Thesis (Graduation Project)	8
	General Physics II B	4	Physical Chemistry Experiments	1	Physics of Materials	3	Total	8
	General Chemistry A	4	Mechanics of Materials B	3	Experiments for Advanced Materials Science	1		
	Experiments of Fundamental Physics	2	Materials Characterization Techniques	3	Advanced Materials Research-2	1		
	Writing and Communication Skills	2	Polymer Materials	3	Advanced Chinese II	2		
	The Outline of Modern and Contemporary History of China	2	General Organic Chemistry (optional)	3	Crystal Chemistry (optional)	3		
	Physical Education II	1	Basic Experiments for Organic Chemistry	1	Fundamentals of Electrochemisty	3		

	Total	19	Mao Zedong Thought and Introduction to the Theoretical System of Socialism	3	Biomaterials (optional)	2		
			Physical Education IV	1	Experiments for Biomaterials	2		
			Total	21	Total	21		
Summer	Practice Course of Cultivation of Ethics and Fundamentals of Law	1	Practice Course of the Basic Principles of Marxism	1	Industrial Practice	4		
	CAD Engineering Drawing	3	Practice Course of Introduction to Mao Zedong Thought and Theoretical System of Socialism with Chinese Characteristic	3	Total	4		
	Total	4	Total	4				

Curriculum Structure of Materials Physics Track

General Education Required Courses (55 credits)

Calculus A I/II
 Linear Algebra B
 General Physics B I/II
 General Chemistry A
 Introduction to Programming B
 Experiments of Fundamental Physics
 Writing and Communication Skills
 Situation and Policy
 The Outline of Modern and Contemporary History of China
 Cultivation of Ethic Thought and Fundamentals of Law
 Mao Zedong Thought and Introduction to the Theoretical System of Socialism with Chinese Characteristic
 The Basic Principles of Marxism
 Practice Course of the Basic Principles of Marxism
 Practice Course of Introduction to Mao Zedong Thought and Theoretical System of Socialism with Chinese Characteristic
 Practice Course of Cultivation of Ethics and Fundamentals of Law
 Physical Education I/II/III/IV
 Military Theory
 Military Skills

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-1
 Experiments for Advanced Materials Science and Engineering I
 Experiments for Advanced Materials Science and Engineering II
 Comprehensive Experiments of Materials-2
 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
 Ceramic Materials
 Applied Quantum Mechanics
 Biomaterials
 Experiments for Biomaterials

at least choose two

Major Elective Courses (at least 7 credits)

Introduction to Life Science
 Advanced Materials Research 1/2/3 (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 Science and Artificial Intelligence
 Computational Materials Science
 Advanced Thin Film Technology
 Awareness Practical of Manufacturing Engineering
 Biosensors
 Advanced Electron Microscopy
 Digital Circuit
 Digital Circuit Laboratory
 Distinguish Lectures for Innovation and Entrepreneurship in Materials Science and Engineering

The minimum credit requirement for graduation: 143 credits (including 10 credits for GE Elective Courses, not including English courses)

Recommended Plan for Courses Selection of Materials Science and Engineering Program (not including English courses)

Declare major at the end of First Year

	First Year	Credits	Second Year	Credits	Third Year	Credits	Fourth Year	Credits
Fall	Calculus I A	4	Fundamentals of Circuits and Electronics	3	Seminars Frontiers of Modern Materials Science and Technology	1	Advanced Materials Research-3	1
	Linear Algebra B	4	Analog Circuit Laboratory	1	Materials Chemistry	3	Practice-Based Courses	2
	General Physics I B	4	Fundamentals of Materials Science and Engineering	3	Comprehensive Experiments of Materials-1	4	Total	3
	Frontier Seminars in Materials Science and Engineering	1	Experiments for Fundamentals of Materials Science and Engineering	1	Experiments for Advanced Materials Science and Engineering-1	1		
	Cultivation of Ethic Thought and Fundamentals of Law	2	Crystallography	2	Physical Metallurgy	3		
	Physical Education I	1	Introduction to Programming B	3	Ceramic Materials	3		
	Total	16	Probability and Statistics	3	Thermodynamics of Materials	3		
			The Basic Principles of Marxism	2	Applied Quantum Mechanics (optional)	3		
			Physical Education III	1	Total	21		
		Total	19					
Spring	Calculus II A	4	Physical Chemistry	3	Comprehensive Experiments of Materials-2	4	Thesis (Graduation Project)	8
	General Physics II B	4	Physical Chemistry Experiments	1	Physics of Materials	3	Total	8
	General Chemistry A	4	Mechanics of Materials B	3	Experiments for Advanced Materials Science	1		
	Experiments of Fundamental Physics	2	Materials Characterization Techniques	3	Advanced Materials Research-2	1		
	Writing and Communication Skills	2	Polymer Materials	3	Advanced Chinese II	2		
	The Outline of Modern and Contemporary History of China	2	Advanced Materials Research-1	1	Semiconducting Materials, Devices and Technology (optional)	3		
	Physical Education II	1	Mao Zedong Thought and Introduction to the Theoretical System of Socialism	3	Biomaterials (optional)	2		

	Total	19	Physical Education IV	1	Experiments for Biomaterials (optional)	2		
			Total	18	Total	18		
Summer	Practice Course of Cultivation of Ethics and Fundamentals of Law	1	Practice Course of the Basic Principles of Marxism	1	Industrial Practice	4		
	CAD Engineering Drawing	3	Practice Course of Introduction to Mao Zedong Thought and Theoretical System of Socialism with Chinese Characteristic	3	Total	4		
	Total	4	Total	4				

Recommended Plan for Courses Selection of Materials Science and Engineering Program (not including English courses)

Declare major at the end of Second Year

	First Year	Credits	Second Year	Credits	Third Year	Credits	Fourth Year	Credits
Fall	Calculus I A	4	Fundamentals of Circuits and Electronics	3	Seminars Frontiers of Modern Materials Science and Technology	1	Advanced Materials Research-3	1
	Linear Algebra B	4	Analog Circuit Laboratory	1	Materials Chemistry	3	Practice-Based Courses	2
	General Physics I B	4	Fundamentals of Materials Science and Engineering	3	Comprehensive Experiments of Materials-1	4	Total	3
	Frontier Seminars in Materials Science and Engineering	1	Experiments for Fundamentals of Materials Science and Engineering	1	Experiments for Advanced Materials Science and Engineering-1	1		
	Cultivation of Ethic Thought and Fundamentals of Law	2	Crystallography	2	Advanced Materials Research-1	1		
	Physical Education I	1	Introduction to Programming B	3	Physical Metallurgy	3		
	Total	16	Probability and Statistics	3	Ceramic Materials	3		
			The Basic Principles of Marxism	2	Thermodynamics of Materials	3		
			Physical Education III	1	Applied Quantum Mechanics (optional)	3		
			Total	19	Total	22		
Spring	Calculus II A	4	Physical Chemistry	3	Comprehensive Experiments of Materials-2	4	Thesis (Graduation Project)	8
	General Physics II B	4	Physical Chemistry Experiments	1	Physics of Materials	3	Total	8
	General Chemistry A	4	Mechanics of Materials B	3	Experiments for Advanced Materials Science	1		
	Experiments of Fundamental Physics	2	Materials Characterization Techniques	3	Advanced Materials Research-2	1		
	Writing and Communication Skills	2	Polymer Materials	3	Advanced Chinese II	2		
	The Outline of Modern and Contemporary History of China	2	Mao Zedong Thought and Introduction to the Theoretical System of Socialism	3	Semiconducting Materials, Devices and Technology (optional)	3		
	Physical Education II	1	Physical Education IV	1	Biomaterials (optional)	2		

	Total	19	Total	17	Experiments for Biomaterials (optional)	2		
					Total	18		
Summer	Practice Course of Cultivation of Ethics and Fundamentals of Law	1	Practice Course of the Basic Principles of Marxism	1	Industrial Practice	4		
	CAD Engineering Drawing	3	Practice Course of Introduction to Mao Zedong Thought and Theoretical System of Socialism with Chinese Characteristic	3	Total	4		
	Total	4	Total	4				