

武汉理工大学材料科学与工程学院

School of Materials Science & Engineering of
Wuhan University of Technology

本科专业培养方案

Undergraduate Program

(Grade 2013)

武汉理工大学教务处

Academic Affairs Office of Wuhan University of Technology

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材料成型及控制工程专业本科培养方案

Undergraduate Program for Specialty in Materials Forming and Control Engineering

一、业务培养目标

I Educational Objectives

本专业培养具有扎实而宽厚的自然科学基础，较好的人文科学素养，较强的社会责任感，具有宽泛的材料成型及控制工程专业能力，以及良好的交流和沟通能力、组织管理能力，面向企业的工程技术及管理人才。

本专业毕业的学生，既可从事材料成型工程领域的产品开发、生产及应用、工艺设计及控制、新技术开发及工程服务等方面的工作，也可承担企业管理、生产技术管理及企业市场经营等工作。

Aiming at preparing students for excellent enterprise-oriented talents with initiative spirit, professional behavior and social responsibility, the major brings up students to be solid grounded in basic theory and wide-ranged in specialized knowledge of material forming and control engineering.

Students can be fit into jobs in the fields of material forming engineering. They can do the work of production development, application, process design and control, new technology development, engineering service , as well as enterprise management, technology management, and market business.

二、业务培养要求

II Educational Requirement

本专业学生主要学习机械学、材料学和自动化学科的基础理论与技术，得到现代工程师的基本训练，具备从事各类材料成型工艺、模具设计、计算机应用、工程控制及生产组织管理的基本能力。

毕业生应获得以下几方面的知识和能力：

1. 具有较宽厚的自然科学基础知识，较好的人文、艺术及社会科学基础知识的素质；
2. 系统地掌握本专业领域的技术理论基础知识，主要包括力学、机械学、材料科学、电工与电子技术、材料成型工艺基础、自动化技术基础、市场经济及企业管理等基础知识；
3. 具有本专业所必需的制图、计算、实验、测试、文献检索和基本工艺操作等基本技能及较强的计算机和外语应用能力；
4. 熟悉本专业领域内 1 个方向的专业技术，了解学科前沿及发展趋势；
5. 具有较强的自学能力、创新意识和较高的综合素质；
6. 具有良好的质量、环境、职业安全和服务意识，应对危机与突发事件的初步能力；
7. 具有较强的交流和沟通能力、团队合作的能力，具有一定的组织管理能力；
8. 具有良好的身体素质、心理素质，较强的社会责任感和良好的工程职业道德；
9. 熟悉本专业领域技术标准，相关行业的政策、法律和法规。

The undergraduate programs of the specialty are designed to acquire a all-rounded education of mechanics, materials and automation with specific emphasis on basic theories and technology, be trained on being a modern engineer, and gain ability to engage in material forming process, mold design, computer application, engineering control and production management.

The students awarded their bachelor degree of Material Physics have the capacities and knowledge as follows.

1. Basic knowledge of natural science, humanities, art and social science.
2. Basic theory and skills of this specialty, mainly including mechanics, materials, Electrical Engineering and Electric Technology , material forming process, automation technique, marketing economy , and business management etc.

3. Basic theory and skills of cartography, computing, experiment, testing, literature search, process operation and great aptitude for foreign languages and computer applications.
4. Familiar with specialized technique, the latest information and development trend related to this industry.
5. Ability of self-study, innovation and comprehensive quality.
6. Strong awareness of quality, environment, occupational safety , service, and basic ability to deal with crises and emergencies.
7. Strong ability of communication, cooperation, and organization.
8. Physical, psychological, social responsibility and professional behavior.
9. Familiar with technical standards , laws, principles and policies related to this industry.

三、主干学科

III Major Disciplines

主干学科：机械工程、材料科学与工程

Major Disciplines: Mechanical Engineering, Materials Science and Engineering

四、专业核心课程与专业特色课程

IV Core Courses and Characteristic Courses

专业核心课程：理论力学、材料力学、工程图学、机械原理、机械设计、电工与电子技术基础、金属学及热处理、CAD/CAM 基础、测试技术基础、材料成型控制工程基础、材料成型原理

Core Courses: Theoretical Mechanics, Materials Mechanics, Engineering Graphics, Mechanic Principle, Mechanic Design, Fundamentals of Electrical Engineering and Electric Technology, Metallography and Heat Treatment, Fundamentals of CAD/CAM, Fundamentals of Testing Techniques, Fundamentals of Control Engineering of Material Forming , Principle of Material Forming

专业特色课程：CAD/CAM 基础、测试技术基础、材料成型控制工程基础、材料成型原理

Characteristic Courses: Fundamentals of CAD/CAM, Fundamentals of Testing Techniques, Fundamentals of Control Engineering of Material Forming, Principle of Materials Forming

五、计划学制与学位

V Length of School and Degree

修业年限：四年

Duration: Four Years

授予学位：工学学士

Degree Granted: Bachelor of Engineering

六、最低毕业学分规定

VI Graduation Credit Criteria

课程类别 Course Classification 课程性质 Course Nature	通识课程 Public Basic Courses	学科大类课程 Basic Courses in General Discipline	专业课程 Courses in Specialty	个性课程 Personalized Course	集中性实践 Practice Courses	课外学 Extracurricular Credits	总学分 Total Credits
必修课 Required Courses	35	39.5	40.5	\	28	\	190
选修课 Elective Courses	9	3	15	10	\	10	

注：第二专业需修满 50 学分，其中含 5 学分《毕业设计（论文）》。

Note: The second major needs 50 credits at least, including 5 credits of Graduation Thesis.

七、课程修读指导建议

VII Recommendations on Course Studies

本专业设有塑性成型和焊接两个方向。在选择专业选修课程时，必须选定一个方向，具体参见八、理论教学建议进程表。

There are two orientations of this program, Plastic Molding and Welding. When taking specialized elective courses, you should select a specific orientation. For more details, please go to No. VIII—the theoretical course schedule.

八、理论教学建议进程表

VIII Theory Course Schedule

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Number	课 程 名 称 Course Title	学 分 Crs	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur			
通 识 课 程 Public Basic Courses	必修课程 Required Courses	4220001110	思想道德修养与法律基础 Morals, Ethics and Fundamentals of Law	3	48			8		1-6		
		4220002110	中国近现代史纲要 Outline of Contemporary and Modern Chinese History	2	32					1-6		
		4220003110	毛泽东思想和中国特色社会主义理论体系概论 Introduction to Mao Zedong Thought and Socialism with Chinese Characteristics	4	96			32		1-6		
		4220005110	马克思主义基本原理 Marxism Philosophy	3	48			8		1-6		
		1060003130	军事理论 Military Theory	1	32			16		1-4		
		4210001110	体育 1 Physical Education I	1	32					1		
		4210002110	体育 2 Physical Education II	1	32					2	体育 1	
		4210003110	体育 3 Physical Education III	1	32					3	体育 2	
		4210004110	体育 4 Physical Education IV	1	32					4	体育 3	
		1050001130	心理健康教育 Mental Health Education	1	16					1-2		
		4030002110	大学英语 A1 College English A I	3	64				16	1		
		4030003110	大学英语 A2 College English A II	3	64				16	2	大学英语 A1	
		4030004110	大学英语 A3 College English A III	3	64				16	3	大学英语 A2	
		4030005110	大学英语 A4 College English A IV	3	64				16	4	大学英语 A3	
		4120017110	大学计算机基础 Foundation of Computer	2	32		12			1		
		程序设计语言课程组(三选一, 3 学分) Courses of Computer Program Design (select one out of three, Credits: 3)										
		4120023110	计算机程序设计基础(C 语言) Fundamentals of Computer Program Design(C)	3	48		12			2		
		4120024110	计算机程序设计基础(FORTRAN 语言) Fundamentals of Computer Program Design(FORTRAN)	3	48		12			2		

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Number	课 程 名 称 Course Title	学 分 Crs	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major
		总学时 Tot hrs.	实验 Exp.		上机 Ope-ration	实践 Prac-tice	课外 Extra-cur					
		4120025110	计算机程序设计基础(VB 语言) Fundamentals of Computer Program Design(VB)	3	48		12			2		
小 计 Subtotal				35	736		24	64	64			
选修课 Elective Courses	创新创业类 Innovation and Entrepreneurship Courses			全校学生要求至少取得 9 学分，建议每个类别中分别至少选修一门课程。 All students are required to obtain at least nine credits, and suggested to select at least one course in five categories respectively.								
	人文社科类 Arts and Social Science Courses											
	经济管理类 Economy and Management Courses											
	科学技术类 Science and Technology Courses											
	艺术体育类 Art and Physical Education Courses											
学科大类课程 Basic Disciplinary Courses	必修课 Required Courses	4090070110	专业导论 Introduction to Automotive Support Engineering	1	16					1		
		4050063110	高等数学 A 上 Advanced Mathematics A I	5	80					1		
		4050064110	高等数学 A 下 Advanced Mathematics A II	5	80					2	高等数学 A 上	
		4050229110	线性代数 Linear Algebra	2.5	40					2		
		4050024110	大学物理 C Physics C	4.5	72					2		
		4080039110	工程图学 A 上 Engineering Graphics A I	3.5	56					2		*
		4080040110	工程图学 A 下 Engineering Graphics A II	2.5	40					3	工程图学 A 上	*
		4050058110	概率论与数理统计 B Probability and Mathematics Statistic B	3	48					3		
		4050224110	物理实验 B Physics Lab. B	1	32	32				3		
		4100009110	电工与电子技术基础 A 上 Electrical Engineering A I	3.5	56	10				3		
		4100010110	电工与电子技术基础 A 下 Electrical Engineering A II	3.5	56	10				4	电工与电子技术基础 A 上	
		4080078110	金属工艺学 B Metallurgical Technology B	2.5	40	4				4		*
		4080054110	互换性与测量技术 B Interchangeability and Measurement B	2	32	4				5		
		小 计 Subtotal			39.5	648	60					
	选修课 Elective Courses	4050053110	复变函数与积分变换 C Complex Analysis & Integration Transformation	2	32					3		
		4090021110	流体动力学基础 C Fluid Mechanics Elements C	2	32					5		
		4090064110	热工基础 Elements of Thermodynamics	2	32	2				5		

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Number	课 程 名 称 Course Title	学 分 Crs	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur			
		4090075110	轨道车辆概论 Introduction to Railway Vehicle	2	32					5		
		4090024110	汽车 CAD/CAE Computer Aided Design and Engineering of Automobile and Engine	2	32		10			5		
		4090003110	电机学基础 Fundamentals of Electrical Machinery	2	32	2				5		
		4050144110	普通化学 General Chemistry	3	48	18				1		
		小 计 Subtotal		15	240	22	10					
		修读说明: 要求至少选修 3 学分, “普通化学”课学分可用修读的“无机化学”课学分冲抵。 NOTE: Minimum subtotal credits: 3, "General Chemistry" credits are available to study "Inorganic Chemistry" to offset.										
专 业 课 程 Specialized Courses	必 修 课 Required Courses	4050129110	理论力学 A Theoretical Mechanics A	4.5	72					3	高等数学 A 下	
		4080062110	机械原理 Mechanic Principle	3.5	56	4				4	工程图学 A 下	*
		4050016110	材料力学 B Materials Mechanics B	4.5	72					4	高等数学 A 下	
		4050017110	材料力学 B 实验 Experiment of Materials Mechanics B	1	32	32				4	材料力学 B	
		4080060110	机械设计 Mechanic Design	4	64	6				5	机械原理	*
		4070349120	金属学及热处理 Metallography and Heat Treatment	3.5	56	4				5	金属工艺学 B	*
		4070257120	材料成型原理 Principle of Material Forming	4.5	72					5	理论力学 A 金属学及热处理	*
		4100006110	单片机原理及接口技术 A Principle and Application of Microcomputer A	3	48	8				6	大学计算机基础	
		4070011110	材料成型控制工程基础 Fundamentals of Material Forming Control and Engineering	2.5	40	4				6	电工与电子技术基础 A	
		4070172110	CAD/CAM 基础 A Fundamentals of CAD/CAM A	2.5	40		8			6	大学计算机基础	*
		4070039110	测试技术基础 Fundamentals of Testing Techniques	2	32					6	电工与电子技术基础 A	*
		4070185110	材料成型规律及性能综合实验 Comprehensive Experiments of Material Forming Law and Performance	1	32	32				6	金属学及热处理	
		4070186110	材料成型过程综合实验 Comprehensive Experiments of Material Forming Process	1	32	32				7	金属学及热处理	
		4070183110	材料成型 CAD/CAM 综合实验 CAD/CAM Comprehensive Experiments of Material Forming	1.5	48	48				7	CAD/CAM 基础 A	
		4070184110	材料成型 CAE 综合实验 CAE Comprehensive Experiments of Material Forming	1.5	48	48				7	材料成型数值模拟	

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Number	课 程 名 称 Course Title	学 分 Crs	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur			
		小 计 Subtotal				40.5	744	218	8			
选修课 Elective Courses	塑性成型方向 Plastic Molding											
	4070147110	现代材料成形技术 Forming Technology of Modern Materials	3.5	56					6	金属学及热处理	*	
	4070059110	高分子材料成形基础 Fundamentals of Polymer Material Molding	2.5	40					6	金属学及热处理	*	
	4070259120	现代模具设计方法 Method of Modern Mold Design	2	32					7	金属学及热处理	*	
	4070306130	材料成型数值模拟 Numerical Simulation of Material Forming	2	32		8			7	CAD/CAM 基础 A		
	4070187110	材料成型自主设计综合实验 Comprehensive Experiments of Independent Design of Material	1	32	32				7	金属学及热处理		
	小 计 Subtotal				11	192	32	8				8
	焊接方向 Welding											
	4070082110	焊接电源技术 Technology of Welding Power	2	32					6	金属学及热处理	*	
	4070084110	焊接结构 Welding Structure	2	32					6	金属学及热处理	*	
	4070019110	材料焊接方法 Method of Material Welding	2	32					6	金属学及热处理	*	
	4070256120	焊接工装设计 Welding Fixture Design	2	32					7	金属学及热处理	*	
	4070126110	焊接数值模拟 Numerical Simulation of Welding	2	32		4			7			
	4070187110	材料成型自主设计综合实验 Comprehensive Experiments of Independent Design of Material	1	32	32				7	金属学及热处理		
	小 计 Subtotal				11	192	32	4				8
	任选课 Elective Courses											
	4070155110	液压传动与控制 A Transmission and Control of Hydraulic Power A	2	32					7	金属学及热处理		
	4070115110	模具制造学 Mold Manufacture	2	32					7	金属学及热处理		
	4090136110	成形机械及控制 Forming Machinery and Control	2	32					7	金属学及热处理		
	4070020110	材料焊接性 Material Weldability	2	32					7	金属学及热处理		
	4070302120	焊接质量检测与评价 Welding Quality Inspection and Evaluation	2	32					7	金属学及热处理		
4070154110	压力焊与钎焊 Pressure and Braze Welding	2	32					7	金属学及热处理			
4070029110	材料力学性能 Material Mechanical Performance	2	32					7	金属学及热处理			

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Number	课 程 名 称 Course Title	学 分 Crs	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur			
			小 计 Subtotal	14	224							
		修读说明：要求选修一个方向： 11 学分；任选课至少选修 4 学分。 NOTE: Minimum subtotal class credits of any orientation: 11; Students should take at least 4 credits for elective courses.										
个 性 课 程 Personalized Course	选 修 课 Elective Courses	修读说明：学生可跨专业自主选择修读全校其他专业的课程。要求至少选修 10 学分。 NOTE: Students can choose any courses from the other specialties. Minimum subtotal credits: 10.										

九、集中性实践教学环节建议进程表

IX Practice Schedule

课程编号 Course Number	实践环节名称 Practice Courses Name	周数 Weeks	学分 Crs	建议修读学期 Suggested Term	第二专业 Second Major
1060002110	军事训练 Military Training	3	1.5	1	
4080150110	机械制造工程实训 B Training on Mechanical Manufacturing Engineering B	4	4	3	
4100069110	电工电子实习 B Practice of Electrical Engineering & Electronics B	1	1	4	
4080149110	机械原理课程设计 Practice for Mechanic Principle	1.5	1.5	4	*
4080147110	机械设计课程设计 Practice for Mechanical Design	3	3	5	*
4070220110	认识实习 Practice for Engineering Cognition	1	1	5	
4070223110	生产实习 Practice for Producing	3	3	6	
4070270120	工装模具设计工程实训 Training on Fixture Design and Mold Design	2	2	7	*
4070265120	毕业论文 Graduation Thesis	17	11	8	5*
	小 计 Subtotal	35.5	28		11.5

十、其它要求

X Other Demands

《形势与政策》课程，平均每学期 16 学时，一般按专题进行，在第七学期末考核，计 2 个课外学分，具体由学校学生发展指导中心负责组织落实。

Situation & Policy, a 16 hours/term with 2 credits course, is taught according to topics and tested at the end of the 7th term . The course will be arranged by the University Students' Affairs' Department in each school.

材料科学与工程专业本科培养方案

Undergraduate Program for Major in Materials Science & Engineering

一、业务培养目标

I Educational Objectives

本专业培养具有良好社会责任感和职业道德，具有较好自然科学基础和人文社会科学基础，扎实的材料科学与工程领域的材料科学、材料工程方面较宽的基础知识，综合素质好，具有创新精神，能在各种材料的制备、加工成型、材料结构与性能、材料应用等领域从事科学研究与教学、技术开发、新材料研制、工艺和设备设计、技术改造、生产技术管理与经营管理等方面工作，适应社会主义市场经济发展的高层次、高素质、德智体全面发展的科学研究与工程技术人才。

Aiming at preparing students for excellent researchers and engineers with initiative spirit, social responsibility and professional behavior, this program will enable students to be solid grounded in basic theory and wide-ranged in specialized knowledge of materials science and engineering. Students can be fit into jobs in the fields of materials preparing, materials analyzing and materials applying. They can do the work of scientific research and teaching, development of technology and product, new materials development, design of process and equipment, manufacturing management and operating management.

二、业务培养要求

II Educational Requirement

本专业学生主要学习材料科学与工程的基础理论和基本知识，掌握材料的制备、组成、组织结构与性能之间关系的基本规律，接受各种材料的制备、结构与性能检测分析技能的基本训练，掌握材料设计和制备工艺设计，使学生具有开发新材料、研究新工艺、提高和改善材料性能和提高产品质量的基本能力。

毕业生应获得以下几方面的知识和能力：

1. 具有人文社会科学素养、社会责任感和工程职业道德；
2. 具有从事工程工作所需的自然科学、人文社会科学以及经济和管理知识；
3. 掌握材料科学与工程学科的基础理论，具有材料合成与制备、材料加工、材料复合、材料设计、材料性能检测和质量控制等专业基础知识，具有材料科学与工程领域的工程基础知识和系统的工程实践学习经历；
4. 掌握材料的结构与性能的分析研究方法，具有研究和开发新材料、新工艺的初步能力，具备正确选择设备进行材料研究、材料设计、材料开发的初步能力；掌握基本的创新方法，具有追求创新的态度和意识；研究和设计过程中能够综合考虑经济、环境、法律、安全、健康、伦理等制约因素；
5. 具有本专业必需的机械设计、电工与电子技术、计算机应用的基本知识和技能；
6. 掌握中外文资料查询、文献检索以及运用现代信息技术获取相关信息的基本方法，具有初步的科学研究和实际工作能力，了解本专业的前沿发展现状和趋势；
7. 了解与本专业相关的职业和行业的生产、设计、研究与开发、环境保护和可持续发展等方面的方针、政策、法规，能正确认识工程对于客观世界和社会的影响；
8. 具有适应发展的能力以及对终生终身学习的正确认识和学习能力；
9. 具有一定的组织管理能力、较强的表达能力和人际交往能力以及在团队中发挥作用的能力；具有一定的国际视野和跨文化的交流、竞争与合作能力。

Students are mainly required to acquire a all-rounded education of materials science and engineering with specific emphasis on basic theories and fundamental knowledge; learn to know the basic rules of the relationship between materials organization and their performance; be trained on various practical work of inorganic non-metallic materials preparing, testing and analyzing; and gain ability to develop new materials

and do research on new techniques.

Specific program objectives have been established to attain this general objective that its graduates will have:

1. Humanities and art, social responsibility and professional behavior;
2. Basic knowledge of engineering and theories of materials science and engineering; disciplines with materials synthesizing and preparing, materials designing and engineering research and product quality controlling; experience of engineering practice;
3. Knowledge of experimental skills in materials synthesizing and preparing, forming and processing, structure analyzing, property testing, materials design, practical utilization and product quality control; basic knowledge related to materials science and engineering; experiences of practical engineering;
4. Basic methods for structure analysis and property testing; preliminary abilities to develop new materials, technologies and devices; preliminary abilities to employ adequate equipments to perform materials research and development; preliminary creative consciousness; Ability to use theory and technical methods and comprehensively considering different factors including economy, environment, law and safety, which confine product equipment and the process;
5. Basic knowledge and skills of mechanical design, electrical engineering & electric technology, and computer applications, which are needed in composite materials and engineering;
6. Basic methods of literature search, data query and use of modern information technology to obtain relative information;
7. Knowledge of guiding principles and policies of producing, designing, researching, environment protection and sustainable development in related industry and knowledge of the status and trends in the fields;
8. Ability to adapt to the development and keep study all their lifelong;
9. Ability of organizing and managing, expressing and communicating and to deal with crisis and emergency events and compete and cooperate in cross-cultural fields.

三、主干学科

III Major Disciplines

主干学科：材料科学与工程、化学、物理学

Major Disciplines: Materials Science and Engineering, Chemistry, Physics

四、专业核心课程与专业特色课程

IV Core Courses and Characteristic Courses

专业核心课程：材料科学基础、材料工程基础、材料概论、材料研究与测试方法、计算机在材料科学与工程中应用。

Core Courses: Fundamentals of Materials Science, Fundamentals of Materials Engineering, Introduction to Materials, Methods of Materials Research and Testing, Computer applied in Materials Science & Engineering .

专业特色课程：材料概论、材料科学基础、材料工程基础、材料研究与测试方法

Characteristic Courses: Introduction to Materials, Fundamentals of Materials Science, Fundamentals of Materials Engineering, Methods of Materials Research and Testing

五、计划学制与学位

V Length of Schooling and Degree

修业年限：四年

Duration: Four Years

授予学位：工学学士

Degree Granted: Bachelor of Engineering

六、最低毕业学分规定

VI Graduation Credit Criteria

课程类别 Course Classification 课程性质 Course Nature	通识课程 Public Basic Courses	学科大类课程 Basic Disciplinary Courses	专业课程 Specialized Courses	个性课程 Personalized Course	集中性实践 Practice Courses	课外学分 Study Credit after Class	总学分 Total Credits
必修课 Required Courses	35	60	35.5	\	24.5	\	190
选修课 Elective Courses	9	3	7	6	\	10	

七、课程修读指导建议

VII Recommendations on Course Studies

八、理论教学建议进程表

VIII Theory Course Schedule

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Code	课程名称 Course Name	学分 Credits	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur			
通识课程 Public Basic Courses	必修课 Required Courses	4220001110	思想道德修养与法律基础 Morals, Ethics and Fundamentals of Law	3	48			8		1-6		
		4220002110	中国近现代史纲要 Outline of Contemporary and Modern Chinese History	2	32					1-6		
		4220003110	毛泽东思想和中国特色社会主义理论体系概论 Introduction to Mao Zedong Thought and Socialism with Chinese	4	96			32		1-6		
		4220005110	马克思主义基本原理 Marxism Philosophy	3	48			8		1-6		
		1060003130	军事理论 Military Theory	1	32			16		1-4		
		1050001130	心理健康教育 Mental Health Education	1	16					1-2		
		4210001110	体育 1 Physical Education I	1	32					1		
		4210002110	体育 2 Physical Education II	1	32					2	体育 1	
		4210003110	体育 3 Physical Education III	1	32					3	体育 2	
		4210004110	体育 4 Physical Education IV	1	32					4	体育 3	
		4030002110	大学英语 A1 College English A 1	3	64				16	1		
		4030003110	大学英语 A2 College English A II	3	64				16	2	大学英语 A1	
		4030004110	大学英语 A3 College English A III	3	64				16	3	大学英语 A2	
		4030005110	大学英语 A4 College English A IV	3	64				16	4	大学英语 A3	
		4120017110	大学计算机基础 Foundation of Computer	2	32		12			1		

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Code	课 程 名 称 Course Name	学分 Credits	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major	
					总学时 Tot hrs.	实 验 Exp.	上 机 Ope-ration	实 践 Prac-tice	课 外 Extra-cur				
学 科 大 类 课 程 Basic Disciplinary Courses		程序设计语言课程组(三选一, 3 学分) Courses of Computer Program Design (select one out of three, Credits: 3)											
		4120023110	计算机程序设计基础(C 语言) Fundamentals of Computer Program	3	48		12			2			
		4120024110	计算机程序设计基础(FORTRAN 语言) Fundamentals of Computer Program Design(FORTRAN)	3	48		12			2			
		4120025110	计算机程序设计基础(VB 语言) Fundamentals of Computer Program	3	48		12			2			
		小 计 Subtotal		35	736		24	64	64				
		选 修 课 Elective Courses	创新创业类 Innovation and Entrepreneurship Courses		全校学生要求至少取得 9 学分, 建议每个类别中分别至少选修一门课程。 All students are required to obtain at least nine credits, and suggested to select at least one course in five categories respectively.								
	人文社科类 Arts and Social Science Courses												
	经济管理类 Economy and Management Courses												
	科学技术类 Science and Technology Courses												
	艺术体育类 Art and Physical Education Courses												
		必 修 课 Required Courses	4070160110	专业导论 Introduction to Materials Science	1	16					1		
			4050063110	高等数学 A 上 Advanced Mathematics A I	5	80					1		
			4050064110	高等数学 A 下 Advanced Mathematics A II	5	80					2	高等数学 A 上	
			4050021110	大学物理 A 上 Physics A I	3.5	56					2		
			4080042110	工程图学 C Engineering Graphics C	4	64		8			2		
4070016110			材料概论 Introduction to Materials	2	32					3			
4050022110			大学物理 A 下 Physics A II	3.5	56					3	大学物理 A 上		
4050222110			物理实验 A 上 Physics Lab. A I	1	28	28				3	大学物理 A 上		
4050223110			物理实验 A 下 Physics Lab. A II	1	28	28				4	大学物理 A 下		
4050229110			线性代数 B Linear Algebra B	2.5	40					3	高等数学 A 下		
4050058110			概率论与数理统计 B Probability and Mathematical Statistics	3	48					4	高等数学 A 下		
4100012110			电工与电子技术基础 C Fundamentals of Electrical Engineering & Electric Technology C	4	64	10				4			
4080061110			机械设计基础 Fundamentals of Mechanical Design	3.5	56	6				4			
4050072110			工程力学 B Engineering Mechanics, B	4	64					4			

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Code	课 程 名 称 Course Name	学分 Credits	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major
					总学时 Tot hrs.	实 验 Exp.	上 机 Ope-ration	实 践 Prac-tice	课 外 Extra-cur			
		4050073110	工程力学 B 实验 Engineering Mechanics Experiment B	0.5	16	16				4		
		4050452130	无机化学 Inorganic Chemistry	3.5	60					1		
		4050453130	无机化学实验 Inorganic Chemistry Experiment	1	32	32				1		
		4050820130	有机化学 Organic Chemistry	3.5	60					2		
		4050821130	有机化学实验 Organic Chemistry Experiment	1	32	32				2		
		4050044110	分析化学 C Analytical Chemist	1.5	24					3		
		4050045110	分析化学实验 Analytical Chemistry C Experiment	1	32	32				3	分析化学 C	
		4050220110	物理化学 C Physical Chemistry C	4	64					3		
		4050219110	物理化学 B 实验 Physical Chemistry B Experiment	1	32	32				3	物理化学 C	
		小 计 Subtotal			60	1064	216	8				
	选 修 课 Elective Courses	4200286130	综合化学实验 B（偏无机） Comprehensive Chemical Experiments B	1	32	32				4		
		4200287130	综合化学实验 C（偏有机） Comprehensive Chemical Experiments C	1	32	32				4		
		4070037110	材料与环境 Materials & Environment	2	32					5		
		4070118110	能源科学概论 Introduction to Science of Energy	2	32					5		
		4060090110	矿物与岩石 Minerals & Rocks	2	32	10				5		
		小 计 Subtotal			8	160	74					
		读说明：至少选修 3 学分。必选一门综合化学实验。 NOTE: Minimum subtotal credits: 3.At least one course about Comprehensive Chemical Experiments is needed.										
专 业 课 Specialized Courses	必 修 课 Required Courses	4070028110	材料科学基础 Fundamentals of Materials Science	4.5	72					4		
		4070017110	材料工程基础 Fundamentals of Materials Engineering	4	64					5		
		4070080110	固体物理 D Solid Physics D	2.5	40					5		
		4070036110	材料研究与测试方法 B Methods of Materials Research and Testing B	2.5	40					5		
		4070281120	材料研究与测试方法实验 Experiments on Testing Techniques of Materials	2	64	64				5		
		4070090110	计算机在材料科学与工程中应用 A Computer Applied in Materials Science & Engineering A	2.5	40		20			6		
		小 计 Subtotal			18	320	64	20				

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Code	课 程 名 称 Course Name	学分 Credits	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major
					总学时 Tot hrs.	实 验 Exp.	上 机 Ope- ration	实 践 Prac- tice	课 外 Extra- cur			
		模块一(材料科学方向) Module 1 (Materials Science)										
		4070097110	结构缺陷 Structural Imperfection	2	32					5		
		4070023110	材料化学 A Materials Chemistry A	3.5	56					5		
		4070280120	材料科学基础实验 A Fundamental Experiments on Materials Science	1	32	32				5	材料科学基础	
		4070033110	材料物理 B Materials Physics B	3.5	56					6		
		4070161110	材料工艺与设备 A Gelatin Materials Technology & Equipment	2.5	40					6		
		4070282120	材料制备与物性分析 A Analysis of Materials Preparing & Physical Properties A	5	160	160				7		
		小 计 Subtotal		17.5	376	192						
		模块二(材料工程 I 方向) Module 2 (Materials Engineering I)										
		4070029110	材料力学性能 Materials Mechanical Performance	2	32					5		
		4070174110	金属学原理 Principles of Metallography	2	32					5		
		4070320130	金属固态相变原理及应用 Principles and Applications of Metal Solid Transformation	2.5	40					5		
		4070304120	材料科学基础实验 B Fundamental Experiments on Materials	1	32	32				5		
		4070101110	金属凝固理论与技术 Theoretical Basis of Metal Solidification	2.5	40					6		
		4070321130	金属材料学 Metal Materials Science	2.5	40					6		
		4080156110	金相分析技术实验 Experiments on Metallographical Analysis	2	64	64				6		
		4070190110	材料结构控制与性能测试 Materials Structure Controlling and Property	3	96	96				7		
		小 计 Subtotal		17.5	376	192						
		模块三(材料工程 II 方向) Module 3(Material Engineering II)										
		4070034110	材料物理性能 Material Physical Performance	2	32					5		
		4070144110	无机非金属材料工学 A Inorganic Non-metallic Material Engineering	5	80					5		
		4070280120	材料科学基础实验 A Experiments on Material Science Foundation and Testing A	1	32	32				5	材料科学基础	
		4070120110	热工设备 Thermal Engineering Equipment	2	32					6		

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Code	课 程 名 称 Course Name	学分 Credits	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur			
		4070143110	无机非金属材料工厂设计概论 Design of Inorganic Non-metallic Materials Plant	2.5	40		12			6		
		4070276120	材料工程基础实验 Fundamental Experiments on Materials	2	64	64				6		
		4070284120	材料制备与性能实验 Experiments on Materials Fabrication and Properties	3	96	96				7		
		小 计 Subtotal		17.5	376	192	12					
	选修课 Elective Courses	模块一(材料科学方向) Module 1 (Materials Science)										
		4070021110	材料合成与加工 Materials Synthesizing and Processing	2	32					6		
		4070014110	材料腐蚀与防护 Materials Corrosion and Protection	2	32					6		
		4070157110	金属材料 Metallic materials	2	32					6		
		4070135110	特种玻璃 Special Glass	1.5	24					6		
		4070094110	胶凝材料 Gelling Materials	2	32					6		
		4070048110	复合材料 Composite Materials	2	32					7		
		4070058110	高分子材料 Polymer Materials	2	32					7		
		4070077110	功能陶瓷材料与器件 Functional Ceramics Materials and	2	32					7		
		小 计 Subtotal		15.5	248							
		模块二(材料工程 I 方向) Module 2 (Materials Engineering I)										
		4070158110	铸造工艺学 Foundry Engineering	2	32					6		
		4070038110	材料质量分析与失效分析 Materials Quality and Failure Analysis	2	32					6		
		4070121110	热工设备原理与设计 Principles and Design of Thermal Equipments	3	48					6		
		4070141110	特种铸造 Special Casting	2	32					6		
		4070010110	材料表面与强化技术 Materials Surface Hardening	2	32					7		
		4070045110	非铁合金及其熔炼 Nonferrous Alloys and Melting	2	32					7		
		4070156110	铸铁及其熔炼 Cast Iron and Melting	2	32					7		
		4070119110	凝固过程数值模拟 Numerical Simulation of Coagulation Processes	2	32					7		

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Code	课 程 名 称 Course Name	学分 Credits	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur			
		4070159110	铸造设备及自动化 Foundry Equipments & Automation	2	32					7		
		4070114110	模具 CAD Mould CAD	1.5	24		8			7		
		小 计 Subtotal		20.5	328		8					
		模块三(材料工程 II 方向) Module 3(Material Engineering II)										
		4070135110	特种玻璃 Special Glass	1.5	24					6		
		4070136110	特种陶瓷 Special Ceramics	1.5	24					6		
		4070137110	特种水泥 Special Cement	1.5	24					6		
		4070070110	高性能混凝土 High-Performance Concrete	1.5	24					6		
		4070094110	胶凝材料 Cementitious Materials	2	32					6		
		4070047110	粉体科学与工程基础 Fundamentals of Powder Science and Engineering	2	32					6		
		4070134110	陶瓷装饰学 Ceramics Decoration Art	1.5	24					7		
		4070153110	新型墙体材料 New Materials for Walls	1.5	24					7		
		4070041110	道桥工程材料 Materials for Highway and Bridge Engineering	2	32					7		
		4070008110	玻璃深加工技术 Glass Further Processing	2	32					7		
		4070006110	玻璃光导纤维 Optical Glass Fiber	2	32					7		
		4070077110	功能陶瓷材料与器件 Functional Ceramics Materials and Apparatus	2	32					7		
		小 计 Subtotal		21	336							
		修读说明：要求至少选修 7 学分。 NOTE: Minimum subtotal credits:7.										
个性课程 Personalized Course	选修课 Elective Courses	4070081110	光电子材料及应用 Photoelectron Materials and its Applications	1	16					6		
		4070009110	薄膜材料与技术 Thin-film Materials and Technology	1	16					6		
		4070073110	功能材料 A Functional Materials A	2	32					6		
		4070116110	纳米材料与纳米技术 Nanomaterials and Nanotechnology	2	32					7		
		4070071110	新能源材料与技术 Materials and Technology of New Energy	2	32					7		
		4070152110	新型建筑材料 New Materials for Buildings	2	32					7		

课程类别 Course Classifi- cation	课程 性质 Course Nature	课程编号 Course Code	课 程 名 称 Course Name	学分 Credits	学时分配 Including					建议修 读学期 Suggested Term	先修课程 Prerequisite Course	第二 专业 Second Major	
					总学时 Tot hrs.	实 验 Exp.	上 机 Ope- ration	实 践 Prac- tice	课 外 Extra- cur				
		以下两门课程推荐材料工程 I 方向的学生修读											
		4070348130	金属材料前沿 Metal Material Frontier	2	32					6			
		4070349130	材料科学研究思维与方法 Thinking and Method of Materials Science Research	1	16					6			
		小 计 Subtotal		13	208								
		修读说明：学生可跨专业自主选择修读全校其他专业的课程，建议修读以上课程。要求至少选修 6 学分。 NOTE: Students can select any courses from the other specialties, and are especially suggested to select the courses above. Minimum subtotal credits:6.											

九、集中性实践教学环节建议进程表

IX Practice Schedule

课程编号 Course Number	实践环节名称 Name of Internship and Practical Training	周数 Weeks	学分 Credits	建议修读学期 Suggested Term	第二专业 Second Major
1060002110	军事训练 Military Training	3	1.5	1	
4080151110	机械制造工程实训 C Training on Mechanical Manufacturing Engineering C	2	2	4	
4100069110	电工电子实习 B Practice of Electrical Engineering & Electronics B	1	1	4	
4080146110	机械设计基础课程设计 Practice of Fundamentals of Mechanical Design	2	2	4	
4070216110	认识实习 Practice of Engineering Cognition	1	1	5	
4070211110	工程设计训练 Training on Engineering Design	3	3	6	
4070226110	专业实习 Practice of Specialty	3	3	6	
4070339120	毕业论文 Graduation Thesis	17	11	8	
小 计 Subtotal		32	24.5		

十、其它要求

X Other Demands

《形势与政策》课程，平均每学期 16 学时，一般按专题进行，在第七学期末考核，计 2 个课外学分，具体由学校学生发展指导中心负责组织落实。

Situation & Policy, a course with 16 hours / term and 2 extracurricular credits, is taught in terms of topics and tested at the end of the 7th term. The course will be arranged by the Centre of Development and Guidance for Students in the university.

材料物理专业本科培养方案

Undergraduate Program for Major in Materials Physics

一、业务培养目标

I Educational Objectives

材料物理专业是为适应高新技术和新兴产业发展对新材料的迫切需求而发展起来的新兴专业。本专业培养适应 21 世纪社会主义现代化建设需要的德、智、体、美全面发展，能够掌握材料物理基本理论和专业知识，从分子、原子、电子层次上研究材料的结构、物理机制和物理性能，致力于材料设计、研发、应用，具有良好的综合技能和创新能力，能够在力、热、声、光、电、磁、生物医学等新材料领域，从事科学研究、教学、技术开发、生产及技术等工作的高素质创新型高级专门人才。

Aiming at educating students to be advanced researchers and engineers in 21st century with initiative spirit, social responsibility and professional behavior, this program is designed to enable students to be solid grounded in basic theory and wide-ranged in specialized knowledge of inorganic non-metallic materials engineering. Students educated are capable to take positions in the fields including material design, material processing and forming, structure and property analysis, utilization in devices and industrial materials applying. Students educated are capable to be professional personnel in the areas including scientific research, teaching, technology development and manufacture.

二、业务培养要求

II Educational Requirement

本专业学生主要学习材料科学和物理学的基本理论与方法，具有良好的数学和物理基础和实验技能，得到材料制备技术、结构和性能研究的基本方法的良好训练。能应用现代物理研究分析手段，研究各种功能材料特别是电子信息材料、光电传感材料中的物理问题及其规律，并运用这些规律设计和研制新材料、改进材料性能、发展材料科学的基础理论。实行厚基础宽口径教育，培养过程体现知识、能力、素质协调发展的原则。

毕业生应获得以下几方面的知识和能力：

1. 掌握材料的物质结构、能级结构、结构与性能的基本原理，掌握材料设计、性能优选的原则，掌握材料的组成、结构和性能关系；
2. 掌握材料的物理合成、掺杂改性的基本原理，掌握材料制备的主要方法及相关工程技术原理。掌握材料性能测试与分析的主要技术方法，具有应用计算机进行材料的物理性能计算、计算机控制材料的性能测试等方面的能力；具备从应用目标出发对现有材料进行成本、工艺、环保、性能和效益综合评估及材料选用的初步能力；
3. 至少掌握一门外国语；掌握资料查询、文献检索及运用现代信息技术获取相关信息的基本方法；具有一定的实验设计能力；具有创造实验条件、归纳、整理、分析实验结果、撰写论文、参与学术交流的能力；
4. 熟悉国家的科教兴国战略、熟悉国家关于材料科学与工程研究、科技开发及相关产业的政策，熟悉国内外知识产权等方面的法律法规；了解科技发展、知识产权等方面的方针、政策和法规；
5. 了解材料物理发展的理论前沿和光、电、热、声、磁功能材料、半导体材料、生物医用材料、新能源材料等新兴学科交叉领域的应用前景和行业需求，尤其要掌握光、电功能材料领域研究前沿、发展动态和下一步发展趋势；
6. 具有一定的组织管理能力、较强的表达能力和人际交往能力以及在团队中发挥作用的能力；具有一定的国际视野和跨文化的交流、竞争与合作能力。

Students are required to learn basic theories and fundamental knowledge of materials science and physics; acquire basic knowledge of mathematics and physics and experimental technique; be well trained in material

preparation, structure analysis, property testing and device design. Students educated can do research work on advance functional materials, especially electronic information materials and optoelectronic functional materials using advanced research analysis methods, and then have abilities to develop new materials, explore new technologies, optimize material properties, and modify device performances and improving product quality.

Specific program objectives have been established to educate undergraduates:

1. Learn principles of matter structure, energy structure, and principles of structure and property; master material design and property optimization. Learn the relationship of material component, structure and property.

2. Learn basic principles of physic synthesis and doping, general synthesis method and technique, property test and analysis; utilize computer and software to investigate physical property and test; and design and evaluate target materials based on cost, manufacture, environment friend, property and economic benefit.

3. Learn at least one foreign language, basic methods of literature search and use of modern information technology to obtain relative information, capability of experiment design and collecting, concluding, analysis, thesis writing and academic communication.

4. Knowledge of strategy of invigorating the country through science, technology and education, knowledge of guiding policies of materials science and engineering, development of science technology and principles of intellectual property law.

5. Knowledge of theory front of material physics and optical, electric, thermal, acoustics and magnetic materials, semi-conductive material, biomedical material, new energy materials, knowledge of development trend and industry demand.

6. Ability of organization and management, expression and communication and to deal with crisis and emergency events and compete and cooperate in cross-cultural fields.

三、主干学科

III Major Disciplines

主干学科：材料科学、物理学

Major Disciplines: Materials Science, Physics

四、专业核心课程与专业特色课程

IV Core Courses and Characteristic Courses

专业核心课程：材料物理、理论物理（理论力学、统计力学、量子力学）、近代光学、电磁场理论、材料科学基础、固体物理 B、结构缺陷、物理化学、材料物理、材料研究与测试方法、材料合成与制备技术

专业实验课程：大学物理实验、物理化学实验、材料研究与测试方法实验、材料科学基础实验、材料设计与理论计算实验、功能材料制备及物理性能分析实验

专业实践课程：机械制造工程实训、电工电子实习、认识实习、专业实习、毕业论文

专业特色课程：理论物理（理论力学、统计力学、量子力学）、近代光学、电磁场理论、固体物理 B、材料物理、材料分析与计算实验、功能材料制备及物理性能分析实验

Core Courses: Materials Physics, Theoretical Physics, Modern Optics, Electromagnetic Fields Theory, Fundamentals of Materials Science, Solid State Physics B, Structure Defect, Physics Chemistry, Methods of Materials Research and Testing, Materials Synthesizing and Processing.

五、计划学制与学位

V Length of Schooling and Degree

修业年限：四年

Duration: Four Years

授予学位: 工学学士

Degree Granted: Bachelor of Engineering

六、最低毕业学分规定

VI Graduation Credit Criteria

课程类 Course Classification 课程性质 Course Nature	通识课程 Basic Courses in General Education	学科大类课程 Basic Courses in General Discipline	专业课程 Courses in Specialty	个性课程 Individualized Courses	集中性实践 Intensified Internship and Practical Training	课外学分 Extracurricular Credits	总学分 Total Credits
必修课 Required Courses	35	49.5	51	\	19.5	\	190
选修课 Elective Courses	9	2	8	6	\	10	

七、课程修读指导建议

VII Recommendations on Course Studies

八、理论教学建议进程表

VIII Table of Teaching Schedule

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Code	课程名称 Course Name	学分 Credits	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur			
通识课程 Public Basic Courses	必修课 Required Courses	4220001110	思想道德修养与法律基础 Morals, Ethics and Fundamentals of Law	3	48			8		1-6		
		4220002110	中国近现代史纲要 Outline of Contemporary and Modern Chinese History	2	32					1-6		
		4220003110	毛泽东思想和中国特色社会主义理论体系概论 Introduction to Mao Zedong Thought and Socialism with Chinese Characteristics	4	96			32		1-6		
		4220005110	马克思主义基本原理 Marxism Philosophy	3	48			8		1-6		
		1060003130	军事理论 Military Theory	1	32			16		1-4		
		1050001130	心理健康教育 Mental Health Education	1	16					1-2		
		4210001110	体育 1 Physical Education I	1	32					1		
		4210002110	体育 2 Physical Education II	1	32					2	体育 1	
		4210003110	体育 3 Physical Education III	1	32					3	体育 2	
		4210004110	体育 4 Physical Education IV	1	32					4	体育 3	
		4030002110	大学英语 A1 College English A 1	3	64				16	1		
		4030003110	大学英语 A2 College English A II	3	64				16	2	大学英语 A1	
		4030004110	大学英语 A3 College English A III	3	64				16	3	大学英语 A2	

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Code	课 程 名 称 Course Name	学分 Credits	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur			
		4030005110	大学英语 A4 College English A IV	3	64				16	4	大学英语 A3	
		4120017110	大学计算机基础 Foundation of Computer	2	32		12			1		
		程序设计语言课程组(三选一, 3 学分) Courses of Computer Program Design (select one out of three, Credits: 3)										
		4120023110	计算机程序设计基础(C 语言) Fundamentals of Computer Program Design(C)	3	48		12			2		
		4120024110	计算机程序设计基础(FORTRAN 语言) Fundamentals of Computer Program Design(FORTRAN)	3	48		12			2		
		4120025110	计算机程序设计基础(VB 语言) Fundamentals of Computer Program Design(VB)	3	48		12			2		
		小 计 Subtotal		35	736		24	64	64			
		选修课 Elective Courses	创新创业类 Innovation and Entrepreneurship Courses		全校学生要求至少取得 9 学分, 建议每个类别中分别至少选修一门课程。 All students are required to obtain at least nine credits, and suggested to select at least one course in five categories respectively.							
	人文社科类 Arts and Social Science Courses											
	经济管理类 Economy and Management Courses											
	科学技术类 Science and Technology Courses											
	艺术体育类 Art and Physical Education Courses											
	学 科 大 类 课 程 Basic Disciplinary Courses	必修课程 Required Courses	4070160110	专业导论 Introduction to Materials Physics	1	16					1	
4050063110			高等数学 A 上 Advanced Mathematics A I	5	80					1		
4050064110			高等数学 A 下 Advanced Mathematics A II	5	80					2	高等数学 A 上	
4080042110			工程图学 C Engineering Graphics C	4	64		8			2		
4050021110			大学物理 A 上 Physics A I	3.5	56					2		
4050022110			大学物理 A 下 Physics A II	3.5	56					3	大学物理 A 上	
4050222110			物理实验 A 上 Physics Lab. A I	1	28	28				3	大学物理 A 上	
4050223110			物理实验 A 下 Physics Lab. A II	1	28	28				4	大学物理 A 下	
4050229110			线性代数 Linear Algebra	2.5	40					3	高等数学 A 下	
4070016110			材料概论 Introduction to Materials	2	32					3		
4050058110			概率论与数理统计 B Probability and Mathematical Statistics B	3	48					4	高等数学 A 下	
4100012110			电工与电子技术基础 C Fundamentals of Electrical Engineering & Electric Technology C	4	64	10				4		
4050452130			无机化学 Inorganic Chemistry	3.5	60					1		

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Code	课 程 名 称 Course Name	学分 Credits	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur			
		4050453130	无机化学实验 Inorganic Chemistry Experiment	1	32	32				1		
		4050820130	有机化学 Organic Chemistr	3.5	60					2		
		4050821130	有机化学实验 Organic Chemistry Experimen	1	32	32				2		
		4050220110	物理化学 C Physical C	4	64					3		
		4050219110	物理化学 B 实验 Physical Chemistry B Experiment	1	32	32				3	物理化学 C	
		小 计 Subtotal		49.5	872	162	8					
	选修课 Elective Courses	4070037110	材料与环境 Materials & Environment	2	32					5		
		4070118110	能源科学概论 Introduction to Energy Sources Sciences	2	32					5		
		4060090110	矿物与岩石 Minerals & Rocks	2	32	10				5		
		小 计 Subtotal		6	96	10						
		修读说明：要求至少选修 2 学分。 NOTE: Minimum subtotal class credits: 2 .										
专 业 课 程 Basic Disciplinary Courses	必修课程 Required Courses	4050051110	复变函数与积分变换 A Complex Function and Integral Transform A	4	64					3		
		4070028110	材料科学基础 Fundamentals of Materials Science	4.5	72					4		
		4070280120	材料科学基础实验 A Experiments on Fundamentals of Materials Science A	1	32	32				4	材料科学基础	
		4070043110	电磁场理论 Electromagnetic Fields Theory	2	32					4		
		4050171110	数理方程 A Mathematical Physics Equation A	3	48					5		
		4070324130	理论物理（理论力学、统计力学、量子力学） Theoretical Physics	4.5	72					5		
		4050121110	近代光学 Modern Optics	3	48	12				5		
		4070097110	结构缺陷 Structure Imperfection	2	32					5		
		4070035110	材料研究与测试方法 A Methods of Materials Research and Testing A	3.5	56					5		
		4070281120	材料研究与测试方法实验 Experiments on Materials Research and Testing Method	2	64	64				5		
		4070150110	相变原理 Phase Transformation	2	32					5		
		4070079110	固体物理 B Solid Physics B	3.5	56					6		
		4070308130	材料物理 Materials Physics	4	64					6		

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Code	课 程 名 称 Course Name	学分 Credits	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur			
课程类别 Course Classification		4070024110	材料化学 B Materials Chemistry B	3	48					6		
		4070090110	计算机在材料科学中应用 Computer applied in Materials Science	2	32					6		
		4070307130	材料设计与理论计算实验 Material Design and Theory Calculation Exp.	1	32		32			6	计算机在材料科学中应用	
		4070214110	功能材料制备及物理性能分析实验 Functional Materials Preparing and Physical Properties Analyzing	6	192	192				7		
		小 计 Subtotal		51	976	300	32					
	选修课 Elective Courses	4070145110	无机非金属材料工学 B Inorganic Non-metallic Materials Engineering B	2	32					6		
		4070334130	新材料合成与制备技术 Materials Synthesizing and Processing	2	32					6		
		4070122110	光纤传感材料与技术 Materials and Applications of Optical Fiber	2	32					7		
		4070046110	半导体材料与器件 Semiconductor Materials and Devices	2	32					7		
		4070117110	电介质材料及应用 Dielectric Materials and Applications	2	32					6		
		4070314130	光电子材料及应用 Photoelectron Materials and its Applications	2	32					7		
		小 计 Subtotal		12	192							
		修读说明：要求至少选修 8 学分 NOTE: Minimum subtotal credits:8										
个性课程 Personalized Course	选修课 Elective Courses	4070009110	薄膜材料与技术 Thin-film Materials and Technology	2	32					6		
		4070098110	金属材料 Metallic Materials	2	32					7		
		4070058110	高分子材料 Polymer Materials	2	32					7		
		4070048110	复合材料 Composite Materials	2	32					7		
		4070014110	材料腐蚀与防护 Materials Corrosion and Protection	2	32					7		
		4070116110	纳米材料与纳米技术 Nanomaterials and Nanotechnology	2	32					7		
		4070071110	新能源材料与技术 Materials and Technology of New Energy	2	32					7		
		4070077110	功能陶瓷材料与器件 Functional Ceramic Material and Devices	2	32					7		
		4070333130	现代生物技术与材料 Modern Biological Technology and Materials	2	32					7		
		4070078030	固体激光技术 Solid Laser Technique	2	32					7		
		4070338130	智能材料与结构 Smart Materials and Structures	2	32					7		

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					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur			
			小 计 Subtotal	22	352							
		修读说明：学生可跨专业自主选择修读全校其他专业的课程，建议修读以上课程。要求至少选修 6 学分。 NOTE: Students can select any courses from the other specialties, and are especially suggested to select the courses above. Minimum subtotal credits:6.										

九、集中性实践教学环节建议进程表

IX Practice Schedule

课程编号 Course Code	实践环节名称 Name of Internship and Practical Training	周数 Weeks	学分 Crs	建议修读学期 Suggested Term	第二专业 Second Major
1060002110	军事训练 Military Training	3	1.5	1	
4080151110	机械制造工程实训 C Training on Mechanical Manufacturing Engineering C	2	2	4	
4100069110	电工电子实习 B Practice of Electrical Engineering & Electronics B	1	1	4	
4070217110	认识实习 Practice of Engineering Cognition	1	1	5	
4070229110	专业实习 Practice of Specialty	3	3	6	
4070340130	毕业论文 Graduation Thesis	17	11	8	
	小 计 Subtotal	27	19.5		

十、其它要求

X Other Demands

《形势与政策》课程，平均每学期 16 学时，一般按专题进行，在第七学期末考核，计 2 个课外学分，具体由学校学生发展指导中心负责组织落实。

Situation & Policy, a course with 16 hours / term and 2 extracurricular credits, is taught in terms of topics and tested at the end of the 7th term. The course will be arranged by the Centre of Development and Guidance for Students in the university.

材料化学专业本科培养方案

Undergraduate Program for Major in Materials Chemistry

一、业务培养目标

I Educational Objectives

本专业培养具有良好社会责任感和职业道德，具有较好自然科学基础和人文社会科学基础，扎实的材料科学的基本理论与技术，具备材料化学相关的基本知识和基本技能，综合素质好，具有创新精神，能在各种材料的合成与加工、成型、结构与性能分析、产业化应用等领域从事新材料研制、技术开发、工艺设计、技术改造、应用系统集成等方面工作，适应社会主义市场经济发展的高层次、高素质、德智体全面发展的材料化学的基础理论研究及应用开发人才。

Aiming at preparing students for excellent basic theoretical researchers and application developing engineers with initiative spirit, social responsibility and professional behavior, this program will enable students to be solid grounded in basic theory and wide-ranged in specialized knowledge of materials chemistry. Students can be fit into jobs in the fields of materials synthesizing and preparing, forming and processing, structure analyzing, property testing and industrial applications. They can do the work of new materials research, development of technology, design of technique, technology innovation and application system integration.

二、业务培养要求

II Educational Requirement

本专业学生主要学习材料科学和化学的基本理论、基本知识、材料科学的基本技能和工程应用的多学科领域知识，掌握材料的组成、结构、性能与加工工艺、使用环境之间关系的基本规律，接受材料的合成与加工、结构与性能分析技能、材料设计的基本训练，具有运用化学和材料化学的基础理论、基本知识和实验技能进行材料研究和技术开发的基本能力。

毕业生应获得以下几方面的知识和能力：

1. 具有人文社会科学素养、社会责任感和工程职业道德；
2. 具有从事工程工作所需的自然科学、人文社会科学以及经济和管理知识；了解相近专业的一般原理和知识；
3. 掌握材料制备(或合成)、材料加工、材料结构与性能测定、材料设计、材料应用和产品质量控制等方面的基础知识、基本原理和基本实验技能；具有材料化学专业的工程基础知识和系统的工程实践学习经历；
4. 掌握材料的结构与性能的分析研究方法，具有设计、研究和开发新材料、新工艺的初步能力，具备正确选择设备进行材料研究、材料设计、材料开发的初步能力；掌握基本的创新方法，具有追求创新的态度和意识；研究和设计过程中能够综合考虑经济、环境、法律、安全、健康、伦理等制约因素；
5. 具有本专业必需的机械设计、电工与电子技术、计算机应用的基本知识和技能；
6. 掌握中外文资料查询、文献检索以及运用现代信息技术获取相关信息的基本方法；具有一定的实验设计，创造实验条件，归纳、整理、分析实验结果，撰写论文；
7. 了解材料化学的理论前沿、应用前景和最新发展动态；了解与本专业相关的职业和行业的生产、设计、研究与开发、环境保护和可持续发展等方面的方针、政策、法规，能正确认识工程对于客观世界和社会的影响；
8. 具有适应发展的能力以及对终生终身学习的正确认识和学习能力；
9. 具有一定的组织管理能力、较强的表达能力和人际交往能力以及在团队中发挥作用的能力；具有一定的国际视野和跨文化的交流、竞争与合作能力。

Students are mainly required to acquire a all-rounded education of materials science and chemistry with specific emphasis on basic theories and fundamental knowledge; learn to know multidiscipline knowledge of

chemistry and materials science, inherent dependence of structure and property on composition and preparation condition for materials, relationship between materials performance and environment, basic skills in materials preparing, structure analyzing, property testing and device design; and gain ability to develop new materials, do research on new techniques.

Specific program objectives have been established to attain this general objective that its graduates will have:

1. Humanities and art, social responsibility and professional behavior;
2. Related knowledge of mathematics, science and economic management needed in composite materials and engineering;
3. Knowledge of experimental skills in materials synthesizing and preparing, forming and processing, structure analyzing, property testing, materials design, practical utilization and product quality control; basic engineering knowledge related to materials chemistry; experiences of practical engineering;
4. Basic methods for structure analysis and property testing; preliminary abilities to develop new materials, technologies and devices; preliminary abilities to employ adequate equipments to perform materials research and development; preliminary creative consciousness; Ability to use theory and technical methods and comprehensively considering different factors including economy, environment, law and safety, which confine product equipment and the process;
5. Basic knowledge and skills of mechanical design, electrical engineering & electric technology, and computer applications, which are needed in composite materials and engineering;
6. Basic methods of literature search, data query and use of modern information technology to obtain relative information;
7. Knowledge of guiding principles and policies of producing, designing, researching, environment protection and sustainable development in related industry and knowledge of the status and trends in the fields;
8. Ability to adapt to the development and keep study all their lifelong;
9. Ability of organizing and managing, expressing and communicating and to deal with crisis and emergency events and compete and cooperate in cross-cultural fields.

三、主干学科

III Major Disciplines

主干学科：材料科学、化学

Major Disciplines: Materials science, Chemistry

四、专业核心课程与专业特色课程

IV Core Courses and Characteristic Courses

专业核心课程：无机化学、分析化学、有机化学、物理化学、材料概论、结构化学、材料科学基础、计算化学、材料合成与加工、材料物理、材料化学原理及应用、材料研究与测试方法、材料化学合成及表征实验

Core Courses: Major Courses: Inorganic Chemistry, Analytical Chemistry, Organic Chemistry, Physical Chemistry, Introduction to Materials, Structural Chemistry, Fundamentals of Materials Science, Calculation Chemistry, Materials Synthesizing and Processing, Materials Physics, Principle and Application of Materials Chemistry, Methods of Materials Research and Testing, Experiments on Materials Chemistry and Characterization.

专业特色课程：材料概论、材料科学基础、材料化学原理及应用、材料物理、材料化学合成及表征实验

Characteristic Courses: Introduction to Materials, Fundamentals of Materials Science, Principle and Application of Materials Chemistry, Materials Physics, Experiments on Materials Chemistry and Characterization

五、计划学制与学位

V Length of Schooling and Degree

修业年限：四年

Duration: Four Years

授予学位：工学学士

Degree Granted: Bachelor of Engineering

六、最低毕业学分规定

VI Graduation Credit Criteria

课程类 Course Classification	通识课程 Basic Courses in General Education	学科大类课程 Basic Courses in General Discipline	专业课程 Courses in Specialty	个性课程 Individualized Courses	集中性实践 Intensified Internship and Practical Training	课外学分 Extracurricular Credits	总学分 Total Credits
课程性质 Course Nature							
必修课 Required Courses	35	60	37.5	\	22.5	\	190
选修课 Elective Courses	9	3	7	6	\	10	

七、课程修读指导建议

VII Recommendations on Course Studies

八、理论教学建议进程表

VIII Theory Course Schedule

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Code	课程名称 Course Name	学分 Credits	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur			
通识课程 Public Basic Courses	必修课 Required Courses	4220001110	思想道德修养与法律基础 Morals, Ethics and Fundamentals of Law	3	48			8		1-6		
		4220002110	中国近现代史纲要 Outline of Contemporary and Modern Chinese History	2	32					1-6		
		4220003110	毛泽东思想和中国特色社会主义理论体系概论 Introduction to Mao Zedong Thought and Socialism with Chinese Characteristics	4	96			32		1-6		
		4220005110	马克思主义基本原理 Marxism Philosophy	3	48			8		1-6		
		1060003130	军事理论 Military Theory	1	32			16		1-4		
		1050001130	心理健康教育 Mental Health Education	1	16					1-2		
		4210001110	体育 1 Physical Education I	1	32					1		
		4210002110	体育 2 Physical Education II	1	32					2	体育 1	
		4210003110	体育 3 Physical Education III	1	32					3	体育 2	
		4210004110	体育 4 Physical Education IV	1	32					4	体育 3	
		4030002110	大学英语 A1 College English A 1	3	64				16	1		

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Code	课 程 名 称 Course Name	学分 Credits	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major	
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur				
		4030003110	大学英语 A2 College English A II	3	64				16	2	大学英语 A1		
		4030004110	大学英语 A3 College English A III	3	64				16	3	大学英语 A2		
		4030005110	大学英语 A4 College English A IV	3	64				16	4	大学英语 A3		
		4120017110	大学计算机基础 Foundation of Computer	2	32		12			1			
		程序设计语言课程组(三选一, 3 学分) Courses of Computer Program Design (select one out of three, Credits: 3)											
		4120023110	计算机程序设计基础(C 语言) Fundamentals of Computer Program Design(C)	3	48		12			2			
		4120024110	计算机程序设计基础(FORTRAN 语言) Fundamentals of Computer Program Design(FORTRAN)	3	48		12			2			
		4120025110	计算机程序设计基础(VB 语言) Fundamentals of Computer Program Design(VB)	3	48		12			2			
		小 计 Subtotal		35	736		24	64	64				
		选修课 Elective Courses	创新创业类 Innovation and Entrepreneurship Courses		全校学生要求至少取得 9 学分, 建议每个类别中分别至少选修一门课程。 All students are required to obtain at least nine credits, and suggested to select at least one course in five categories respectively.								
	人文社科类 Arts and Social Science Courses												
	经济管理类 Economy and Management Courses												
	科学技术类 Science and Technology Courses												
	艺术体育类 Art and Physical Education Courses												
	学 科 大 类 Disciplinary Courses	必修课程 Required Courses	4070160110	专业导论 Introduction to Materials Science	1	16					1		
4080042110			工程图学 C Engineering Graphics C	4	64		8			2			
4050063110			高等数学 A 上 Advanced Mathematics A I	5	80					1			
4050064110			高等数学 A 下 Advanced Mathematics A II	5	80					2	高等数学 A 上		
4050021110			大学物理 A 上 Physics A I	3.5	56					2			
4050022110			大学物理 A 下 Physics A II	3.5	56					3	大学物理 A 上		
4050222110			物理实验 A 上 Physics Lab. A I	1	28	28				3	大学物理 A 上		
4050223110			物理实验 A 下 Physics Lab. A II	1	28	28				4	大学物理 A 下		
4070016110			材料概论 Introduction to Materials	2	32					3			
4050229110			线性代数 B Linear Algebra B	2.5	40					3			
4050058020			概率论与数理统计 B Probability and Mathematical Statistics B	3	48					4			

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Code	课 程 名 称 Course Name	学分 Credits	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major	
					总学时 Tot hrs.	实验 Exp.	上机 Ope-ration	实践 Prac-tice	课外 Extra-cur				
		4100012110	电工与电子技术基础 C Fundamentals of Electrical Engineering & Electric Technology C	4	64	10				4			
		4080061110	机械设计基础 Fundamentals of Mechanical Design	3.5	56	6				4			
		4050072110	工程力学 B Engineering Mechanics, B	4	64					4			
		4050073110	工程力学 B 实验 Engineering Mechanics Experiment B	0.5	16	16				4			
		4050452130	无机化学 Inorganic Chemistry	3.5	60					1			
		4050453130	无机化学实验 Inorganic Chemistry Experiment	1	32	32				1			
		4050820130	有机化学 Organic Chemistry	3.5	60					2			
		4050821130	有机化学实验 Organic Chemistry Experiment	1	32	32				2			
		4050044110	分析化学 C Analytical Chemist	1.5	24					3			
		4050252020	分析化学 C 实验 Analytical Chemistry C Experiment	1	32	32				3	分析化学 C		
		4050220110	物理化学 C Physical C	4	64					3			
		4050219110	物理化学 B 实验 Physical Chemistry B Experiment	1	32	32				3	物理化学 C		
		小 计 Subtotal			60	1064	216	8					
		选修课 Elective Courses	4200286130	综合化学实验 B（偏无机） Comprehensive Chemical Experiments B (Inorganic)	1	32	32				4		
	4200287130		综合化学实验 C（偏有机） Comprehensive Chemical Experiments C (Organic)	1	32	32				4			
	4070037110		材料与环境 Materials & Environment	2	32					5			
	4070118110		能源科学概论 Introduction to Energy Sources Sciences	2	32					5			
	4060090110		矿物与岩石 Minerals & Rocks	2	32	10				5			
	小 计 Subtotal			8	160	74							
	读说明：至少选修 3 学分。必选一门综合化学实验； NOTE: Minimum subtotal credits: 3.At least one course about Comprehensive Chemical Experiments is needed.												
专业基础课程 Basic Disciplinary Courses	必修课 Required Courses	4070028110	材料科学基础 Fundamentals of Materials Science	4.5	72					4			
		4070280120	材料科学基础实验 A Experiments on Fundamentals of Materials Science A	1	32	32				5	材料科学基础		
		4070033110	材料物理 B Materials Physics B	3.5	56					5			
		4070095110	结构化学 B Structural Chemistry B	3.5	56					5			

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Code	课 程 名 称 Course Name	学分 Credits	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Prac-tice	课外 Extra-cur			
		4070089110	计算化学 A Calculation Chemistry A	3	48		30			5		
		4070014110	材料腐蚀与防护 Materials Corrosion and Protection	2	32					5		
		4070003110	材料表面与界面 Materials Surface and Boundary	2	32					5		
		4070025110	材料化学原理及应用 Principle and Application of Materials Chemistry	4.5	72					6		
		4070035110	材料研究与测试方法 A Methods of Materials Research and Testing A	3.5	56					6		
		4070281120	材料研究与测试方法实验 Experiments on Methods of Material Research and Testing	2	64	64				6	材料研究与测试方法 A	
		4070021110	材料合成与加工 Materials Synthesizing and Processing	2	32					6		
		4070189110	材料化学合成及表征实验 Experiments on Materials Chemistry and Characterization	6	192	192				7		
		小 计 Subtotal		37.5	744	288	30					
	选修课 Elective Courses	4070138110	电化学原理与应用 Electrochemical Fundamentals and Applications	2	32					6		
		4070139110	燃料电池材料及应用 Fundamentals and Applications of Fuel Cell Materials	2	32					6		
		4070077110	功能陶瓷材料与器件 Functional Ceramic Materials and Devices	2	32					7		
		4070162110	材料工艺与设备 B Techniques and Equipments of Materials B	2	32					7		
		4070098110	金属材料 Metallic Materials	2	32					7		
		4070058110	高分子材料 Polymer Materials	2	32					7		
		4070048030	复合材料 Composite Materials	2	32					7		
		4070105110	精细陶瓷与工艺 Fine Ceramic Techniques	2	32					7		
		4070318130	半导体光电化学 Semiconductor Photoelectrochemistry	1	16					7		
		4070325130	纳米材料化学 Nanomaterials Chemistry	1	16					7		
Personalized 程	选修课 Elective Courses	小 计 Subtotal		18	288							
		修读说明：要求至少选修 7 学分。 NOTE: Minimum subtotal credits:7.										
		4070081110	光电子材料及应用 Photoelectron Materials and its Applications	1	16					6		
		4070009110	薄膜材料与技术 Thin-film Materials and Technology	1	16					6		
		4070145110	无机非金属材料工学 B Inorganic Non-metallic Materials Engineering B	2	32					6		

课程类别 Course Classifi- cation	课程 性质 Course Nature	课程编号 Course Code	课 程 名 称 Course Name	学分 Credits	学时分配 Including					建议修 读学期 Suggested Term	先修课程 Prerequisite Course	第二 专业 Second Major
					总学时 Tot hrs.	实验 Exp.	上机 Ope- ration	实践 Prac- tice	课外 Extra- cur			
		4070350130	电化学原理及应用 Principle and Application of Electrochemistry	2	32					6		
		4070116110	纳米材料与纳米技术 Nanomaterials and Nanotechnology	2	32					7		
		4070149110	现代功能材料 Modern Functional Materials	2	32					7		
		4070071110	新能源材料与技术 Materials and Technology of New Energy	2	32					7		
		小 计 Subtotal			12	192						
	修读说明：学生可跨专业自主选择修读全校其他专业的课程，建议修读以上课程。要求至少选修 6 学分。 NOTE: Students can select any courses from the other specialties, and are especially suggested to select the courses above. Minimum subtotal credits: 6.											

九、集中性实践教学环节建议进程表

IX Practice Schedule

课程编号 Course Code	实践环节名称 Name of Internship and Practical Training	周数 Weeks	学分 Credits	建议修读学期 Suggested Term	第二专业 Second Major
1060002110	军事训练 Military Training	3	1.5	1	
4080151110	机械制造工程实训 C Training on Mechanical Manufacturing Engineering C	2	2	4	
4100069110	电工电子实习 B Practice of Electrical Engineering & Electronics B	1	1	4	
4080146110	机械设计基础课程设计 Practice of Fundamentals of Mechanical Design	2	2	4	
4070218110	认识实习 Practice of Engineering Cognition	1	1	5	
4070230110	专业实习 Practice of Specialty	3	3	6	
4070210110	高温设备设计 Practice of Thermal Equipment Design	1	1	7	
4070341130	毕业论文 Graduation Thesis	17	11	8	
小 计 Subtotal		30	22.5		

十、其它要求

X Other Demands

《形势与政策》课程，平均每学期 16 学时，一般按专题进行，在第七学期末考核，计 2 个课外学分，具体由学校学生发展指导中心负责组织落实。

Situation & Policy, a course with 16 hours / term and 2 extracurricular credits, is taught in terms of topics and tested at the end of the 7th term. The course will be arranged by the Centre of Development and Guidance for Students in the university.

无机非金属材料工程专业本科培养方案

Undergraduate Program for Specialty in Inorganic Non-metallic Material Engineering

一、业务培养目标

I Educational Objectives

本专业培养有良好社会责任感和职业道德，具有较好自然科学基础和人文社会科学基础，扎实的无机非金属材料领域的材料科学、材料工程方面专业知识，综合素质好，具有创新精神，能在无机非金属材料制备、加工成型、材料分析、材料应用等领域从事科学研究与教学、技术和产品开发、新材料研制、工艺和设备设计、技术改造、生产技术管理与经营管理等方面工作，适应社会主义市场经济发展的高层次、高素质、德智体全面发展的科学研究与工程技术人才。

本专业期待毕业生几年之后能达成下列目标：

1. 具有良好的修养与道德水准；
2. 能够进行无机非金属材料技术与产品研发、工艺与设备设计、和生产技术管理；
3. 能够在一个技术开发团队中作为骨干或者领导有效地发挥作用；
4. 在无机非金属材料制备、加工成型、材料分析、材料应用等领域具有就业竞争力，并有能力进入研究生阶段学习；
5. 能够通过终身学习拓展自己的知识和能力；
6. 有意愿创新实践，并有能力服务社会。

This major aims at training students with social responsibility, professional morality, solid fundamental knowledge of natural and social science, professional expertise of materials science and engineering in the field of inorganic nonmetallic materials. They should have good comprehensive capabilities and innovative inspirations, quantifying them for engagements in scientific research, teaching, technology and product development, new materials development, process and equipment design, technical reconstruction, operation management and business management in the fields of preparation, processing, forming, analysis and application of inorganic nonmetallic materials.

Graduates of this major are supposed to achieve the following aims:

1. Having good manner and excellent moralities
2. An ability to conduct research on technology and product of inorganic non-metallic materials, the design of technique and equipment as well as management of production technique.
3. An ability to function as the leading role in a technique developing team.
4. Having strong competitiveness for employment in the field of inorganic non-metallic materials preparation, processing, materials analysis and materials application; an ability to be admitted to the postgraduate study.
5. An ability to develop ones' own knowledge and abilities through lifelong learning.
6. Recognition of innovation practice and an ability to serve for the society.

二、业务培养要求

II Educational Requirements

本专业学生主要学习材料科学与工程方面的基础理论和基本知识，掌握材料的制备、组成、组织结构与性能之间关系的基本规律，接受各种无机非金属材料的制备、结构与性能检测分析、设计与开发的基本训练，掌握开发新材料、研究新工艺、提高和改善材料性能和提高产品质量的基本能力。

毕业生应获得以下几方面的知识和能力：

1. 具有人文社会科学素养、社会责任感和工程职业道德；

2. 具有从事工程工作所需的自然科学、人文社会科学以及经济和管理知识;
3. 掌握工程基础知识和材料科学与工程学科的基础理论, 具有材料合成与制备、材料设计及工程研究、产品质量控制等专业基础知识; 具有系统的工程实践学习经历; 了解本专业的前沿发展现状和趋势;
4. 掌握无机非金属材料结构与性能的分析方法、生产工艺的设计方法和无机非金属材料的应用技术, 具备材料研究、材料设计、材料应用、工程设计和实施工程实验的能力, 并能够对实验结果进行分析;
5. 掌握基本的创新方法, 具有追求创新的态度和意识; 具有综合运用理论和技术手段设计材料生产装备或工艺的能力, 设计过程中能够综合考虑经济、环境、法律、安全、健康、伦理等制约因素;
6. 掌握文献检索、资料查询及运用现代信息技术获取相关信息的基本方法; 对终身学习有正确认识, 具有不断学习和适应发展的能力;
7. 了解与本专业相关的职业和行业的生产、设计、研究与开发、环境保护和可持续发展等方面的方针、政策和法律、法规, 能正确认识工程对于客观世界和社会的影响;
8. 具有一定的组织管理能力、表达能力和人际交往能力以及在团队中发挥作用的能力; 具有国际视野和跨文化的交流、竞争与合作能力。

Students are mainly required to acquire an all-rounded education of material science and engineering with specific emphasis on basic theories and fundamental knowledge; learn to know the basic rules of the relationship between materials organization and their performance; be trained on various practical work of inorganic non-metallic materials preparing, testing and analyzing; and gain ability to develop new materials and do research on new techniques.

Specific program objectives have been established to attain this general objective that its graduates will have:

1. Humanities and art, social responsibility and professional behavior;
2. Basic knowledge of engineering and theories of materials science and engineering; disciplines with materials synthesizing and preparing, materials designing and engineering research and product quality controlling; experience of engineering practice;
3. Methods for analyzing materials structure and performance and designing the product process, technology applications in inorganic nonmetallic materials;
4. Knowledge of professional skills and economic management related to work;
5. Ability to use theory and technical methods and comprehensively consider different factors including economy, environment, law and safety, which confine product equipment and the process;
6. Basic methods of literature search, data query and use of modern information technology to obtain relevant information;
7. Knowledge of guiding principles and policies of producing, designing, researching, environment protection and sustainable development in related industry and knowledge of the status and trends in the fields;
8. Ability of organizing and managing, expressing and communicating as well as the international vision and the ability to compete and cooperate in cross-cultural fields.

三、主干学科

III Major Disciplines

主干学科: 材料科学与工程、化学、物理学

Major Disciplines: Materials Science & Engineering, Chemistry, Physics

四、专业核心课程与专业特色课程

IV Core Courses and Characteristic Courses

专业核心课程: 无机化学, 物理化学、材料科学基础、材料工程基础、材料研究与测试方法、无机

非金属材料工学

Core Courses: Inorganic Chemistry, Physical Chemistry, Introduction to Materials, Fundamentals of Materials Science, Fundamentals of Materials Engineering, Methods of Materials Research and Testing, Inorganic Non-metallic Materials Engineering

专业特色课程：材料科学基础、材料工程基础、材料概论、材料制备与性能实验、无机非金属材料工厂设计概论、无机非金属材料工学

Characteristic Courses: Fundamentals of Materials Science, Fundamentals of Materials Engineering, Introduction to Materials, Experiments on Materials Fabrication and Performance, Introduction of Inorganic Non-metallic Materials Plant Design, Inorganic Non-metallic Materials Engineering

五、计划学制与学位

V Length of School and Degree

修业年限：四年

Duration: Four Years

授予学位：工学学士

Degree Granted: Bachelor of Engineering

六、最低毕业学分规定

VI Graduation Credit Criteria

课程类别 Course Classification 课程性质 Course Nature	通识课程 Public Basic Courses	学科大类课程 Basic Courses in General Discipline	专业课程 Courses in Specialty	个性课程 Personalized Course	集中性实践 Practice Courses	课外学 Extracurricular Credits	总学分 Total Credits
必修课 Required Courses	35	60	31.5	\	30.5	\	190
选修课 Elective Courses	9	4	10	\	\	10	

七、课程修读指导建议

VII Recommendations on Course Studies

八、理论教学建议进程表
VIII Theory Course Schedule

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Number	课 程 名 称 Course Title	学 分 Crs	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major	
					总学时 Tot hrs.	实验 Exp.	上机 Ope-ration	实践 Prac-tice	课外 Extra-cur				
通 识 课 程 Public Basic Courses	必修课程 Required Courses	4220001110	思想道德修养与法律基础 Morals, Ethics and Fundamentals of Law	3	48			8		1-6			
		4220002110	中国近现代史纲要 Outline of Contemporary and Modern Chinese History	2	32					1-6			
		4220003110	毛泽东思想和中国特色社会主义理论体系概论 Introduction to Mao Zedong Thought and Socialism with Chinese Characteristics	4	96			32		1-6			
		4220005110	马克思主义基本原理 Marxism Philosophy	3	48			8		1-6			
		1060003130	军事理论 Military Theory	1	32			16		1-4			
		1050001130	心理健康教育 Mental Health Education	1	16					1-2			
		4210001110	体育 1 Physical Education I	1	32					1			
		4210002110	体育 2 Physical Education II	1	32					2	体育 1		
		4210003110	体育 3 Physical Education III	1	32					3	体育 2		
		4210004110	体育 4 Physical Education IV	1	32					4	体育 3		
		4030002110	大学英语 A1 College English A I	3	64				16	1			
		4030003110	大学英语 A2 College English A II	3	64				16	2	大学英语 A1		
		4030004110	大学英语 A3 College English A III	3	64				16	3	大学英语 A2		
		4030005110	大学英语 A4 College English A IV	3	64				16	4	大学英语 A3		
		4120017110	大学计算机基础 Foundation of Computer	2	32		12			1			
		程序设计语言课程组(三选一，3 学分) Courses of Computer Program Design (select one out of three, Credits: 3)											
			4120023110	计算机程序设计基础(C 语言) Fundamentals of Computer Program Design(C)	3	48		12			2		
			4120024110	计算机程序设计基础(FORTRAN 语言) Fundamentals of Computer Program Design(FORTRAN)	3	48		12			2		
			4120025110	计算机程序设计基础(VB 语言) Fundamentals of Computer Program Design(VB)	3	48		12			2		
		小 计 Subtotal			35	736		24	64	64			
	选修课程 Elective Courses	创新创业类 Innovation and Entrepreneurship Courses			全校学生要求至少取得 9 学分，建议在每个类别中分别至少选修一门课程。 All students are required to obtain at least nine credits, and suggested to select at least one course in five categories respectively.								
		人文社科类 Arts and Social Science Courses											
		经济管理类 Economy and Management Courses											

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Number	课 程 名 称 Course Title	学 分 Crs	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major
		总学时 Tot hrs.	实验 Exp.		上机 Ope- ration	实践 Prac- tice	课外 Extra- cur					
	科学技术类 Science and Technology Courses											
艺术体育类 Art and Physical Education Courses												
学 科 大 类 课 程 Basic Disciplinary Courses	必修课程 Required Courses	4070160110	专业导论 Introduction to Materials Physics	1	16					1		
		4080042110	工程图学 C Engineering Graphics C	4	64		8			2		
		4050063110	高等数学 A1 Advanced Mathematics A I	5	80					1		
		4050064110	高等数学 A2 Advanced Mathematics A II	5	80					2	高等数学 A1	
		4050021110	大学物理 A 上 Physics A I	3.5	56					2		
		4050022110	大学物理 A 下 Physics A II	3.5	56					3	大学物理 A 上	
		4050466130	物理实验 A 上 Physics Lab. A I	1	32	32				3	大学物理 A 上	
		4050467130	物理实验 A 下 Physics Lab. A II	1	32	32				4	大学物理 A 下	
		4070016110	材料概论 Introduction to Materials	2	32					3		
		4050229110	线性代数 Linear Algebra	2.5	40					3	高等数学 A2	
		4050058020	概率论与数理统计 B Probability and Mathematical Statistics B	3	48					4	高等数学 A2	
		4100012110	电工与电子技术基础 C Fundamentals of Electrical Engineering & Electric Technology C	4	64	10				4		
		4080061110	机械设计基础 Base of Mechanical Design	3.5	56	6				4		
		4050072110	工程力学 B Engineering Mechanics, B	4	64					4		
		4050073110	工程力学 B 实验 Engineering Mechanics Experiment B	0.5	16	16				4		
		4050452130	无机化学 Inorganic Chemistry	3.5	60					1		
		4050453130	无机化学实验 Inorganic Chemistry Experiment	1	32	32				1		
		4050820130	有机化学 Organic Chemistry	3.5	60					2		
		4050821130	有机化学实验 Organic Chemistry Experiment	1	32	32				2		
		4050044110	分析化学 C Analytical Chemistry	1.5	24					3		
		4050045110	分析化学实验 Analytical Chemistry C Experiment	1	32	32				3	分析化学 C	
		4050220110	物理化学 C Physical C	4	64					3		

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Number	课 程 名 称 Course Title	学 分 Crs	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur			
		4050219110	物理化学 B 实验 Physical Chemistry B Experiment	1	32	32				3	物理化学 C	
		小 计 Subtotal		60	1072	224	8					
	选修课 Elective Courses	4200286130	综合化学实验 B (偏无机) Comprehensive Chemical Experiments B (Inorganic)	1	32	32				4		
		4200287130	综合化学实验 C (偏有机) Comprehensive Chemical Experiments C (Organic)	1	32	32				4		
		4070091110	计算机在材料科学与工程中应用 A Computer Applied in Materials Science & Engineering A	2.5	40		12			5		
		4070037110	材料与环境 Materials & Environment	2	32					5		
		4070118110	能源科学概论 Introduction to Science of Energy Sources	2	32					5		
		4060090110	矿物与岩石 Minerals & Rocks	2	32	10				5		
		4070151110	项目管理 B Project management B	1	16					5		
		4070002110	安全工程 Safety Engineering	1	16					5		
		小 计 Subtotal		12.5	232	74	12					
		修读说明: 至少选修 3 学分。必选一门综合化学实验。 NOTE: Minimum subtotal credits: 3. At least one course about Comprehensive Chemical Experiments is needed.										
专 业 课 程 Specialized Courses	必修课 Required Courses	4070028110	材料科学基础 Fundamentals of Materials Science	4.5	72					4		
		4070280120	材料科学基础实验 A Basic Experiments on Materials Science A	1	32	32				5	材料科学基础	
		4070142110	无机材料物理性能 Physical Properties of Inorganic Non-metallic Materials	2	32					5		
		4070144110	无机非金属材料工学 A Inorganic Non-metallic Materials Engineering A	5	80					5		
		4070017110	材料工程基础 Fundamentals of Materials Engineering	4	64					5		
		4070276120	材料工程基础实验 Basic Experiments on Materials Engineering	2	64	64				6	料工程基础	
		4070030110	材料设计实验 Experiments on Materials Design	1	32	20				6		
		4070036110	材料研究与测试方法 B Methods of Materials Research and Testing B	2.5	40					6		
		4070281120	材料研究与测试方法实验 Experiments on Testing Techniques of Materials	2	64	64				6	材料研究与测试方法 B	
		4070120110	热工设备 Thermal Equipments	2	32					6		
		4070143110	无机非金属材料工厂设计概论 Introduction of Inorganic Non-metallic Materials Plant Design	2.5	40			12		6		
		4070284120	材料制备与性能实验 Experiments on Materials Fabrication and Performance	3	96	96				7	无机非金属材料工学 A	
		小 计 Subtotal		31.5	648	276		12				

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Number	课 程 名 称 Course Title	学 分 Crs	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major	
					总学时 Tot hrs.	实验 Exp.	上机 Ope-ration	实践 Prac-tice	课外 Extra-cur				
选修课 Elective Courses		4070047110	粉体科学与工程基础 Fundamentals of Powder Science and Engineering	2	32					6			
		4070093110	建筑工程概论 B Introduction to Architecture Engineering B	1	16					6			
		4070094110	胶凝材料 Gelatin Materials	2	32					6			
		4070136110	特种陶瓷 Special Ceramics	1.5	24					6			
		4070137110	特种水泥 Special Cement	1.5	24					6			
		4070135110	特种玻璃 Special Glass	1.5	24					6			
		4070070110	高性能混凝土 High-performance Concrete	1.5	24					6			
		4070074110	功能材料 B Functional Materials B	1	16					7			
		4070086030	环境保护与绿色生产技术 Environmental Protection and Eco-production	1	16					7			
		4070133110	陶瓷色釉料及产品设计 Ceramic Glaze and Product Design	2	32					7			
		4070008110	玻璃深加工技术 Further Processing Techniques of Glass	2	32					7			
		4070088110	混凝土制备技术与设备 Techniques and Equipments of Concrete Producing	1.5	24					7			
		4070087110	混凝土施工技术 Construction Techniques of Concrete	1	16					7			
		4070006110	玻璃光导纤维 Optical Glass Fiber	2	32					7			
		4070042110	道桥工程材料 Engineering Materials of Highways and Bridges	2	32					7			
		4070009110	薄膜材料与技术 Thin-film Materials and Technology	1	16					7			
		4070116110	纳米材料与纳米技术 Nanomaterials and Nanotechnology	2	32					7			
		4070081110	光电子材料及应用 Photoelectron Materials and the Applications	1	16					7			
		4070071110	新能源材料与技术 New Energy Sources Materials and Technology	2	32					7			
			小 计 Subtotal		29.5	472							
	修读说明：要求至少选修 10 学分。 NOTE: Minimum subtotal credits: 10												

九、集中性实践教学环节建议进程表

IX Practice Schedule

课程编号 Course Number	实践环节名称 Practice Courses Name	周数 Weeks	学分 Crs	建议修读学期 Suggested Term	第二专业 Second Major
1060002110	军事训练 Military Training	3	1.5	1	

课程编号 Course Number	实践环节名称 Practice Courses Name	周数 Weeks	学分 Crs	建议修读学期 Suggested Term	第二专业 Second Major
4080151110	机械制造工程实训 C Training on Mechanical Manufacturing Engineering C	2	2	4	
4100069110	电工电子实习 B Practice of Electrical Engineering & Electronics B	1	1	4	
4080146110	机械设计基础课程设计 Practice of Fundamentals of Mechanical Design	2	2	5	
4070225110	专业实习 Practice of Specialty	2	2	6	
4070211110	工程设计训练 Training on Engineering Design	3	3	6	
4070202110	岗位实习 Internship	8	8	7	
4070262120	毕业论文 Graduation Thesis	17	11	8	
小 计 Subtotal		38	30.5		

十、其它要求

X Other Demands

《形势与政策》课程，平均每学期 16 学时，一般按专题进行，在第七学期末考核，计 2 个课外学分，具体由学校学生发展指导中心负责组织落实。

Situation & Policy, a 16 hours/term with 2 credits course, is taught according to topics and tested at the end of the 7th term. The course will be arranged by the University Students' Affairs' Department in each school.

高分子材料与工程专业本科培养方案

Undergraduate Program for Major in Polymer Materials & Engineering

一、业务培养目标

I Educational Objectives

本专业培养具有良好的思想道德素质、民族自豪感和社会责任感、健全心理和健康的体魄，能够德、智、体全面发展，基础扎实、知识面宽、能力强、素质高，富有创新精神的人才。

培养具有高分子材料与工程等方面的知识，能在高分子材料的合成改性和加工成型等领域从事科学研究、技术开发、工艺和设备设计、生产及经营管理等方面工作，适应社会的高层次、高素质、全面发展的科学研究与工程技术人才。

Aiming at preparing students for excellent researchers and engineers with initiative spirit, social responsibility and professional behavior, this program will enable students to be solid grounded in basic theory and wide-ranged in specialized knowledge of polymer materials and engineering. Students can be fit into jobs of scientific research, development of technology, design of technique and equipment, and manufacturing and operating management.

二、业务培养要求

II Educational Requirement

要求学生掌握人文社会科学理论、具有社会责任感和工程职业道德，较强的外语能力和计算机应用能力，掌握科学学习方法，具有较强的学习和适应社会发展的能力。本专业学生主要学习高聚物化学与物理的基本理论和高分子材料的组成、结构与性能的知识及高分子成型加工技术的知识。

1. 具有从事高分子材料行业工作所需的数学、自然科学、经济和管理知识；
2. 掌握高分子材料的合成、改性的方法，高分子材料的组成、结构和性能关系；
3. 掌握聚合物加工流变学、成型加工工艺和成型模具设计的基本理论和基本技能；
4. 具有对高分子材料进行改性及加工工艺研究、设计和分析测试的能力；
5. 了解高分子材料专业的前沿发展现状和趋势，具有高分子材料专业系统的工程实践学习经历；
6. 掌握文献检索、资料查询及运用现代信息技术获取相关信息的基本方法；
7. 掌握基本的创新方法，具有创新意识，具有综合运用理论和技术方法设计、开发新型高分子材料及产品的初步能力，并能在设计开发过程中全面考虑到各种制约因素；
8. 了解与高分子材料行业相关的法律、法规和政策方针，能正确认识高分子材料的发展对自然和社会的影响；
9. 具有一定的管理能力、表达能力和团队合作能力，具有一定的国际视野和跨文化的交流合作及竞争能力；

Students are required to have basic theory of humanities and art, social responsibility and professional behavior; great aptitude for foreign languages and computer applications; strong ability to learn and adapt to the society. The students of this major mainly study basic theory of polymer chemistry and physics, the relation of composition, structure and properties of polymer materials, and polymer molding processing technology.

Specific program objectives have been established to attain this general objective that its graduates will have:

1. Knowledge of mathematics, natural science, economy and management, which are prepared for polymer material industry engineering;

2. Methods of polymerization and modification of polymer materials; knowledge of relationship among compositions, structures and properties of polymer materials;
3. Basic theory and skills of polymer processing rheology, technology of molding processing and molding design;
4. Ability to do research, design, analytical test on modification and processing technology of polymer materials;
5. Knowledge of the status and trends in the field polymer materials; experience of engineering practice in polymer materials;
6. Basic methods of literature search, data query and use of modern information technology to obtain relative information;
7. Ability to use theory and technical methods to develop new polymer materials and products and comprehensively considering restraining factors;
8. Knowledge of laws, principles and policies related to polymer industry and development of polymer materials affected on nature and society;
9. Ability of organizing and managing, expressing and communicating as well as the international vision and the ability to compete and cooperate in cross-cultural fields.

三、主干学科

III Major Disciplines

主干学科：材料科学与工程

Major Disciplines: Materials Science and Engineering

四、专业核心课程与专业特色课程

IV Core Courses and Characteristic Courses

专业核心课程：有机化学、物理化学、高分子化学、高分子物理、材料化工基础、聚合物流变学、聚合物加工原理与工艺、聚合物合成工艺学、材料研究与测试方法。

Core Courses: Organic Chemistry, Physical Chemistry, Polymer Chemistry, Polymer Physics, Fundamentals of Materials Chemical Engineering, Rheology of Polymer, Principle and Technology of Polymer Processing, Technology of Polymer Synthesis, Methods of Materials Research and Testing.

专业特色课程：高分子材料研究进展，聚合物复合材料，高分子建筑材料，防水材料，高聚物循环再生技术，高分子共混物改性

Characteristic Courses: Research Development of Polymer Materials, Polymer Composite Materials, Polymer Materials for Building, Waterproof Materials, Technology of Polymer Materials Recycling, Polymer Blends and Modification

五、计划学制与学位

V Length of Schooling and Degree

修业年限：四年

Duration: Four Years

授予学位：工学学士

Degree Granted: Bachelor of Engineering

六、最低毕业学分规定

VI Graduation Credit Criteria

课程类 Course Classification 课程性质 Course Nature	通识课程 Basic Courses in General Education	学科大类课程 Basic Courses in General Discipline	专业课程 Courses in Specialty	个性课程 Individualized Courses	集中性实践 Intensified Internship and Practical Training	课外学分 Extracurricular Credits	总学分 Total Credits
必修课 Required Courses	35	60	39	\	21.5	\	190
选修课 Elective Courses	9	3	6.5	6	\	10	

七、课程修读指导建议

VII Recommendations on Course Studies

八、理论教学建议进程表

VIII Theory Course Schedule

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Number	课程名称 Course Title	学分 Crs	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur			
通识课程 Public Basic Courses	必修 Required Courses	4220001110	思想道德修养与法律基础 Morals, Ethics and Fundamentals of Law	3	48			8		1-6		
		4220002110	中国近现代史纲要 Outline of Contemporary and Modern Chinese History	2	32					1-6		
		4220003110	毛泽东思想和中国特色社会主义理论体系概论 Introduction to Mao Zedong Thought and Socialism with Chinese Characteristics	4	96			32		1-6		
		4220005110	马克思主义基本原理 Marxism Philosophy	3	48			8		1-6		
		1060003130	军事理论 Military Theory	1	32			16		1-4		
		1050001130	心理健康教育 Mental Health Education	1	16					1-2		
		4210001110	体育 1 Physical Education I	1	32					1		
		4210002110	体育 2 Physical Education II	1	32					2	体育 1	
		4210003110	体育 3 Physical Education III	1	32					3	体育 2	
		4210004110	体育 4 Physical Education IV	1	32					4	体育 3	
		4030002110	大学英语 A1 College English A 1	3	64				16	1		
		4030003110	大学英语 A2 College English A II	3	64				16	2	大学英语 A1	
		4030004110	大学英语 A3 College English A III	3	64				16	3	大学英语 A2	
		4030005110	大学英语 A4 College English A IV	3	64				16	4	大学英语 A3	

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Number	课 程 名 称 Course Title	学 分 Crs	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major	
		总学时 Tot hrs.	实验 Exp.		上机 Ope-ration	实践 Prac-tice	课外 Extra-cur						
		4120017110	大学计算机基础 Foundation of Computer	2	32		12			1			
		程序设计语言课程组(三选一, 3 学分) Courses of Computer Program Design (select one out of three, Credits: 3)											
		4120023110	计算机程序设计基础(C 语言) Fundamentals of Computer Program Design(C)	3	48		12			2			
		4120024110	计算机程序设计基础(FORTRAN 语言) Fundamentals of Computer Program Design(FORTRAN)	3	48		12			2			
		4120025110	计算机程序设计基础(VB 语言) Fundamentals of Computer Program Design(VB)	3	48		12			2			
		小 计 Subtotal		35	736		24	64	64				
		选 修 课 Elective Courses	创新创业类 Innovation and Entrepreneurship Courses		全校学生要求至少取得 9 学分, 建议在每个类别中分别至少选修一门课程。 All students are required to obtain at least nine credits, and suggested to select at least one course in five categories respectively.								
	人文社科类 Arts and Social Science Courses												
	经济管理类 Economy and Management Courses												
	科学技术类 Science and Technology Courses												
	艺术体育类 Art and Physical Education Courses												
	学 科 大 类 课 程 Basic Disciplinary Courses	必 修 课 Required Courses	4070160110	专业导论 Introduction to Materials Physics	1	16					1		
			4080042110	工程图学 C Engineering Graphics C	4	64		8			2		
4050063110			高等数学 A 上 Advanced Mathematics A I	5	80					1			
4050064110			高等数学 A 下 Advanced Mathematics A II	5	80					2	高等数学 A 上		
4050021110			大学物理 A 上 Physics A I	3.5	56					2			
4050022110			大学物理 A 下 Physics A II	3.5	56					3	大学物理 A 上		
4050222110			物理实验 A 上 Physics Lab. A I	1	28	28				3	大学物理 A 上		
4050223110			物理实验 A 下 Physics Lab. A II	1	28	28				4	大学物理 A 下		
4070016110			材料概论 Introduction to Materials	2	32					3			
4050229110			线性代数 Linear Algebra	2.5	40					3	高等数学 A 下		
4050058020			概率论与数理统计 B Probability and Mathematical Statistics B	3	48					4	高等数学 A 下		
4100012110			电工与电子技术基础 C Fundamentals of Electrical Engineering & Electric Technology C	4	64	10				4			
4080061110			机械设计基础 Base of Mechanical Design	3.5	56	6				4			

课程类别 Course Classifi- cation	课程 性质 Course Nature	课程编号 Course Number	课 程 名 称 Course Title	学 分 Crs	学时分配 Including					建议修 读学期 Suggested Term	先修课程 Prerequisite Course	第二 专业 Second Major	
					总学时 Tot hrs.	实验 Exp.	上机 Ope- ration	实践 Prac- tice	课外 Extra- cur				
		4050072110	工程力学 B Engineering Mechanics, B	4	64					4			
		4050073110	工程力学 B 实验 Engineering Mechanics Experiment B	0.5	16	16				4			
		4050452130	无机化学 Inorganic Chemistry	3.5	60					1			
		4050453130	无机化学实验 Inorganic Chemistry Experiment	1	32	32				1			
		4050820130	有机化学 Organic Chemistry	3.5	60					2			
		4050821130	有机化学实验 Organic Chemistry Experiment	1	32	32				2			
		4050044110	分析化学 C Analytical Chemist	1.5	24					3			
		4050252020	分析化学实验 Analytical Chemistry C Experiment	1	32	32				3	分析化学 C		
		4050220110	物理化学 C Physical C	4	64					3			
		4050219110	物理化学 B 实验 Physical Chemistry B Experiment	1	32	32				3	物理化学 C		
		小 计 Subtotal			60	1064	216	8					
		选修 课 Elective Courses	4200286130	综合化学实验 B（偏无机） Comprehensive Chemical Experiments B (Inorganic)	1	32	32				4		
	4200287130		综合化学实验 C（偏有机） Comprehensive Chemical Experiments C (Organic)	1	32	32				4			
	4070037110		材料与环境 Materials & Environment	2	32					5			
	4070118110		能源科学概论 Introduction to Science of Energy Sources	2	32					5			
	4060090110		矿物与岩石 Minerals & Rocks	2	32	10				5			
	小 计 Subtotal			8	160	74							
	修读说明：要求至少选修 3 学分。 NOTE: Minimum subtotal credits: 3.												
	专 业 课 程 Specialized Courses	必修 课 Required Courses	4070064110	高分子化学 A Polymer Chemistry A	3.5	56					5		
			4070067110	高分子物理 A Polymer Physics A	3.5	56					5		
4070022110			材料化工基础 Fundamentals of Materials Chemical Engineering	3.5	56					5			
4070090110			计算机在材料科学与工程中应用 A Computer applied in Materials Science & Engineering A	2.5	40		20			5			
4070294120			高分子科学实验 Experiments on Polymer Science	3	96	96				5			
4070110110			聚合物加工原理与工艺 Principle and Technology of Polymer Processing	3	48					6			
4070260120			聚合物合成工艺学 Technology of Polymer Synthesis	3.5	56			16		6			

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Number	课 程 名 称 Course Title	学 分 Crs	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major
					总学时 Tot hrs.	实验 Exp.	上机 Ope- ration	实践 Prac- tice	课外 Extra- cur			
		4070111110	聚物流变学 Rheology of Polymer	2	32					6		
		4070109110	聚合物加工设备 Equipments of Polymer Processing	2	32					6		
		4070076110	功能高分子 Functional Polymer	2	32					6		
		4070292120	高分子化工与合成工艺实验 Experiments on Polymer Chemical Engineering g and Synthesize Technology	2	64	64				6		
		4070289120	高分子材料加工实验 Experiments on Polymer Materials Processing	2	64	64				6		
		4070036110	材料研究与测试方法 B Methods of Materials Research and Testing B	2.5	40					7		
		4070291120	高分子材料实验 Experiments on Polymer Materials	2	64	64				7		
		4070288120	高分子材料表征技术实验 Experiments on Polymer Material Characterization	1	32	32				7		
		4070290120	高分子材料科学与工程综合实验 Comprehensive Experiments on Polyme Materials Science and Engineering	1	32	32				7		
		小 计 Subtotal			39	800	352	20	16			
		选 修 课 Elective Courses	4070129110	塑料模具设计 Mould Design of Plastics Processing	1.5	24					6	
	4070063110		高分子共混物改性 Polymer Blends and Modification	2	32					6		
	4070106110		聚合反应工程 Reactive Engineering of Polymerization	1.5	24					6		
	4070123110		热稳定聚合物 Thermal Stabilized Polymer	1.5	24					7		
	4070124110		乳液聚合 Emulsion Polymerization	1.5	24					7		
	4070096110		结构化学 C Structural Chemistry C	1.5	24					7		
	4070061110		高分子材料研究进展 Development of Polymer Materials	2	32					7		
	4070066110		高分子建筑材料 Polymer Materials For Building	1.5	24					7		
	4070107110		聚合物复合材料 Polymer Composite Materials	1.5	24					7		
	4070044110		防水材料 Waterproof Materials	1.5	24					7		
	4070312130		高聚物循环再生技术 Technology of Polymer Materials Recycling	1.5	24					7		
	小 计 Subtotal			17.5	280							
修读说明：要求至少选修 6.5 学分。 NOTE: Minimum subtotal credits: 6.5.												

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Number	课 程 名 称 Course Title	学 分 Crs	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur			
个性化课程 Personalized Course	选修课 Elective Courses	修读说明：学生可跨专业自主选择修读全校其他专业的课程。要求至少选修 6 学分。 NOTE: Students can choose any courses from the other specialties. Minimum subtotal credits: 6.										

九、集中性实践教学环节建议进程表

IX Practice Schedule

课程编号 Course Number	实践环节名称 Practice Courses Name	周数 Weeks	学分 Crs	建议修读学期 Suggested Term	第二专业 Second Major
1060002110	军事训练 Military Training	3	1.5	1	
4080151110	机械制造工程实训 C Training on Mechanical Manufacturing	2	2	4	
4100069110	电工电子实习 B Practice of Electrical Engineering & Electronics B	1	1	4	
4080146110	机械设计基础课程设计 Practice of Fundamentals of Mechanical Design	2	2	4	
4070219110	认识实习 Practice of Engineering Cognition	1	1	5	
4070222110	生产实习 Practice of Producing	3	3	7	
4070264120	毕业论文 Graduation Thesis	17	11	8	
小 计 Subtotal		29	21.5		

十、其它要求

X Other Demands

《形势与政策》课程，平均每学期 16 学时，一般按专题进行，在第七学期末考核，计 2 个课外学分，具体由学校学生发展指导中心负责组织落实。

Situation & Policy, a 16 hours/term with 2 credits course, is taught according to topics and tested at the end of the 7th term. The course will be arranged by the University Students' Affairs' Department in each school.

复合材料与工程专业本科培养方案

Undergraduate Program for Major in Composite Materials

一、业务培养目标

I Educational Objectives

本专业培养具有良好的思想道德素质、强烈的民族自豪感和社会责任感、健全的心理和健康的体魄，能够德、智、体全面发展，基础扎实、知识面宽、能力强、素质高，富有创新精神的专业型人才。

培养具有复合材料与工程等方面的知识，能从事复合材料与工程领域的科学研究与教学、技术开发、工艺与设备设计、新产品研制及经营管理等方面工作，适应社会的高层次、高素质、全面发展的科学研究与工程技术人才。

Aiming at preparing students for professional talents with initiative spirit, social responsibility and professional behavior, this program will enable students to be solid grounded in basic theory and wide-ranged in specialized knowledge of inorganic non-metallic materials engineering. Students can be fit into jobs in the fields of composite materials and engineering. They can do the work of scientific research and teaching, development of technology and product, design of technology and equipment, new products development operating management.

二、业务培养要求

II Educational Requirement

本专业学生主要学习复合材料与工程的基础理论，掌握复合材料的制备、组成、结构与性能之间关系的基本规律，接受各种复合材料的制备、性能分析及检测技能的基本训练，使学生具有开发新型复合材料、研究新工艺、改善复合材料性能和提高复合材料产品质量的基本能力。

毕业生应获得以下几方面的知识和能力：

1. 具有较好的人文社会科学素养、较强的社会责任感和良好的工程职业道德；
2. 具有从事复合材料与工程工作所需的相关数学、自然科学知识以及一定的经济管理知识；
3. 掌握扎实的复合材料设计、材料合成与制备、材料复合、性能检测与产品质量控制等专业基础知识；了解本专业的前沿发展现状和趋势；
4. 具有良好的创新意识和综合运用所学科学理论和技术手段对复合材料新产品、新工艺、新技术和新设备进行研究、开发和设计的初步能力；具有良好的项目方案策划能力与科技写作能力。
5. 具有复合材料与工程专业必须的机械设计、电工与电子技术、计算机应用的基本知识和技能；
6. 掌握文献检索、资料查询及运用现代信息技术获取相关信息的基本方法；
7. 了解与本专业相关的职业和行业的生产、设计、研究与开发的法律、法规，熟悉环境保护和可持续发展等方面的方针、政策和法律、法规，能正确认识工程对于客观世界和社会的影响；
8. 具有一定的组织管理能力、较强的表达能力和人际交往能力以及在团队中发挥作用的能力；
9. 具有适应发展的能力以及对终生终身学习的正确认识和学习能力；
10. 初步具备应对危机与突发事件的能力以及一定的国际视野和跨文化的交流、竞争与合作能力。

Students are mainly required to acquire a all-rounded education of composite materials and engineering with specific emphasis on basic theories and fundamental knowledge; learn to know the basic rules of the relationship among composite materials preparing, organizing and their performance; and gain ability to develop new composite materials, do research on new techniques, improve materials performance and product quality.

Specific program objectives have been established to attain this general objective that its graduates will have:

1. Humanities and art, social responsibility and professional behavior;

2. Related knowledge of mathematics, science and economic management needed in composite materials and engineering;

3. Knowledge of composite materials design, materials synthesizing and preparing, performance testing and quality control;

4. Ability to use theory and technical methods to do research, development and design on new products, new techniques, new technologies and new equipments of composite materials; and good ability of project planning and scientific writing

5. Basic knowledge and skills of mechanical design, electrical engineering & electric technology, and computer applications, which are needed in composite materials and engineering;

6. Basic methods of literature search, data query and use of modern information technology to obtain relative information;

7. Knowledge of guiding principles and policies of producing, designing, researching, environment protection and sustainable development in related industry and knowledge of the status and trends in the fields;

8. Ability of organizing and managing, expressing and communicating;

9. Ability to adapt to the development and keep study all their lifelong;

10. Ability to deal with crisis and emergency events and compete and cooperate in cross-cultural fields.

三、主干学科

III Major Disciplines

主干学科：材料科学与工程

Major Disciplines: Materials Science and Engineering

四、专业核心课程与专业特色课程

IV Core Courses and Characteristic Courses

专业核心课程：高分子化学、高分子物理、材料研究与测试方法 B、材料复合原理、复合材料力学、复合材料聚合物基体、复合材料工艺与设备、复合材料结构设计

Core Courses: Polymer Chemistry, Polymer Physics, Methods of Materials Research and Testing B, Principles of Materials Compositing, Mechanics of Composite Materials, Composite Materials Polymer Matrix, Technologies and Equipments of Composite Materials, Structural Design of Composite Materials

专业特色课程：复合材料制备新技术、复合材料界面、功能复合材料、复合材料模具设计、复合材料产品设计

Characteristic Courses: New Technologies of Composite Materials Preparing, Interface of Composite Materials, Functional Composite Materials, Mould Design of Composite Materials, Products Design of Composite Materials.

五、计划学制与学位

V Length of Schooling and Degree

修业年限：四年

Duration: Four Years

授予学位：工学学士

Degree Granted: Bachelor of Engineering

六、最低毕业学分规定

VI Minimum Graduation Credit Criteria

课程类别 Course Classification 课程性质 Course Nature	通识课程 Basic Courses in General Education	学科大类课程 Basic Courses in General Discipline	专业课程 Courses in Specialty	个性课程 Individualized Courses	集中性实践 Intensified Internship and Practical Training	课外学分 Extracurricular Credits	总学分 Total Credits
必修课 Required Courses	35	60	29.5	\	31.5	\	190
选修课 Elective Courses	9	3	12	\	\	10	

七、课程修读指导建议

VII Recommendations on Course Studies

八、理论教学建议进程表

VIII Theory Course Schedule

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Number	课 程 名 称 Course Title	学 分 Crs	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur			
通 识 课 程 Public Basic Courses	必 修 课 Required Courses	4220001110	思想道德修养与法律基础 Morals, Ethics and Fundamentals of Law	3	48			8		1-6		
		4220002110	中国近现代史纲要 Outline of Contemporary and Modern Chinese History	2	32					1-6		
		4220003110	毛泽东思想和中国特色社会主义理论体系概论 Introduction to Mao Zedong Thought and Socialism with Chinese Characteristics	4	96			32		1-6		
		4220005110	马克思主义基本原理 Marxism Philosophy	3	48			8		1-6		
		1060003130	军事理论 Military Theory	1	32			16		1-4		
		1050001130	心理健康教育 Mental Health Education	1	16					1-2		
		4210001110	体育 1 Physical Education I	1	32					1		
		4210002110	体育 2 Physical Education II	1	32					2	体育 1	
		4210003110	体育 3 Physical Education III	1	32					3	体育 2	
		4210004110	体育 4 Physical Education IV	1	32					4	体育 3	
		4030002110	大学英语 A1 College English A 1	3	64				16	1		
		4030003110	大学英语 A2 College English A II	3	64				16	2	大学英语 A1	
		4030004110	大学英语 A3 College English A III	3	64				16	3	大学英语 A2	
		4030005110	大学英语 A4 College English A IV	3	64				16	4	大学英语 A3	

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Number	课 程 名 称 Course Title	学 分 Crs	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major	
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur				
		4120017110	大学计算机基础 Foundation of Computer	2	32		12			1			
		程序设计语言课程组(三选一, 3 学分) Courses of Computer Program Design (select one out of three, Credits: 3)											
		4120023110	计算机程序设计基础(C 语言) Fundamentals of Computer Program Design(C)	3	48		12			2			
		4120024110	计算机程序设计基础(FORTRAN 语言) Fundamentals of Computer Program Design(FORTRAN)	3	48		12			2			
		4120025110	计算机程序设计基础(VB 语言) Fundamentals of Computer Program Design(VB)	3	48		12			2			
		小 计 Subtotal			35	736		24	64	64			
		选修课 Elective Courses	创新创业类 Innovation and Entrepreneurship Courses			全校学生要求至少取得 9 学分, 建议在每个类别中分别至少选修一门课程。 All students are required to obtain at least nine credits, and suggested to select at least one course in five categories respectively.							
	人文社科类 Arts and Social Science Courses												
	经济管理类 Economy and Management Courses												
	科学技术类 Science and Technology Courses												
	艺术体育类 Art and Physical Education Courses												
	学 科 大 类 课 程 Basic Disciplinary Courses	必修课 Required Courses	4070160110	专业导论 Introduction to Materials Physics	1	16					1		
			4080042110	工程图学 C Engineering Graphics C	4	64		8			2		
4050063110			高等数学 A 上 Advanced Mathematics A I	5	80					1			
4050064110			高等数学 A 下 Advanced Mathematics A II	5	80					2	高等数学 A 上		
4050021110			大学物理 A 上 Physics A I	3.5	56					2			
4050022110			大学物理 A 下 Physics A II	3.5	56					3	大学物理 A 上		
4050222110			物理实验 A 上 Physics Lab. A I	1	28	28				3	大学物理 A 上		
4050223110			物理实验 A 下 Physics Lab. A II	1	28	28				4	大学物理 A 下		
4070016110			材料概论 Introduction to Materials	2	32					3			
4050229110			线性代数 Linear Algebra	2.5	40					3	高等数学 A 下		
4050058020			概率论与数理统计 B Probability and Mathematical Statistics B	3	48					4	高等数学 A 下		
4100012110			电工与电子技术基础 C Fundamentals of Electrical Engineering & Electric Technology C	4	64	10				4			
4050072110			工程力学 B Engineering Mechanics, B	4	64					4			

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Number	课 程 名 称 Course Title	学 分 Crs	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur			
		4050073110	工程力学 B 实验 Engineering Mechanics Experiment B	0.5	16	16				4		
		4080061110	机械设计基础 Base of Mechanical Design	3.5	56	6				5		
		4050452130	无机化学 Inorganic Chemistry	3.5	60					1		
		4050453130	无机化学实验 Inorganic Chemistry Experiment	1	32	32				1		
		4050820130	有机化学 Organic Chemistry	3.5	60					2		
		4050821130	有机化学实验 Organic Chemistry Experiment	1	32	32				2		
		4050044110	分析化学 C Analytical Chemist	1.5	24					3		
		4050045110	分析化学实验 Analytical Chemistry C Experiment	1	32	32				3	分析化学 C	
		4050220110	物理化学 C Physical C	4	64					3		
		4050219110	物理化学 B 实验 Physical Chemistry B Experiment	1	32	32				3	物理化学 C	
		小 计 Subtotal		60	1064	216	8					
	选修课 Elective Courses	4200286130	综合化学实验 B (偏无机) Comprehensive Chemical Experiments B (Inorganic)	1	32	32				4		
		4200287130	综合化学实验 C (偏有机) Comprehensive Chemical Experiments C (Organic)	1	32	32				4		
		4070091110	计算机在材料科学与工程中应用 A Computer Applied in Materials Science & Engineering A	2.5	40		12			5		
		4070037110	材料与环境 Materials & Environment	2	32					5		
		4070118110	能源科学概论 Introduction to Science of Energy Sources	2	32					5		
		4060090110	矿物与岩石 Minerals & Rocks	2	32	10				5		
		4070151110	项目管理 B Project management B	1	16					5		
		4070002110	安全工程 Safety Engineering	1	16					7		
		小 计 Subtotal		12.5	232	74	12					
		修读说明：至少选修 3 学分。必选一门综合化学实验。 NOTE: Minimum subtotal credits: 3. At least one course about Comprehensive Chemical Experiments is needed.										

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Number	课 程 名 称 Course Title	学分 Crs	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur			
专 业 课 程 Specialized Courses	必修课程 Required Courses	4070065110	高分子化学 B Polymer Chemistry B	3	48					4	有机化学	
		4070068110	高分子物理 B Polymer Physics B	3	48					4	物理化学 C	
		4070036110	材料研究与测试方法 B Methods of Materials Research and Testing B	2.5	40					5		
		4070208110	高分子化学与物理实验 Experiments on Polymer Chemistry & Physics	2	64	64				5		
		4070015110	材料复合原理 Composite Materials Principles	2	32					5		
		4070055110	复合材料力学 Mechanics of Composite Materials	2	32					5	工程力学 B	
		4070054110	复合材料聚合物基体 Composite Materials Polymer Matrix	2	32					5	高分子化学 B	
		4070052110	复合材料工艺与设备 Technologies and Equipments of Composite Materials	3	48					6		
		4070053110	复合材料结构设计 Structural Design of Composite Materials	2	32					6	复合材料力学	
		4070311130	复合材料设计实验 Experimental on Composite Materials Design	1	32	32				6		
		4070310130	复合材料近代测试技术实验 Experiments on Composite Materials Modern Testing Techniques	2	64	64				6	材料研究与测试方法 B	
		4070200110	复合材料性能实验 Experiments on Composite Materials Properties	2	64	64				6		
		4070197110	复合材料工艺与制备实验 Experiments on Composite Materials Techniques & Manufacture	3	96	96				6	复合材料工艺与设备	
		小 计 Subtotal		29.5	632	320						
	选修课程 Elective Courses	4070344130	复合材料学 Composite Materials	2	32					5		
		4070111110	聚合物流变学 Rheology of Polymer	1.5	24					5	高分子化学 B	
		4070140110	复合材料界面 Interface of Composite Materials	1.5	24					6	材料复合原理	
		4070057110	复合材料制备新技术 New Technologies of Composite Materials	1.5	24					6	复合材料工艺与设备	
		4070326130	纳米材料与纳米技术 Nanomaterials and Nanotechnology	1.5	24					6		
		4070075110	功能复合材料 Functional Composites	2	32					7		
		4070152110	新型建筑材料 New Materials for Building	1.5	24					7		
		4070056110	复合材料模具设计 Design of Composite Materials Mould	1.5	24					7		

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Number	课 程 名 称 Course Title	学分 Crs	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur			
		4070049110	复合材料产品设计 Design of Composite Materials Products	2	32					7	复合材料结构设计	
		4070051110	复合材料工程质量管理 Engineering Quality Management of Composite Materials	1	16					7		
		4070345130	航空航天复合材料 Aerospace Composite Materials	1	16					7		
		小 计 Subtotal		17	272							
		修读说明：要求至少选修 12 学分。 NOTE: Minimum subtotal credits: 12										

九、集中性实践教学环节建议进程表

IX Table of Intensified Internship and Practical Training Schedule

课程编号 Course Code	实践环节名称 Name of Internship and Practical Training	周数 Weeks	学分 Credits	建议修读学期 Suggested Term	第二专业 Second Major
1060002110	军事训练 Military Training	3	1.5	1	
4100069110	电工电子实习 B Practice of Electrical Engineering & Electronics B	1	1	4	
4080151110	机械制造工程实训 C Training on Mechanical Manufacturing Engineering C	2	2	4	
4080146110	机械设计基础课程设计 Practice of Fundamentals of Mechanical Design	2	2	5	
4070198110	复合材料结构课程设计 Practice of Structural Design of Composite Materials	1	1	6	
4070224110	专业实习 Practice of Specialty	2	2	6	
4070346130	工程训练 1 Engineering Training I	1	1	7	
4070347130	工程训练 2 Engineering Training II	2	2	7	
4070201110	岗位实习 Internship	8	8	7	
4070263120	毕业论文 Graduation Thesis	17	11	8	
小 计 Subtotal		39	31.5		

十、其它要求

X Other Demands

《形势与政策》课程，平均每学期 16 学时，一般按专题进行，在第七学期末考核，计 2 个课外学分，具体由学校学生发展指导中心负责组织落实。

Situation & Policy, a course with 16 hours / term and 2 extracurricular credits, is taught in terms of topics and tested at the end of the 7th term. The course will be arranged by the Centre of Development and Guidance for Students in the university.

新能源材料与器件专业本科培养方案

Undergraduate Program for Major in New Energy Materials and Devices

一、业务培养目标

I Educational Objectives

本专业培养具有良好社会责任感和职业道德，具备新能源材料与器件方面较宽的基础知识，能在新能源材料的制备、加工成型、新能源材料结构与性能表征与研究、器件的设计与组装、新能源材料应用等领域从事科学研究与教学、技术开发、工艺和设备设计、技术改造及经营管理等方面工作，适应社会的高层次、高素质、全面发展的科学研究与工程技术人才。

Aiming at preparing students for excellent researchers and engineers with initiative spirit, social responsibility and professional behavior, this program will enable students to be solid grounded in basic theory and wide-ranged in specialized knowledge of new energy materials and devices. Students can be fit into jobs in the fields of new energy materials synthesizing and preparing, forming and processing, structure and property representation and research, devices designing and assembling, and industrial applications. They can also do the work in science research and education, technology development, technique and equipment design, technology innovation, and operation management.

二、业务培养要求

II Educational Requirement

本专业学生主要学习材料科学与工程的基础理论，掌握新能源材料的制备、组成、结构与性能之间关系的基本规律，接受新能源材料的制备、性能分析与检测、器件的设计与组装的基本训练，掌握新能源材料设计和制备工艺设计，使学生具有开发新能源材料、研究新工艺、提高和改善材料性能、设计与开发新能源材料器件的基本能力。毕业生应获得以下几方面的知识和能力：

Students are mainly required to acquire a all-rounded education of materials science and engineering with specific emphasis on basic theories and fundamental knowledge; understand inherent dependence of structure and property on composition and preparation condition for materials, basic skills in new energy materials preparing, structure analyzing, property testing and device designing and assembling; and gain ability to develop new materials, conduct research on new techniques, improve materials properties and design devices. Specific program is designed to train students with the following abilities and knowledge.

1. 具有人文社会科学素养、社会责任感和工程职业道德；
2. 具有从事工程工作所需的自然科学、人文社会科学以及经济和管理知识；了解相近专业的一般原理和知识；
3. 掌握材料科学的基础理论和新能源材料合成与制备、材料复合、器件的设计与组装等专业基础知识，掌握材料应用和产品质量控制等方面的基础知识、基本原理和基本实验技能；具有新能源材料与器件专业的工程基础知识和系统的工程实践学习经历；
4. 掌握材料性能检测和器件质量控制的基本知识，具有研究和开发新能源材料、新工艺的初步能力，具备正确选择设备进行材料研究、器件设计与开发的初步能力；掌握基本的创新方法，具有追求创新的态度和意识；研究和设计过程中能够综合考虑经济、环境、法律、安全、健康、伦理等制约因素；
5. 具有本专业必需的机械设计、电工与电子技术、计算机应用的基本知识和技能；
6. 掌握中外文资料查询、文献检索以及运用现代信息技术获取相关信息的基本方法；具有一定的实验设计，创造实验条件，归纳、整理、分析实验结果，撰写论文；
7. 了解新能源材料与器件的理论前沿、应用前景和最新发展动态；了解与本专业相关的职业和行业的生产、设计、研究与开发、环境保护和可持续发展等方面的方针、政策、法规，能正确认识工程对

于客观世界和社会的影响；

8. 具有适应发展的能力以及对终生终身学习的正确认识和学习能力；
9. 具有一定的组织管理能力、较强的表达能力和人际交往能力以及在团队中发挥作用的能力；具有一定的国际视野和跨文化的交流、竞争与合作能力。

1. Humanities and art quality, social responsibility and professional behavior;
2. Related knowledge of natural science, social science and economic management needed in new energy materials and devices; Understanding the basic theory and knowledge of similar major;
3. Knowledge in basic theory of materials science, new energy materials synthesizing and preparing, forming and processing, devices designing and assembling, and practical utilization and product quality control; basic engineering knowledge related to new energy materials and devices; experiences of practical engineering;
4. Basic methods for materials properties testing and devices quality control; preliminary abilities to develop new materials, technologies and devices; preliminary abilities to employ adequate equipments to perform research and development of materials and devices; preliminary creative consciousness; Ability to consider comprehensively different factors including economy, environment, law and safety to conduct research and design;
5. Basic knowledge and skills of mechanical design, electrical engineering & electric technology, and computer applications, which are needed in new energy materials and devices;
6. Basic methods of literature search, data query and use of modern information technology to obtain relative information; Ability to design experiments, create experimental conditions, induce, collate, analyze experimental results and write papers;
7. Knowledge of the frontier theory, the status and trends in the fields and knowledge of guiding principles and policies of producing, designing, researching, environment protection and sustainable development in related industry;
8. Ability to adapt to the development and keep study all their lifelong;
9. Ability of organizing and managing, expressing and communicating and to deal with crisis and emergency events and compete and cooperate in cross-cultural fields.

三、主干学科

III Major Disciplines

材料科学与工程、化学、物理学

Major Disciplines: Materials science and engineering, Chemistry, Physics

四、专业核心课程与专业特色课程

IV Core Courses and Characteristic Courses

专业核心课程：材料科学基础、材料概论、材料研究与测试方法、新能源材料与器件制备技术、固体物理、材料物理、半导体物理基础、新能源材料与器件组装实验

Core Courses: Fundamentals of Materials Science, Introduction to Materials, New Energy Materials and Manufacturing Technology of Devices, Solid State Physics, Materials Physics, Fundamentals of Semiconductor Physics, Experiments of New Energy Materials and Devices Assembly

专业特色课程：材料概论、材料科学基础、器件设计训练、新能源材料与器件制备技术、半导体物理基础、新能源材料与器件组装实验

Characteristic Courses: Introduction to Materials, Fundamentals of Materials Science, Training on Devices Design, New Energy Materials and Manufacturing Technology of Devices, Fundamentals of Semiconductor Physics, Experiments of New Energy Materials and Devices Assembly

五、计划学制与学位

V Length of Schooling and Degree

修业年限：四年

Duration: Four Years

授予学位：工学学士

Degree Granted: Bachelor of Engineering

六、最低毕业学分规定

VI Graduation Credit Criteria

课程类别 Course Classification 课程性质 Course Nature	通识课程 Basic Courses in General Education	学科大类课程 Basic Courses in General Discipline	专业课程 Courses in Specialty	个性课程 Individualized Courses	集中性实践 Intensified Internship and Practical Training	课外学分 Extracurricular Credits	总学分 Total Credits
必修课 Required Courses	35	60	37.5	\	21.5	\	190
选修课 Elective Courses	9	3	8	6	\	10	

七、课程修读指导建议

VII Recommendations on Course Studies

八、理论教学建议进程表

VIII Theory Course Schedule

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Code	课程名称 Course Name	学分 Credits	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur			
通识课程 Public Basic Courses	必修课 Required Courses	4220001110	思想道德修养与法律基础 Morals, Ethics and Fundamentals of Law	3	48			8		1-6		
		4220002110	中国近现代史纲要 Outline of Contemporary and Modern Chinese History	2	32					1-6		
		4220003110	毛泽东思想和中国特色社会主义理论体系概论 Introduction to Mao Zedong Thought and Socialism with Chinese Characteristics	4	96			32		1-6		
		4220005110	马克思主义基本原理 Marxism Philosophy	3	48			8		1-6		
		1060003130	军事理论 Military Theory	1	32			16		1-4		
		1050001130	心理健康教育 Mental Health Education	1	16					1-2		
		4210001110	体育 1 Physical Education I	1	32					1		
		4210002110	体育 2 Physical Education II	1	32					2	体育 1	
		4210003110	体育 3 Physical Education III	1	32					3	体育 2	
		4210004110	体育 4 Physical Education IV	1	32					4	体育 3	
		4030002110	大学英语 A1 College English A 1	3	64				16	1		

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Code	课 程 名 称 Course Name	学分 Credits	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major	
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur				
		4030003110	大学英语 A2 College English A II	3	64				16	2	大学英语 A1		
		4030004110	大学英语 A3 College English A III	3	64				16	3	大学英语 A2		
		4030005110	大学英语 A4 College English A IV	3	64				16	4	大学英语 A3		
		4120017110	大学计算机基础 Foundation of Computer	2	32		12			1			
		程序设计语言课程组(三选一, 3 学分) Courses of Computer Program Design (select one out of three, Credits: 3)											
		4120023110	计算机程序设计基础(C 语言) Fundamentals of Computer Program Design(C)	3	48		12			2			
		4120024110	计算机程序设计基础(FORTRAN 语言) Fundamentals of Computer Program Design(FORTRAN)	3	48		12			2			
		4120025110	计算机程序设计基础(VB 语言) Fundamentals of Computer Program Design(VB)	3	48		12			2			
		小 计 Subtotal		35	736		24	64	64				
		选修课 Elective Courses	创新创业类 Innovation and Entrepreneurship Courses		全校学生要求至少取得 9 学分, 建议每个类别中分别至少选修一门课程。 All students are required to obtain at least nine credits, and suggested to select at least one course in five categories respectively.								
	人文社科类 Arts and Social Science Courses												
	经济管理类 Economy and Management Courses												
	科学技术类 Science and Technology Courses												
	艺术体育类 Art and Physical Education Courses												
学 科 大 类 Disciplinary Courses	必修课程 Required Courses	4070160110	专业导论 Introduction to Materials Science	1	16					1			
		4080042110	工程图学 C Engineering Graphics C	4	64		8			2			
		4050063110	高等数学 A1 Advanced Mathematics A I	5	80					1			
		4050064110	高等数学 A2 Advanced Mathematics A II	5	80					2	高等数学 A1		
		4050021110	大学物理 A1 Physics A I	3.5	56					2			
		4050022110	大学物理 A2 Physics A II	3.5	56					3	大学物理 A1		
		4050222110	物理实验 A1 Physics Lab. A I	1	28	28				3	大学物理 A1		
		4050223110	物理实验 A2 Physics Lab. A II	1	28	28				4	大学物理 A2		
		4070016110	材料概论 Introduction to Materials	2	32					3			
		4050229110	线性代数 B Linear Algebra B	2.5	40					3	高等数学 A2		
		4050058020	概率论与数理统计 B Probability and Mathematical Statistics B	3	48					4	高等数学 A2		

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Code	课 程 名 称 Course Name	学分 Credits	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major	
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur				
		4100012110	电工与电子技术基础 C Fundamentals of Electrical Engineering & Electric Technology C	4	64	10				4			
		4080061110	机械设计基础 Base of Mechanical Design	3.5	56	6				4			
		4050072110	工程力学 B Engineering Mechanics, B	4	64					4			
		4050073110	工程力学 B 实验 Engineering Mechanics Experiment B	0.5	16	16				4			
		4050452130	无机化学 Inorganic Chemistry	3.5	60					1			
		4050453130	无机化学实验 Inorganic Chemistry Experiment	1	32	32				1			
		4050820130	有机化学 Organic Chemistry	3.5	60					2			
		4050821130	有机化学实验 Organic Chemistry Experiment	1	32	32				2			
		4050044110	分析化学 C Analytical Chemistry C	1.5	24					3			
		4050252020	分析化学 C 实验 Analytical Chemistry C Experiment	1	32	32				3	分析化学 C		
		4050220110	物理化学 C Physical Chemistry C	4	64					3			
		4050219110	物理化学 B 实验 Physical Chemistry B Experiment	1	32	32				3	物理化学 C		
		小 计 Subtotal			60	1064	216	8					
		选修课 Elective Courses	4200286130	综合化学实验 B（偏无机） Comprehensive Chemical Experiments B (Inorganic)	1	32	32				4		
	4200287130		综合化学实验 C（偏有机） Comprehensive Chemical Experiments C (Organic)	1	32	32				4			
	4070037110		材料与环境 Materials & Environment	2	32					5			
	4070118110		能源科学概论 Introduction to Energy Sources Sciences	2	32					5			
	4060090110		矿物与岩石 Minerals & Rocks	2	32	10				5			
	小 计 Subtotal			8	160	74							
	修读说明：至少选修 3 学分。必选一门综合化学实验。 NOTE: Minimum subtotal credits: 3.At least one course about Comprehensive Chemical Experiments is needed.												
专业课程 Specialized Courses	必修课 Required Courses	4070028110	材料科学基础 Fundamentals of Materials Science	4.5	72					4			
		4070280120	材料科学基础实验 A Experiments on Fundamentals of Materials Science A	1	32	32				5	材料科学基础		
		4070033110	材料物理 B Materials Physics B	3.5	56					5			
		4070079110	固体物理 B Solid Physics B	3.5	56					5			

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Code	课 程 名 称 Course Name	学分 Credits	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur			
		4070023110	材料化学 A Materials Chemistry A	3.5	56					5		
		4070035110	材料研究与测试方法 A Methods of Materials Research and Testing A	3.5	56					5		
		4070281120	材料研究与测试方法实验 Experiments on Methods of Material Research and Testing	2	64	64				5	材料研究与测试方法 A	
		4070335130	新能源材料与器件制备技术 New Energy Materials and Manufacturing Technology of Devices	4.5	72					6		
		4070329130	器件设计训练 Training on Devices Design	3	96					6		
		4070319130	半导体物理基础 Fundamentals of Semiconductor Physics	3.5	56					6		
		4070336130	新能源材料与器件组装实验 Experiments of New Energy Materials and Devices Assembly	5	160	160				7		
		小 计 Subtotal		37.5	776	256						
	选修课 Elective Courses	4070337130	新能源结构材料 New Energy Structure Materials	2	32					6		
		4070118110	纳米材料与纳米器件 Nanomaterials and Nanodevices	2	32					6		
		4070317130	化学电源 Chemical Power Sources	1.5	24					6		
		4070313130	光电信号检测技术 Detection Technology of Photo-Electric Signals	2	32					6		
		4070014110	材料腐蚀与防护 Materials Corrosion and Protection	2	32					6		
		4070077110	功能陶瓷材料与器件 Functional Ceramic Material and Devices	2	32					7		
		4070332130	太阳能电池材料与器件 Solar Cell Materials and Devices	2	32					7		
		4070330130	燃料电池材料与器件 Fuel Cell Materials and Devices	2	32					7		
		4070046110	半导体材料与器件 Semiconductor Materials and Devices	2	32					7		
		4070117110	电介质材料及应用 Dielectric Materials and its Application	2	32					7		
		4070318130	半导体光电化学 Semiconductor Photoelectrochemistry	1	16					7		
		4070331130	热电材料与器件 Thermoelectric Materials and Devices	2	32					7		
		小 计 Subtotal		16	256							
		修读说明：要求至少选修 8 学分。 NOTE: Minimum subtotal credits:8.										

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Code	课 程 名 称 Course Name	学分 Credits	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur			
个性课程 Personalized Course	选修课 Elective Courses	4070081110	光电子材料及应用 Photoelectron Materials and its Applications	1	16					6		
		4070009110	薄膜材料与技术 Thin-film Materials and Technology	1	16					6		
		4070145110	无机非金属材料工学 B Inorganic Non-metallic Materials Engineering B	2	32					6		
		4070116110	纳米材料与纳米技术 Nanomaterials and Nanotechnology	2	32					7		
		4070149110	现代功能材料 Modern Functional Materials	2	32					7		
		小 计 Subtotal										
		修读说明：学生可跨专业自主选择修读全校其他专业的课程，建议修读以上课程。要求至少选修 6 学分。 NOTE: Students can select any courses from the other specialties, and are especially suggested to select the courses above. Minimum subtotal credits: 6.										

九、集中性实践教学环节建议进程表

IX Practice Schedule

课程编号 Course Code	实践环节名称 Name of Internship and Practical Training	周数 Weeks	学分 Credits	建议修读学期 Suggested Term	第二专业 Second Major
1060002110	军事训练 Military Training	3	1.5	1	
4080151110	机械制造工程实训 C Training on Mechanical Manufacturing Engineering C	2	2	4	
4100069110	电工电子实习 B Practice of Electrical Engineering & Electronics B	1	1	4	
4080146110	机械设计基础课程设计 Practice of Fundamentals of Mechanical Design	2	2	5	
4070218110	认识实习 Practice of Engineering Cognition	1	1	5	
4070230110	专业实习 Practice of Specialty	3	3	6	
4070342130	毕业论文 Graduation Thesis	17	11	8	
小 计 Subtotal		29	21.5		

十、其它要求

X Other Demands

《形势与政策》课程，平均每学期 16 学时，一般按专题进行，在第七学期末考核，计 2 个课外学分，具体由学校学生发展指导中心负责组织实施。

Situation & Policy, a course with 16 hours / term and 2 extracurricular credits, is taught in terms of topics and tested at the end of the 7th term. The course will be arranged by the Centre of Development and Guidance for Students in the university.

材料科学与工程专业（国际班）本科培养计划

Undergraduate Program for Material Science and Engineering (International Class)

一、业务培养目标

I Educational Objectives

本专业以材料科学与工程学院生源为基础，以国际化开放模式（2+2 合作办学）培养具备材料科学、材料工程方面较宽的基础知识，能在各种材料的制备、加工成型、材料结构与性能、材料应用等领域从事科学研究与教学、技术开发、工艺和设备设计、技术改造及经营管理等方面工作，具有较强国际竞争力的高层次、高素质、全面发展的复合型拔尖创新人才。

This program aims at training advanced talents with solid foundation and exceptional abilities in material science and engineering based on the mode of international and open training ways. Students of this program are prepared to acquire basic knowledge of materials science and engineering, who are capable of jobs about scientific research, technological development, techniques and equipment design, technical reconstruction and operational management in the fields of materials preparation, processing and shaping, materials structure and performance, materials application, etc.

二、业务培养要求

II Educational Requirement

本专业学生主要学习材料科学与工程的基础理论，掌握材料的制备、组成、组织结构与性能之间关系的基本规律，接受各种材料的制备、性能分析与检测技能的基本训练，掌握材料设计和制备工艺设计，使学生具有开发新材料、研究新工艺、提高和改善材料性能和提高产品质量的基本能力。

毕业生应获得以下几方面的知识和能力：

1. 掌握材料科学的基础理论和材料合成与制备、材料复合、材料设计等专业基础知识；
2. 掌握材料性能检测、评价和产品质量控制的基本知识，具有研究和开发新材料、新工艺的初步能力；
3. 掌握材料加工的基本知识，具有正确选择设备进行材料研究、材料设计、材料开发的初步能力；
4. 具有本专业必需的机械设计、电工与电子技术、计算机应用的基本知识和技能；
5. 具有较全面的外语表达与交流能力以及计算机能力，掌握科技论文写作、文献检索、资料查询的基本方法，具有初步的科学研究和实际工作能力。

Students of this program are required to acquire basic theories of materials science and engineering, master regulations among preparation, composition, organizational structure and performance, receive basic trainings on materials preparation, performance analysis and testing skills, and acquire basic techniques for materials design and preparation as well as abilities for developing new materials, research new techniques, improving materials performance and product quality.

The graduates are also required to acquire the knowledge or abilities as follows:

1. Mastering fundamental theory of MSE in materials synthesis and production, materials composition and design;
2. Being proficient in materials performance measurement, assessment and quality control; acquiring abilities for research on development of new materials and techniques;
3. Mastering fundamental theory about materials processing as well as abilities of choosing right equipments for materials research, design and development;
4. Mastering fundamental skills and knowledge of mechanical design, electrical engineering and

electronic technology as well as computer application;

5. Acquiring competencies for foreign language expression and computer application; mastering basic methods of paper writing, information inquiry and literature retrieval; having preliminary research and practical working abilities.

三、主干学科

III Major Disciplines & Major Courses

主干学科：材料科学与工程、化学、物理学

Major Disciplines: Material Science and Engineering, Chemistry, Physics

四、专业核心课程与专业特色课程

IV Core Courses and Characteristic Courses

专业核心课程：高等数学、大学物理、电工与电子技术基础、机械设计基础、工程力学、无机化学、有机化学、物理化学、材料科学基础、材料工程基础、材料化学、材料物理

Core Courses: Advanced Mathematics, Physics, Fundamentals of Electrical Engineering & Electric Technology, Base of Mechanical Design, Engineering Mechanics, Inorganic Chemistry, Organic Chemistry, Physical Chemistry, Fundamentals of Materials Science, Fundamentals of Materials Engineering, Materials Chemistry, Materials Physics

专业特色课程：功能材料、聚合物形态与结构、信息技术与电子材料、材料研究与测试方法、计算机在材料科学与工程中应用、工程设计训练、材料科学基础实验、材料制备与物性分析

Characteristic Courses: Functional Materials, Polymer Morphology and Structures, Information Technology and Electronic Materials, Micro-analysis of Materials, Computer in Materials Science & Engineering, Engineering Design Training, Material Science Foundation and Practice, Material Preparation & Physical Properties Analysis

五、计划学制与学位

V Length of School and Degree

修业年限：四年(2+2)/(3+1)

Duration: Four years

授予学位：工学学士(武汉理工大学、国外大学分别授予学位)

Degree Granted: Bachelor of Engineering (from both WUT and overseas universities)

六、最低毕业学分规定

VI Graduation Credit Criteria

课程类别 Course Classification 课程性质 Course Nature	通识课程 Public Basic Courses	学科大类课程 Basic Courses in General Discipline	专业课程 Courses in Specialty	个性课程 Personalized Course	集中性实践 Practice Courses	课外学 Extracurricular Credits	总学分 Total Credits
必修课 Required Courses	35	60	44.5	\	21.5	\	190
选修课 Elective Courses	9	3	7	\	\	10	

七、课程修读指导建议

VII Recommendations on Course Studies

八、理论教学建议进程表
Theory Course Schedule

Theory Courses														
课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Number	课 程 名 称 Course Title	学 分 Crs	学时分配 Including						先修课程 Prerequisite Course	第二专业 Second Major		
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur	建议修读学期 Suggested Term				
通 识 课 程 Public Basic Courses	必修课程 Required Courses	4220001110	思想道德修养与法律基础 Morals, Ethics and Fundamentals of Law	3	48			8		1-6				
		4220002110	中国近现代史纲要 Outline of Contemporary and Modern Chinese History	2	32					1-6				
		4220003110	毛泽东思想和中国特色社会主义理论体系概论 Introduction to Mao Zedong Thought and Socialism with Chinese Characteristics	4	96			32		1-6				
		4220005110	马克思主义基本原理 Marxism Philosophy	3	48			8		1-6				
		1060001110	军事理论 Military Theory	2	32			16		1-6				
		4210001110	体育 1 Physical Education I	1	32					1				
		4210002110	体育 2 Physical Education II	1	32					2	体育 1			
		4210003110	体育 3 Physical Education III	1	32					3	体育 2			
		4210004110	体育 4 Physical Education IV	1	32					4	体育 3			
		4030002110	大学英语 A1 College English A I	3	64				16	1				
		4030003110	大学英语 A2 College English A II	3	64				16	2	大学英语 A1			
		4030004110	大学英语 A3 College English A III	3	64				16	3	大学英语 A2			
		4030005110	大学英语 A4 College English A IV	3	64				16	4	大学英语 A3			
		4120017110	大学计算机基础 Foundation of Computer	2	32		12			1				
		程序设计语言课程组(三选一，3 学分)												
		4120023110	计算机程序设计基础(C 语言) Fundamentals of Computer Program Design(C)	3	48		12			2				
		4120024110	计算机程序设计基础(FORTRAN 语言) Fundamentals of Computer Program Design(FORTRAN)	3	48		12			2				
		4120025110	计算机程序设计基础(VB 语言) Fundamentals of Computer Program Design(VB)	3	48		12			2				
		小 计 Subtotal				35	704		24	64	64			
	选修课程 Elective Courses	创新创业类 Innovation and Entrepreneurship Courses			全校学生要求至少取得 9 学分，建议在每个类别中分别至少选修一门课程。 All students are required to obtain at least nine credits, and suggested to select at least one course in five categories respectively.									
		人文社科类 Arts and Social Science Courses												
		经济管理类 Economy and Management Courses												
		科学技术类 Science and Technology Courses												

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Number	课 程 名 称 Course Title	学 分 Crs	学时分配 Including						先修课程 Prerequisite Course	第二专业 Second Major
					总学时 Tot hrs.	实验 Exp.	上机 Ope- ration	实践 Prac- tice	课外 Extra- cur	建议修 读学期 Suggested Term		
		艺术体育类 Art and Physical Education Courses										
学 科 大 类 课 程 Basic Disciplinary Courses	必修课程 Required Courses	4070160110	专业导论 Introduction to Materials Physics	1	16					1		
		4070016110	材料概论 Introduction to Materials	2	32					3		
		4050063110	高等数学 A 上 Advanced Mathematics A I	5	80					1		
		4050064110	高等数学 A 下 Advanced Mathematics A II	5	80					2	高等数学 A 上	
		4050229110	线性代数 Linear Algebra	2.5	40					3	高等数学 A 下	
		4050058020	概率论与数理统计 B Probability and Mathematical Statistics B	3	48					4	高等数学 A 下	
		4050021110	大学物理 A 上 Physics A I	3.5	56					2		
		4050022110	大学物理 A 下 Physics A II	3.5	56					3	大学物理 A 上	
		4050222110	物理实验 A 上 Physics Lab. A I	1	28	28				3	大学物理 A 上	
		4050223110	物理实验 A 下 Physics Lab. A II	1	28	28				4	大学物理 A 下	
		4080042110	工程图学 C Engineering Graphics C	4	64		8			2		
		4100012110	电工与电子技术基础 C Fundamentals of Electrical Engineering & Electric Technology C	4	64	10				4		
		4080061110	机械设计基础 Base of Mechanical Design	3.5	56	6				4		
		4050072110	工程力学 B Engineering Mechanics, B	4	64					4		
		4050073110	工程力学 B 实验 Engineering Mechanics Experiment B	0.5	16	16				4		
		4050452130	无机化学 Inorganic Chemistry	3.5	60					1		
		4050453130	无机化学实验 Inorganic Chemistry Experiment	1	32	32				1		
		4050820130	有机化学 Organic Chemistry	3.5	60					2		
		4050821130	有机化学实验 Organic Chemistry Experiment	1	32	32				2		
		4050044110	分析化学 C Analytical Chemist	1.5	24					3		
		4050252020	分析化学实验 Analytical Chemistry C Experiment	1	32	32				3	分析化学 C	
		4050220110	物理化学 C Physical C	4	64					3		
		4050219110	物理化学 B 实验 Physical Chemistry B Experiment	1	32	32				3	物理化学 C	
				小 计 Subtotal		60	1064	216	8			

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Number	课 程 名 称 Course Title	学分 Crts	学时分配 Including						先修课程 Prerequisite Course	第二专业 Second Major
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur	建议修读学期 Suggested Term		
专 业 课 Specialized Courses	选 修 课 Elective Courses	4200286130	综合化学实验 B (偏无机) Comprehensive Chemical Experiments B (Inorganic)	1	32	32				4		
		4200287130	综合化学实验 C (偏有机) Comprehensive Chemical Experiments C (Organic)	1	32	32				4		
		4070037110	材料与环境 Materials & Environment	2	32					5		
		4070118110	能源科学概论 Introduction to Science of Energy Sources	2	32					5		
		4060090110	矿物与岩石 Minerals & Rocks	2	32	10				5		
		小 计 Subtotal		8	160	74						
		修读说明: 至少选修 3 学分。必选一门综合化学实验。 NOTE: Minimum subtotal credits: 3. At least one course about Comprehensive Chemical Experiments is needed.										
专 业 课 Specialized Courses	必 修 课 Required Courses	模块 I: 适合在武汉理工大学就读的国际班学生 Module I (Students in Wuhan University of Technology)										
		4070028110	材料科学基础 Fundamentals of Materials Science	4.5	72					4		
		4070073110	功能材料 A Functional Materials A	2	32					4		
		4070112110	聚合物形态与结构 Polymer Morphology and Structures	2	32					4		
		4070191110	材料科学基础实验 A Material Science Foundation and Practice A	1	32	32				4		
		4070023110	材料化学 A Materials Chemistry A	3.5	56					5		
		4070080110	固体物理 D Solid State Physics D	2.5	40					5		
		4070036110	材料研究与测试方法 B Micro-analysis of Materials B	2.5	40					5		
		4070193110	材料研究与测试方法实验 Experiments of Material Research and	2	64	64				5		
		4070033110	材料物理 B Materials Physics B	3.5	56					6		
		4070017110	材料工程基础 Fundamentals of Materials Engineering	4	64					6		
		4070161110	材料工艺与设备 A Gelatin Material Equipment & Technology A	2.5	40					6		
		4070099110	金属材料学 Metal Material Science	2	32					6		
		4070211110	工程设计训练 Engineering Design Training	3	96	96				6		
		4070090110	计算机在材料科学与工程中应用 A Computer in Materials Science & Engineering A	2.5	40		20			7		
		4070058110	高分子材料 Polymer Material	2	32					7		
		4070195110	材料制备与物性分析 A Material Preparation & Physical Properties Analysis A	5	160	160				7		
		小 计 Subtotal		44.5	888	352	20					

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Number	课 程 名 称 Course Title	学 分 Crs	学时分配 Including						先修课程 Prerequisite Course	第二专业 Second Major
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur	建议修读学期 Suggested Term		
		模块 II: 适合赴蒙纳士大学就读的国际班学生 Module II (Students in Monash University)										
		4070028110	材料科学基础 Fundamentals of Materials Science	4.5	72					4		
		4070073110	功能材料 A Functional Materials A	2	32					4		
		4070112110	聚合物形态与结构 Polymer Morphology and Structures	3	48					4		
		4070004110	信息技术与电子材料 Information Technology and Electronic Materials	1	16					4		
		MTE3541	材料耐久性 Materials Durability	6	64	12			32	5		
		MTE3542	微结构设计 Microstructure Design	6	64	12			32	5		
		MTE3543	微结构应用: 材料力学 Microstructure Applications: Materials Mechanics	6	64	12			32	5		
		MTE3546	工程材料 II Engineering Materials II	6	64	12			32	6		
		MTE3547	材料模型 Materials Characterization and Molding	6	64	12			32	6		
		MTE4572	高分子/复合工艺学 Polymer/Composite Processing & Engineering	6	64	12			32	7		
		MTE4573	金属和陶瓷工艺学 Processing and Engineering of Metals and Ceramics	6	64	12			32	8		
		小 计 Subtotal		52.5	616	84			224			
	选修课 Elective Courses	模块 I: 适合在武汉理工大学就读的国际班学生 Module I (Students in Wuhan University of Technology)										
		4070116110	纳米材料与纳米技术 Nano Materials and technology	2	32					6		
		4070047110	粉体科学与工程基础 Powder Engineering	2	32					7		
		4070014110	材料腐蚀与防护 Materials Corrosion and Protection	2	32					7		
		4070038110	材料质量分析与失效分析 Material Quality and Failure Analysis	2	32					7		
		4070077110	功能陶瓷材料与器件 Functional Ceramics Materials and Apparatus	2	32					7		
		4070006110	玻璃光导纤维 Optical Glass Fiber	2	32					7		
		小 计 Subtotal		12	192							
		修读说明: 要求至少选修 7 学分。 NOTE: Minimum subtotal credits: 7										
		模块 II: 适合赴蒙纳士大学就读的国际班学生 Module II (Students in Monash University)										
		MTE4591/3591	复合材料、热固材料 and 人造橡胶 Composites, Thermosets and Elastomers	6	64	12			32	5		
		MTE4592	先进陶瓷材料及其应用 Advanced Ceramics and Applications	6	64	12			32	6		

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Number	课 程 名 称 Course Title	学 分 CrS	学时分配 Including						先修课程 Prerequisite Course	第二专业 Second Major
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur	建议修读学期 Suggested Term		
		MTE4593	材料与环境 Materials and Environment	6	64	12			32	6		
		ENG4616	研究训练 Research Training Project	6	64			16	32	5		
		MTE4590 /3590	材料模拟 Materials Simulation	6	64	12			32	6		
		MTE4594	工程合金工艺、设计和选择 Engineering Alloys Processing, Design and Selection	6	64	12			32	8		
		MTE4595	材料腐蚀与防护 Material Corrosion and Protection	6	64	12			32	8		
		MTE4596	生物材料 Biomaterials	6	64			16	32	8		
		MTE4597	纳米材料与纳米技术 Nanomaterials and Nanotechnology	6	64			16	32	8		
		小 计 Subtotal		54	576	72		48	288			
		修读说明：要求至少选修 20 学分 NOTE: Minimum subtotal credits: 20										

九、集中性实践教学环节建议进程表

IX Practice Schedule

课程编号 Course Number	实践环节名称 Practice Courses Name	周数 Weeks	学分 CrS	建议修读学期 Suggested Term	第二专业 Second Major
模块 I: 适合在武汉理工大学就读的国际班学生 Module I (Students in Wuhan University of Technology)					
1060002110	军事训练 Military Training	3	1.5	1	
4080151110	机械制造工程实训 C Training on Mechanical Manufacturing Engineering C	2	2	4	
4100069110	电工电子实习 B Practice of Electrical Engineering & Electronics B	1	1	4	
4080146110	机械设计基础课程设计 Practice of Fundamentals of Mechanical Design	2	2	4	
4070216110	认识实习 Practice of Understanding	1	1	5	
4070226110	专业实习 Practice of Specialty	3	3	6	
4070339120	毕业论文 Graduation Thesis	17	11	8	
小 计 Subtotal		29	21.5		
模块 II: 适合赴蒙纳士大学就读的国际班学生 Module II (Students in Monash University)					
1060002110	军事训练 Military Training	3	1.5	1	
4080151110	机械制造工程实训 C Training on Mechanical Manufacturing Engineering C	2	2	4	
4100069110	电工电子实习 B Practice of Electrical Engineering & Electronics B	1	1	4	

课程编号 Course Number	实践环节名称 Practice Courses Name	周数 Weeks	学分 Crts	建议修读学期 Suggested Term	第二专业 Second Major
MTE3544	材料工程管理与实践 Management and Practice in Materials Engineering	6	6	5	
MTE4571	材料工程设计与实践 Materials Engineering Design and Practice	6	6	6	
MTE4525	材料工程训练 I Materials Engineering Project I	6	6	7	
MTE4525	材料工程训练 II Materials Engineering Project II	6	6	8	
小 计 Subtotal		30	28.5		

十、其它要求

X Other Demands

1. 国际班学生在材料科学与工程学院新生中遴选，选择条件由教务处、材料科学与工程学院根据新生入学的具体条件确定；

Students in the International Class will be selected from freshmen. And the requirements will be confirmed by Department of Teaching Affairs of WUT and School of Materials Science and Engineering.

2. 国际班外语教学除按照基本的英语教学外，国际班需要参加雅思、托福等英语水平考试，加强英语交流与写作能力；

Besides the regular English, the students should take TOFEL or IELTS Examination study in order to improve their communication and writing abilities in English.

3. 《形势与政策》课程，平均每学期 16 学时，一般按专题进行，在第四学期末考核，计 2 个课外学分，具体由学校学生工作部、各学院学工办负责组织落实。

The course of *Situation & Policy*, 16 hours per term with 1 credit, is taught according to specific topics and tested at the end of the 4th term. The course will be arranged by the University's Student Affairs Department and its branch in each school.

材料科学与工程专业（基地班）本科培养方案

Undergraduate Program for Major in Materials Science and Engineering (Bachelor + Master Class)

一、业务培养目标

I Educational Objectives

本专业培养具有良好社会责任感和职业道德，具有较好自然科学基础和人文社会科学基础，扎实的材料科学与工程领域的材料科学、材料工程方面较宽的基础知识，综合素质好，具有较强的创新精神，能在各种材料的制备、加工成型、材料结构与性能、材料应用等领域从事科学研究与教学、技术开发、新材料研制、工艺和设备设计、技术改造、生产技术管理与经营管理等方面工作，适应社会主义市场经济发展的高层次、高素质、创新能力强、实践能力强的复合型拔尖创新人才。

Aiming at preparing students for excellent researchers and engineers with initiative spirit, social responsibility and professional behavior, this program will enable students to be solid grounded in basic theory and wide-ranged in specialized knowledge of materials science and engineering. Students can be fit into jobs in the fields of materials preparing, materials analyzing and materials applying. They can do the work of scientific research and teaching, development of technology and product, new materials development, design of process and equipment, manufacturing management and operating management.

二、业务培养要求

II Educational Requirement

1. 本科阶段基本要求

本科阶段修业年限 3.5 年。

本科阶段课程总学时：2672，课程总学分：147.5；实践环节：27 周（含毕业论文 15 周），实践环节学分：25.5；课外学分：10；个性课程学分：7；本科阶段学分总计：190。

本科阶段的第六学期末，经过第三次流出、流入后，确认攻读硕士学位资格并选择硕士指导教师，第七学期在导师指导下完成本科毕业论文。

1. Educational requirements for bachelor's program:

Educational duration: 3.5 years

Total course periods: 2672 hours; total course credits: 147.5; practice course periods: 27 weeks (including 15 weeks for graduation thesis); practice course credits: 25.5; extracurricular course credits: 10; individual course credits: 7; total credits: 190

At the end of the sixth term, the students will obtain the qualification for the master's program after three times' competition. The graduation thesis will be finished at the seventh term under the guidance of the supervisor.

2. 硕士研究生阶段基本要求与方向

硕士研究生阶段修业年限 2.5 年。其中课程学习 1 年左右，毕业论文 1.5 年左右。

总学分包括课程学分和非课程学分，总学分不低于 34。课程学分包括学位课和选修课的学分，课程学分不低于 28，其中学位课不低于 18 学分。非课程学分（必修环节学分）不低于 6。

硕士研究生阶段修读专业有：材料科学与工程专业、材料学专业，材料加工工程专业、材料物理与化学专业、光电子及信息材料专业、新能源材料专业等。

2. Educational requirements for master's program:

Educational duration: 2.5 years, including at least one year of course study and 1.5 years of graduation thesis.

Total course credits: at least 34, including curricular credits (at least 28) and non-curricular credits (at least 6). At least 18 credits for required courses should be obtained.

Majors for master's program include: Materials Science and Engineering, Materials Science, Materials Processing Engineering, Materials Physics and Chemistry, Optoelectronics and Information Materials, Materials of New Energy Sources.

3. 通过本科阶段的学习应获得以下几方面的知识和能力:

(1) 具有人文社会科学素养、社会责任感和工程职业道德;

(2) 具有从事工程工作所需的自然科学、人文社会科学以及经济和管理知识;

(3) 掌握材料科学与工程学科的基础理论, 具有材料合成与制备、材料加工、材料复合、材料设计、材料性能检测和质量控制等专业基础知识, 具有材料科学与工程领域的工程基础知识和系统的工程实践学习经历;

(4) 掌握材料的结构与性能的分析研究方法, 具有研究和开发新材料、新工艺的初步能力, 具备正确选择设备进行材料研究、材料设计、材料开发的初步能力; 掌握基本的创新方法, 具有追求创新的态度和意识; 研究和设计过程中能够综合考虑经济、环境、法律、安全、健康、伦理等制约因素;

(5) 具有本专业必需的机械设计、电工与电子技术、计算机应用的基本知识和技能;

(6) 掌握中外文资料查询、文献检索以及运用现代信息技术获取相关信息的基本方法, 具有初步的科学研究和实际工作能力, 了解本专业的前沿发展现状和趋势;

(7) 了解与本专业相关的职业和行业的生产、设计、研究与开发、环境保护和可持续发展等方面的方针、政策、法规, 能正确认识工程对于客观世界和社会的影响;

(8) 具有适应发展的能力以及对终生终身学习的正确认识和学习能力;

(9) 具有一定的组织管理能力、较强的表达能力和人际交往能力以及在团队中发挥作用的能力; 具有一定的国际视野和跨文化的交流、竞争与合作能力。

研究生阶段的培养目标和要求按研究生培养计划执行。

Specific program objectives have been established to attain this general objective for the preparation of the master study that its graduates will have:

(1) Humanities and art, social responsibility and professional behavior;

(2) Basic knowledge of engineering and theories of materials science and engineering; disciplines with materials synthesizing and preparing, materials designing and engineering research and product quality controlling; experience of engineering practice;

(3) Knowledge of experimental skills in materials synthesizing and preparing, forming and processing, structure analyzing, property testing, materials design, practical utilization and product quality control; basic knowledge related to materials science and engineering; experiences of practical engineering;

(4) Basic methods for structure analysis and property testing; preliminary abilities to develop new materials, technologies and devices; preliminary abilities to employ adequate equipments to perform materials research and development; preliminary creative consciousness; Ability to use theory and technical methods and comprehensively considering different factors including economy, environment, law and safety, which confine product equipment and the process;

(5) Basic knowledge and skills of mechanical design, electrical engineering & electric technology, and computer applications, which are needed in composite materials and engineering;

(6) Basic methods of literature search, data query and use of modern information technology to obtain relative information;

(7) Knowledge of guiding principles and policies of producing, designing, researching, environment protection and sustainable development in related industry and knowledge of the status and trends in the fields;

(8) Ability to adapt to the development and keep study all their lifelong;

(9) Ability of organizing and managing, expressing and communicating and to deal with crisis and emergency events and compete and cooperate in cross-cultural fields.

Educational requirements for master's program are carried out according to Master Program for Major in Materials Science and Engineering.

三、主干学科

III Major Disciplines

主干学科：材料科学与工程、化学、物理学

Major Disciplines: Materials Science and Engineering, Chemistry, Physics

四、专业核心课程与专业特色课程

IV Core Courses and Characteristic Courses

专业核心课程：材料科学基础、材料工程基础、材料概论、材料研究与测试方法、计算机在材料科学与工程中应用、专业综合实验

Core Courses: Fundamentals of Materials Science, Fundamentals of Materials Engineering, Introduction to Materials, Methods of Materials Research and Testing, Computer applied in Materials Science & Engineering A, Comprehensive Experiments on Materials Science and Engineering

专业特色课程：材料概论、材料科学基础、材料工程基础、材料研究与测试方法

Characteristic Courses: Introduction to Materials, Fundamentals of Materials Science, Fundamentals of Materials Engineering, Methods of Materials Research and Testing

五、学制与学位

V Length of Schooling and Degree

修业年限：六年（其中本科 3.5 年，硕士研究生 2.5 年）

Duration: Six Years

授予学位：工学学士学位，工学硕士学位

Degree Granted: Bachelor of Engineering and Master of Engineering

六、最低毕业学分规定

VI Graduation Credit Criteria

课程类别 Course Classification 课程性质 Course Nature	通识课程 Public Basic Courses	学科大类课程 Basic Disciplinary Courses	专业课程 Specialized Courses	个性课程 Personalized Course	集中性实践 Practice Courses	课外学分 Study Credit after Class	总学分 Total Credits
必修课 Required Courses	35	60	35	\	21.5	\	190
选修课 Elective Courses	9	3	10.5	6	\	10	

七、课程修读指导建议

VII Recommendations on Course Studies

八、理论教学进程表

VIII Theory Course Schedule

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Code	课 程 名 称 Course Name	学分 Credits	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major	
					总学时 Tot hrs.	实验 Exp.	上机 Ope- ration	实践 Prac- tice	课外 Extra- cur				
通 识 课 程 Public Basic Courses	必修课程 Required Courses	4220001110	思想道德修养与法律基础 Morals, Ethics and Fundamentals of Law	3	48			8		1-6			
		4220002110	中国近现代史纲要 Outline of Contemporary and Modern Chinese History	2	32					1-6			
		4220003110	毛泽东思想和中国特色社会主义理论体系概论 Introduction to Mao Zedong Thought and Socialism with Chinese Characteristics	4	96			32		1-6			
		4220005110	马克思主义基本原理 Marxism Philosophy	3	48			8		1-6			
		1060003130	军事理论 Military Theory	1	32			16		1-4			
		1050001130	心理健康教育 Mental Health Education	1	16					1-2			
		4210001110	体育 1 Physical Education I	1	32					1			
		4210002110	体育 2 Physical Education II	1	32					2	体育 1		
		4210003110	体育 3 Physical Education III	1	32					3	体育 2		
		4210004110	体育 4 Physical Education IV	1	32					4	体育 3		
		4030002110	大学英语 A1 College English A I	3	64				16	1			
		4030003110	大学英语 A2 College English A II	3	64				16	2	大学英语 A1		
		4030004110	大学英语 A3 College English A III	3	64				16	3	大学英语 A2		
		4030005110	大学英语 A4 College English A IV	3	64				16	4	大学英语 A3		
		4120017110	大学计算机基础 Foundation of Computer	2	32		12			1			
		程序设计语言课程组(三选一，3 学分) Courses of Computer Program Design (select one out of three, Credits: 3)											
		4120023110	计算机程序设计基础(C 语言) Fundamentals of Computer Program Design(C)	3	48			12			2		
		4120024110	计算机程序设计基础(FORTRAN 语言) Fundamentals of Computer Program Design(FORTRAN)	3	48			12			2		
		4120025110	计算机程序设计基础(VB 语言) Fundamentals of Computer Program Design(VB)	3	48			12			2		
	小 计 Subtotal				35	736		24	64	64			
	选修课程 Elective Courses	创新创业类 Innovation and Entrepreneurship Courses			全校学生要求至少取得 9 学分，建议每个类别中分别至少选修一门课程。 All students are required to obtain at least nine credits, and suggested to select at least one course in five categories respectively.								
		人文社科类 Arts and Social Science Courses											
		经济管理类 Economy and Management Courses											

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Code	课 程 名 称 Course Name	学分 Credits	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major
		总学时 Tot hrs.	实验 Exp.		上机 Ope-ration	实践 Prac-tice	课外 Extra-cur					
		科学技术类 Science and Technology Courses										
		艺术体育类 Art and Physical Education Courses										
学 科 大 类 课 程 Basic Disciplinary Courses	必修课程 Required Courses	4070160110	专业导论 Introduction to Specialty	1	16					1		
		4080042110	工程图学 C Engineering Graphics C	4	64		8			2		
		4050063110	高等数学 A 上 Advanced Mathematics A I	5	80					1		
		4050064110	高等数学 A 下 Advanced Mathematics A II	5	80					2	高等数学 A 上	
		4050021110	大学物理 A 上 Physics A I	3.5	56					2		
		4050022110	大学物理 A 下 Physics A II	3.5	56					3	大学物理 A 上	
		4050222110	物理实验 A 上 Physics Lab. A I	1	28	28				3	大学物理 A 上	
		4050223110	物理实验 A 下 Physics Lab. A II	1	28	28				4	大学物理 A 下	
		4070016110	材料概论 Introduction to Materials	2	32					3		
		4050229110	线性代数 Linear Algebra	2.5	40					3	高等数学 A 下	
		4050058020	概率论与数理统计 B Probability and Mathematical Statistics B	3	48					4	高等数学 A 下	
		4100012110	电工与电子技术基础 C Fundamentals of Electrical Engineering & Electric Technology C	4	64	10				4		
		4080061110	机械设计基础 Base of Mechanical Design	3.5	56	6				4		
		4050072110	工程力学 B Engineering Mechanics, B	4	64					4		
		4050073110	工程力学 B 实验 Engineering Mechanics Experiment B	0.5	16	16				4		
		4050452130	无机化学 Inorganic Chemistry	3.5	60					1		
		4050453130	无机化学实验 Inorganic Chemistry Experiment	1	32	32				1		
		4050820130	有机化学 Organic Chemistry	3.5	60					2		
		4050821130	有机化学实验 Organic Chemistry Experiment	1	32	32				2		
		4050044110	分析化学 C Analytical Chemistry	1.5	24					3		
		4050045110	分析化学实验 Analytical Chemistry C Experiment	1	32	32				3	分析化学 C	
		4050220110	物理化学 C Physical Chemistry C	4	64					3		
		4050219110	物理化学 B 实验 Physical Chemistry B Experiment	1	32	32				3	物理化学 C	

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Code	课 程 名 称 Course Name	学分 Credits	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur			
			小 计 Subtotal		60	1064	216	8				
选修课 Elective Courses	选 修 课	4200286130	综合化学实验 B（偏无机） Comprehensive Chemical Experiments B (Inorganic)	1	32	32				4		
		4200287130	综合化学实验 C（偏有机） Comprehensive Chemical Experiments C (Organic)	1	32	32				4		
		4070037110	材料与环境 Materials & Environment	2	32					5		
		4070118110	能源科学概论 Introduction to Science of Energy Sources	2	32					5		
		4060090110	矿物与岩石 Minerals & Rocks	2	32	10				5		
		小 计 Subtotal			8	128	74					
	修读说明：至少选修 3 学分。必选一门综合化学实验。 NOTE: Minimum subtotal credits: 3.At least one course about Comprehensive Chemical Experiments is needed.											
专业课程 Specialized Courses	必修课 Required Courses	4070028110	材料科学基础 Fundamentals of Materials Science	4.5	72					4		
		4070280120	材料科学基础实验 A Experiments on Fundamentals of Materials Science A	1	32	32				4		
		4070017110	材料工程基础 Fundamentals of Materials Engineering	4	64					5		
		4070079110	固体物理 B Solid Physics B	3.5	56					5		
		4070036110	材料研究与测试方法 A Methods of Materials Research and Testing A	3.5	56					5		
		4070281120	材料研究与测试方法实验 Experiments on Testing Techniques of Materials	2	64	64				5		
		4070097110	结构缺陷 Structural Imperfection	2	32					5		
		4070023110	材料化学 A Materials Chemistry A	3.5	56					5		
		4070090110	计算机在材料科学与工程中应用 A Computer applied in Materials Science & Engineering A	2.5	40		20			6		
		4070033110	材料物理 B Materials Physics B	3.5	56					6		
		4070016210	材料工艺与设备 B Materials Techniques and Equipments B	2	32					6		
		4070283120	材料制备与物性分析 B Materials Preparing and Properties Characterization B	3	96	96				6		
	小 计 Subtotal			35	656	192	20					

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Code	课 程 名 称 Course Name	学分 Credits	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major	
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur				
选修课 Elective Courses	选 修 课	4070021110	材料合成与加工 Materials Synthesizing and Processing	2	32					6			
		4070014110	材料腐蚀与防护 Materials Corrosion and Protection	2	32					6			
		4070073110	功能材料 A Functional Materials A	2	32					6			
		4070098110	金属材料 Metallic Materials	2	32					6			
		4070135110	特种玻璃 Special Glass	1.5	24					6			
		4070094110	胶凝材料 Gelling Materials	2	32					6			
		4070077110	功能陶瓷材料与器件 Functional Ceramic Materials and Devices	2	32					6			
		4070058110	高分子材料 Polymer Materials	2	32					6			
		小 计 Subtotal			15.5	280							
		修读说明：要求至少选修 10.5 学分。 NOTE: Minimum subtotal credits:10.5.											
	个性课程 Individual Course	选 修 课 Elective Courses	4070145110	无机非金属材料工学 B Inorganic Non-metallic Materials Engineering B	2	32					6		
4070116110			纳米材料与纳米技术 Nano-materials	2	32					6			
4070081110			光电子材料及应用 Photoelectron Materials and Applications	1	16					6			
4070009110			薄膜材料与技术 Thin-film Materials and Technology	1	16					6			
4070071110			新能源材料与技术 Materials and Technology of New Energy	2	32					7			
小 计 Subtotal			8	128									
修读说明：学生可跨专业自主选择修读全校其他专业的课程，建议修读以上课程。要求至少选修 6 学分。 NOTE: Students can choose any courses from the other specialties, and are especially suggested to choose the courses above. Minimum subtotal credits: 6.													

九、集中性实践教学进程表

IX Practice Training Table

课程编号 Course Number	实践环节名称 Practice Courses Name	周数 Weeks	学分 Credits	建议修读学期 Suggested Term	第二专业 Second Major
1060002110	军事训练 Military Training	3	1.5	1	
4080151110	机械制造工程实训 C Training on Mechanical Manufacturing Engineering C	2	2	4	
4100069110	电工电子实习 B Practice of Electrical Engineering & Electronics B	1	1	4	
4080146110	机械设计基础课程设计 Practice of Fundamentals of Mechanical Design	2	2	5	
4070216110	认识实习 Practice of Engineering Cognition	1	1	5	

课程编号 Course Number	实践环节名称 Practice Courses Name	周数 Weeks	学分 Credits	建议修读学期 Suggested Term	第二专业 Second Major
4070226110	专业实习 Practice of Specialty	3	3	6	
4070339120	毕业论文 Graduation Thesis	17	11	7	
小 计 Subtotal		29	21.5		

十、其它要求

X Other Demands

1. 学硕班学生在材料科学与工程学院全日制本科学生中产生，按照“学生自愿、注重潜质”的原则，根据其在各省市的高考成绩的相对位置择优遴选。在培养过程中，前3年采用流入-流出动态管理模式对生源实行动态遴选，1年级在学-硕连读班与本院所有本科专业之间实施流入-流出动态管理模式，2-3年在学-硕连读班与材料科学与工程专业之间执行流入-流出动态管理模式。

1. Students of the Bachelor + Master Program are chosen from the full-time undergraduate students according to their will and potentials together with the NCEE relative ranking. During their studying, they should obtain the qualifications for the master's program after three times' competition in the first three years. During their first year of the bachelor's program, they should work hard so as to remain in the bachelor + master class, otherwise they will be moved to other majors. During their second and third years, if they fail to meet the requirements, they will go out of the class and get to the major of materials science and engineering.

2. 《形势与政策》课程，平均每学期16学时，一般按专题进行，在第七学期末考核，计2个课外学分，具体由学校学生工作部、各学院学工办负责组织落实。

2. *Situation & Policy*, a course with 16 hours / term and 2 extracurricular credits, is taught in terms of topics and tested at the end of the 7th term. The course will be arranged by the Centre of Development and Guidance for Students in the university.

材料科学与工程专业（学硕连读班）本科培养方案

Undergraduate Program for Major in Materials Science and Engineering (Bachelor + Master class)

一、业务培养目标

I Educational Objectives

本专业培养具有良好社会责任感和职业道德，具有较好自然科学基础和人文社会科学基础，扎实的材料科学与工程领域的材料科学、材料工程方面较宽的基础知识，综合素质好，具有较强的创新精神，能在各种材料的制备、加工成型、材料结构与性能、材料应用等领域从事科学研究与教学、技术开发、新材料研制、工艺和设备设计、技术改造、生产技术管理与经营管理等方面工作，适应社会主义市场经济发展的高层次、高素质、创新能力强、实践能力强的复合型拔尖创新人才。

Aiming at preparing students for excellent researchers and engineers with initiative spirit, social responsibility and professional behavior, this program will enable students to be solid grounded in basic theory and wide-ranged in specialized knowledge of materials science and engineering. Students can be fit into jobs in the fields of materials preparing, materials analyzing and materials applying. They can do the work of scientific research and teaching, development of technology and product, new materials development, design of process and equipment, manufacturing management and operating management.

二、业务培养要求

II Educational Requirement

1. 本科阶段基本要求

本科阶段修业年限 3.5 年。

本科阶段课程总学时：2672，课程总学分：147.5；实践环节：27 周（含毕业论文 15 周），实践环节学分：25.5；课外学分：10；个性课程学分：7；本科阶段学分总计：190。

本科阶段的第六学期末，经过第三次流出、流入后，确认攻读硕士学位资格并选择硕士指导教师，第七学期在导师指导下完成本科毕业论文。

1. Educational requirements for bachelor's program:

Educational duration: 3.5 years

Total course periods: 2672 hours; total course credits: 147.5; practice course periods: 27 weeks (including 15 weeks for graduation thesis); practice course credits: 25.5; extracurricular course credits: 10; individual course credits: 7; total credits: 190

At the end of the sixth term, the students will obtain the qualification for the master's program after three times' competition. The graduation thesis will be finished at the seventh term under the guidance of the supervisor.

2. 硕士研究生阶段基本要求与方向

硕士研究生阶段修业年限 2.5 年。其中课程学习 1 年左右，毕业论文 1.5 年左右。

总学分包括课程学分和非课程学分，总学分不低于 34。课程学分包括学位课和选修课的学分，课程学分不低于 28，其中学位课不低于 18 学分。非课程学分（必修环节学分）不低于 6。

硕士研究生阶段修读专业有：材料科学与工程专业、材料学专业，材料加工工程专业、材料物理与化学专业、光电子及信息材料专业、新能源材料专业等。

2. Educational requirements for master's program:

Educational duration: 2.5 years, including at least one year of course study and 1.5 years of graduation thesis.

Total course credits: at least 34, including curricular credits (at least 28) and non-curricular credits (at least 6). At least 18 credits for required courses should be obtained.

Majors for master's program include: Materials Science and Engineering, Materials Science, Materials Processing Engineering, Materials Physics and Chemistry, Optoelectronics and Information Materials, Materials of New Energy Sources.

3. 通过本科阶段的学习应获得以下几方面的知识和能力:

(1) 具有人文社会科学素养、社会责任感和工程职业道德;

(2) 具有从事工程工作所需的自然科学、人文社会科学以及经济和管理知识;

(3) 掌握材料科学与工程学科的基础理论, 具有材料合成与制备、材料加工、材料复合、材料设计、材料性能检测 and 产品质量控制等专业基础知识, 具有材料科学与工程领域的工程基础知识和系统的工程实践学习经历;

(4) 掌握材料的结构与性能的分析研究方法, 具有研究和开发新材料、新工艺的初步能力, 具备正确选择设备进行材料研究、材料设计、材料开发的初步能力; 掌握基本的创新方法, 具有追求创新的态度和意识; 研究和设计过程中能够综合考虑经济、环境、法律、安全、健康、伦理等制约因素;

(5) 具有本专业必需的机械设计、电工与电子技术、计算机应用的基本知识和技能;

(6) 掌握中外文资料查询、文献检索以及运用现代信息技术获取相关信息的基本方法, 具有初步的科学研究和实际工作能力, 了解本专业的前沿发展现状和趋势;

(7) 了解与本专业相关的职业和行业的生产、设计、研究与开发、环境保护和可持续发展等方面的方针、政策、法规, 能正确认识工程对于客观世界和社会的影响;

(8) 具有适应发展的能力以及对终生终身学习的正确认识和学习能力;

(9) 具有一定的组织管理能力、较强的表达能力和人际交往能力以及在团队中发挥作用的能力; 具有一定的国际视野和跨文化的交流、竞争与合作能力。

研究生阶段的培养目标和要求按研究生培养计划执行。

Specific program objectives have been established to attain this general objective for the preparation of the master study that its graduates will have:

(1) Humanities and art, social responsibility and professional behavior;

(2) Basic knowledge of engineering and theories of materials science and engineering; disciplines with materials synthesizing and preparing, materials designing and engineering research and product quality controlling; experience of engineering practice;

(3) Knowledge of experimental skills in materials synthesizing and preparing, forming and processing, structure analyzing, property testing, materials design, practical utilization and product quality control; basic knowledge related to materials science and engineering; experiences of practical engineering;

(4) Basic methods for structure analysis and property testing; preliminary abilities to develop new materials, technologies and devices; preliminary abilities to employ adequate equipments to perform materials research and development; preliminary creative consciousness; Ability to use theory and technical methods and comprehensively considering different factors including economy, environment, law and safety, which confine product equipment and the process;

(5) Basic knowledge and skills of mechanical design, electrical engineering & electric technology, and computer applications, which are needed in composite materials and engineering;

(6) Basic methods of literature search, data query and use of modern information technology to obtain relative information;

(7) Knowledge of guiding principles and policies of producing, designing, researching, environment protection and sustainable development in related industry and knowledge of the status and trends in the fields;

- (8) Ability to adapt to the development and keep study all their lifelong;
- (9) Ability of organizing and managing, expressing and communicating and to deal with crisis and emergency events and compete and cooperate in cross-cultural fields.

Educational requirements for master's program are carried out according to Master Program for Major in Materials Science and Engineering.

三、主干学科

III Major Disciplines

主干学科：材料科学与工程、化学、物理学

Major Disciplines: Materials Science and Engineering, Chemistry, Physics

四、专业核心课程与专业特色课程

IV Core Courses and Characteristic Courses

专业核心课程：材料科学基础、材料工程基础、材料概论、材料研究与测试方法、计算机在材料科学与工程中应用、专业综合实验

Core Courses: Fundamentals of Materials Science, Fundamentals of Materials Engineering, Introduction to Materials, Methods of Materials Research and Testing, Computer applied in Materials Science & Engineering A, Comprehensive Experiments on Materials Science and Engineering

专业特色课程：材料概论、材料科学基础、材料工程基础、材料研究与测试方法

Characteristic Courses: Introduction to Materials, Fundamentals of Materials Science, Fundamentals of Materials Engineering, Methods of Materials Research and Testing

五、学制与学位

V Length of Schooling and Degree

修业年限：六年（其中本科 3.5 年，硕士研究生 2.5 年）

Duration: Six Years

授予学位：工学学士学位，工学硕士学位

Degree Granted: Bachelor of Engineering and Master of Engineering

六、最低毕业学分规定

VI Graduation Credit Criteria

课程类别 Course Classification 课程性质 Course Nature	通识课程 Public Basic Courses	学科大类课程 Basic Disciplinary Courses	专业课程 Specialized Courses	个性课程 Personalized Course	集中性实践 Practice Courses	课外学分 Study Credit after Class	总学分 Total Credits
必修课 Required Courses	35	60	35	\	21.5	\	190
选修课 Elective Courses	9	3	10.5	6	\	10	

七、课程修读指导建议

VII Recommendations on Course Studies

八、理论教学进程表

VIII Theory Course Schedule

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Code	课 程 名 称 Course Name	学分 Credits	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major	
					总学时 Tot hrs.	实验 Exp.	上机 Ope- ration	实践 Prac- tice	课外 Extra- cur				
通 识 课 程 Public Basic Courses	必修课程 Required Courses	4220001110	思想道德修养与法律基础 Morals, Ethics and Fundamentals of Law	3	48			8		1-6			
		4220002110	中国近现代史纲要 Outline of Contemporary and Modern Chinese History	2	32					1-6			
		4220003110	毛泽东思想和中国特色社会主义理论体系概论 Introduction to Mao Zedong Thought and Socialism with Chinese Characteristics	4	96			32		1-6			
		4220005110	马克思主义基本原理 Marxism Philosophy	3	48			8		1-6			
		1060003130	军事理论 Military Theory	1	32			16		1-4			
		1050001130	心理健康教育 Mental Health Education	1	16					1-2			
		4210001110	体育 1 Physical Education I	1	32					1			
		4210002110	体育 2 Physical Education II	1	32					2	体育 1		
		4210003110	体育 3 Physical Education III	1	32					3	体育 2		
		4210004110	体育 4 Physical Education IV	1	32					4	体育 3		
		4030002110	大学英语 A1 College English A I	3	64				16	1			
		4030003110	大学英语 A2 College English A II	3	64				16	2	大学英语 A1		
		4030004110	大学英语 A3 College English A III	3	64				16	3	大学英语 A2		
		4030005110	大学英语 A4 College English A IV	3	64				16	4	大学英语 A3		
		4120017110	大学计算机基础 Foundation of Computer	2	32		12			1			
		程序设计语言课程组(三选一，3 学分) Courses of Computer Program Design (select one out of three, Credits: 3)											
		4120023110	计算机程序设计基础(C 语言) Fundamentals of Computer Program Design(C)	3	48			12			2		
		4120024110	计算机程序设计基础(FORTRAN 语言) Fundamentals of Computer Program Design(FORTRAN)	3	48			12			2		
		4120025110	计算机程序设计基础(VB 语言) Fundamentals of Computer Program Design(VB)	3	48			12			2		
	小 计 Subtotal				35	736		24	64	64			
	选修课程 Elective Courses	创新创业类 Innovation and Entrepreneurship Courses			全校学生要求至少取得 9 学分，建议每个类别中分别至少选修一门课程。 All students are required to obtain at least nine credits, and suggested to select at least one course in five categories respectively.								
		人文社科类 Arts and Social Science Courses											
		经济管理类 Economy and Management Courses											

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Code	课 程 名 称 Course Name	学分 Credits	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major
		总学时 Tot hrs.	实验 Exp.		上机 Ope- ration	实践 Prac- tice	课外 Extra- cur					
		科学技术类 Science and Technology Courses										
		艺术体育类 Art and Physical Education Courses										
学 科 大 类 课 程 Basic Disciplinary Courses	必修课程 Required Courses	4070160110	专业导论 Introduction to Specialty	1	16					1		
		4080042110	工程图学 C Engineering Graphics C	4	64		8			2		
		4050063110	高等数学 A 上 Advanced Mathematics A I	5	80					1		
		4050064110	高等数学 A 下 Advanced Mathematics A II	5	80					2	高等数学 A 上	
		4050021110	大学物理 A 上 Physics A I	3.5	56					2		
		4050022110	大学物理 A 下 Physics A II	3.5	56					3	大学物理 A 上	
		4050222110	物理实验 A 上 Physics Lab. A I	1	28	28				3	大学物理 A 上	
		4050223110	物理实验 A 下 Physics Lab. A II	1	28	28				4	物理实验 A 上	
		4070016110	材料概论 Introduction to Materials	2	32					3		
		4050229110	线性代数 Linear Algebra	2.5	40					3	高等数学 A 下	
		4050058020	概率论与数理统计 B Probability and Mathematical Statistics B	3	48					4	高等数学 A 下	
		4100012110	电工与电子技术基础 C Fundamentals of Electrical Engineering & Electric Technology C	4	64	10				4		
		4080061110	机械设计基础 Base of Mechanical Design	3.5	56	6				4		
		4050072110	工程力学 B Engineering Mechanics, B	4	64					4		
		4050073110	工程力学 B 实验 Engineering Mechanics Experiment B	0.5	16	16				4		
		4050452130	无机化学 Inorganic Chemistry	3.5	60					1		
		4050453130	无机化学实验 Inorganic Chemistry Experiment	1	32	32				1		
		4050820130	有机化学 Organic Chemistry	3.5	60					2		
		4050821130	有机化学实验 Organic Chemistry Experiment	1	32	32				2		
		4050044110	分析化学 C Analytical Chemistry	1.5	24					3		
		4050045110	分析化学实验 Analytical Chemistry C Experiment	1	32	32				3	分析化学 C	
		4050220110	物理化学 C Physical Chemistry C	4	64					3		
		4050219110	物理化学 B 实验 Physical Chemistry B Experiment	1	32	32				3	物理化学 C	

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Code	课 程 名 称 Course Name	学分 Credits	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur			
			小 计 Subtotal		60	1064	216	8				
选修课 Elective Courses		4200286130	综合化学实验 B（偏无机） Comprehensive Chemical Experiments B (Inorganic)	1	32	32				4		
		4200287130	综合化学实验 C（偏有机） Comprehensive Chemical Experiments C (Organic)	1	32	32				4		
		4070037110	材料与环境 Materials & Environment	2	32					5		
		4070118110	能源科学概论 Introduction to Science of Energy Sources	2	32					5		
		4060090110	矿物与岩石 Minerals & Rocks	2	32	10				5		
		小 计 Subtotal		12.5	216	74						
读说明：至少选修 3 学分。必选一门综合化学实验。 NOTE: Minimum subtotal credits: 3.At least one course about Comprehensive Chemical Experiments is needed.												
专业 课程 Specialized Courses	必修课 Required Courses	4070028110	材料科学基础 Fundamentals of Materials Science	4.5	72					4		
		4070280120	材料科学基础实验 A Experiments on Fundamentals of Materials Science A	1	32	32				4		
		4070017110	材料工程基础 Fundamentals of Materials Engineering	4	64					5		
		4070079110	固体物理 B Solid Physics B	3.5	56					5		
		4070036110	材料研究与测试方法 A Methods of Materials Research and Testing A	3.5	56					5		
		4070281120	材料研究与测试方法实验 Experiments on Testing Techniques of Materials	2	64	64				5		
		4070097110	结构缺陷 Structural Imperfection	2	32					5		
		4070023110	材料化学 A Materials Chemistry A	3.5	56					5		
		4070090110	计算机在材料科学与工程中应用 A Computer applied in Materials Science & Engineering A	2.5	40		20			6		
		4070033110	材料物理 B Materials Physics B	3.5	56					6		
		4070016210	材料工艺与设备 B Materials Techniques and Equipments B	2	32					6		
		4070283120	材料制备与物性分析 B Materials Preparing and Properties Characterization B	3	96	96				6		
			小 计 Subtotal		35	656	192	20				

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Code	课 程 名 称 Course Name	学分 Credits	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major	
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur				
选修课 Elective Courses		4070021110	材料合成与加工 Materials Synthesizing and Processing	2	32					6			
		4070014110	材料腐蚀与防护 Materials Corrosion and Protection	2	32					6			
		4070073110	功能材料 A Functional Materials A	2	32					6			
		4070098110	金属材料 Metallic Materials	2	32					6			
		4070135110	特种玻璃 Special Glass	1.5	24					6			
		4070094110	胶凝材料 Gelling Materials	2	32					6			
		4070077110	功能陶瓷材料与器件 Functional Ceramic Materials and Devices	2	32					6			
		4070058110	高分子材料 Polymer Materials	2	32					6			
		小 计 Subtotal			17.5	280							
		修读说明：要求至少选修 10.5 学分。 NOTE: Minimum subtotal credits:10.5.											
个性课程 Individual Course	选修课 Elective Courses	4070145110	无机非金属材料工学 B Inorganic Non-metallic Materials Engineering B	2	32					6			
		4070116110	纳米材料与纳米技术 Nano-materials	2	32					6			
		4070081110	光电子材料及应用 Photoelectron Materials and Applications	1	16					6			
		4070009110	薄膜材料与技术 Thin-film Materials and Technology	1	16					6			
		4070071110	新能源材料与技术 Materials and Technology of New Energy	2	32					7			
		小 计 Subtotal			8	128							
		修读说明：学生可跨专业自主选择修读全校其他专业的课程，建议修读以上课程。要求至少选修 6 学分。 NOTE: Students can choose any courses from the other specialties, and are especially suggested to choose the courses above. Minimum subtotal credits: 6.											

九、集中性实践教学进程表

IX Practice Training Table

课程编号 Course Number	实践环节名称 Practice Courses Name	周数 Weeks	学分 Credits	建议修读学期 Suggested Term	第二专业 Second Major
1060002110	军事训练 Military Training	3	1.5	1	
4080151110	机械制造工程实训 C Training on Mechanical Manufacturing Engineering C	2	2	4	
4100069110	电工电子实习 B Practice of Electrical Engineering & Electronics B	1	1	4	
4080146110	机械设计基础课程设计 Practice of Fundamentals of Mechanical Design	2	2	5	
4070216110	认识实习 Practice of Engineering Cognition	1	1	5	

课程编号 Course Number	实践环节名称 Practice Courses Name	周数 Weeks	学分 Credits	建议修读学期 Suggested Term	第二专业 Second Major
4070226110	专业实习 Practice of Specialty	3	3	6	
4070339120	毕业论文 Graduation Thesis	17	11	7	
小 计 Subtotal		29	21.5		

十、其它要求

X Other Demands

1. 学硕班学生在材料科学与工程学院全日制本科学生中产生，按照“学生自愿、注重潜质”的原则，根据其在各省市的高考成绩的相对位置择优遴选。在培养过程中，前3年采用流入-流出动态管理模式对生源实行动态遴选，1年级在学-硕连读班与本院所有本科专业之间实施流入-流出动态管理模式，2-3年在学-硕连读班与材料科学与工程专业之间执行流入-流出动态管理模式。

1. Students of the Bachelor + Master Program are chosen from the full-time undergraduate students according to their will and potentials together with the NCEE relative ranking. During their studying, they should obtain the qualifications for the master's program after three times' competition in the first three years. During their first year of the bachelor's program, they should work hard so as to remain in the bachelor + master class, otherwise they will be moved to other majors. During their second and third years, if they fail to meet the requirements, they will go out of the class and get to the major of materials science and engineering.

2. 《形势与政策》课程，平均每学期16学时，一般按专题进行，在第七学期末考核，计2个课外学分，具体由学校学生工作部、各学院学工办负责组织落实。

2. *Situation & Policy*, a course with 16 hours / term and 2 extracurricular credits, is taught in terms of topics and tested at the end of the 7th term. The course will be arranged by the Centre of Development and Guidance for Students in the university.

材料成型及控制工程（焊接）专业 （卓越工程师班）本科培养方案

Undergraduate Program for Major in Material Forming and Control Engineering (Welding) (Excellent Engineer Class)

一、业务培养目标

I Educational Objectives

本专业培养具有扎实而宽厚的自然科学基础，较好的人文科学素养，较强的社会责任感，具有较强的焊接技术与工程专业能力，以及良好的交流和沟通能力、组织管理能力，面向企业的具有国际视野的工程技术及管理人才。

本专业毕业的学生，既可从事焊接技术与工程领域的产品开发、生产及应用、工艺设计及控制、新技术开发及工程服务等方面的工作，也可承担企业管理、生产技术管理及企业市场经营等工作。

Aiming at preparing students for excellent enterprise-oriented talents with initiative spirit, professional behavior and social responsibility, this program will enable students to be solid grounded in welding technology and wide-ranged in international perspective.

Students can be fit into jobs in the fields of welding technology and engineering. They can do the work of production development, application, process design and control, new technology development, engineering service, as well as enterprise management, technology management, and market business.

二、业务培养要求

II Educational Requirement

本专业学生主要学习机械学、材料学和自动化学科的基础理论与技术，得到现代工程师的基本训练，具备从事焊接技术与工程领域的成型工艺、设计、计算机应用、工程控制及生产组织管理的基本能力。

毕业生应获得以下几方面的知识和能力：

1. 具有扎实的数学、物理等自然科学基础，以及良好的人文社会科学基础和管理科学基础；
2. 具有本专业必需的机械学、材料学、电工与电子技术、自动控制、信息及网络技术、计算机应用技术的基本知识和技能；
3. 按国际焊接工程师要求，系统地掌握焊接技术与工程主课程的基础理论、专业知识和技能。能够根据产品和工程要求优化、设计有关工艺系统及设备。熟悉本专业国际标准、学科前沿和发展趋势。
4. 具有较强的创新意识和进行产品开发和设计、技术改造与创新的初步能力；
5. 具有良好的质量、环境、职业安全和服务意识，应对危机与突发事件的初步能力；
6. 具有较强的自我获取知识的能力，信息收集、处理能力，具备终生学习的能力；
7. 具有较强的交流和沟通能力、团队合作的能力，具有一定的组织管理能力；
8. 具有良好的身体素质、心理素质，较强的社会责任感和良好的工程职业道德；
9. 熟悉本专业领域技术标准，相关行业的政策、法律和法规。

The undergraduate programs of the specialty are designed to acquire a all-rounded education of mechanics, materials and automation with specific emphasis on basic theories and technology, be trained on being a modern engineer, and gain ability to engage in material forming process, design, computer application, engineering control and production management Independent in the fields of welding technology and engineering.

1. Basic knowledge of natural science including mathematics, physics etc, humanities, and management science.
2. Basic knowledge and skills of mechanics, materials, electronics, automations, IT, and applications of computer technology.

3. In accordance with international welding engineer, methods of basic theory and technique of welding technology and engineering. Being able to optimize and design process systems and equipments for engineering requirements, and be familiar with the international standards of this specialty, the latest information and development trend.

4. Basic ability of innovation, development of technology and product ,design of process and equipments.

5. Strong awareness of quality, environment, occupational safety and service, and basic ability to deal with crises and emergencies.

6. Strong ability of self-study, information gathering and processing with life long learning.

7. Strong ability of communication, cooperation, and organization.

8. Physical, psychological, social responsibility and professional behavior.

9. Familiar with technical standards , laws, principles and policies related to this industry.

三、主干学科

III Major Disciplines

主干学科：机械工程、材料科学与工程

Major Disciplines: Mechanical Engineering, Materials Science and Engineering

四、专业核心课程与专业特色课程

IV Core Courses and Characteristic Courses

专业核心课程：工程图学、理论力学、材料力学、机械原理、机械设计、电工与电子技术基础、金属工艺学、金属学及热处理、材料成型控制工程基础、材料成型原理、电弧焊基础、弧焊电源、焊接结构、材料焊接性

Core Courses: Engineering Graphic, Theoretical Mechanics, Materials Mechanics, Mechanic Principle, Mechanic Design, Fundamentals of Electrical Engineering and Electric Technology , Metallurgical Technology, Metallography and Heat Treatment, Fundamentals of Control Engineering of Material Forming, Fundamentals of Testing Techniques, Welding Metallurgy, Fundamentals of Arc Welding, Arc Welding Power, Welding Structure, Material Weldability

专业特色课程：国际焊接标准、焊接结构设计与生产、材料及其焊接行为、焊接工艺制定训练、焊接结构设计与生产训练、焊接工程设计、岗位实习

Characteristic Courses: International Welding Standards, Design and Manufacture of Welding Structure, Material and its Welding Behavior, Training on Welding Process Developing , Welding Structure design and production Training , Welding Engineering Design, Internship

五、计划学制与学位

V Length of School and Degree

修业年限：四年

Duration: Four Years

授予学位：工学学士

Degree Granted: Bachelor of Engineering

六、最低毕业学分规定

VI Graduation Credit Criteria

课程类别 Course Classification 课程性质 Course Nature	通识课程 Public Basic Courses	学科大类课程 Basic Courses in General Discipline	专业课程 Courses in Specialty	个性课程 Personalized Course	集中性实践 Practice Courses	课外学 Extracurricular Credits	总学分 Total Credits
必修课 Required Courses	35	39.5	42.5	\	34	\	190
选修课 Elective Courses	9	5	15	\	\	10	

七、课程修读指导建议

VII Recommendations on Course Studies

八、理论教学建议进程表

VIII Theory Course Schedule

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Number	课 程 名 称 Course Title	学 分 Crs	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major
					总学时 Tot hrs.	实验 Exp.	上机 Ope- ration	实践 Prac- tice	课外 Extra- cur			
通 识 课 程 Public Basic Courses	必修课 Required Courses	4220001110	思想道德修养与法律基础 Morals, Ethics and Fundamentals of Law	3	48			8		1-6		
		4220002110	中国近现代史纲要 Outline of Contemporary and Modern Chinese History	2	32					1-6		
		4220003110	毛泽东思想和中国特色社会主义理论体系概论 Introduction to Mao Zedong Thought and Socialism with Chinese Characteristics	4	96			32		1-6		
		4220005110	马克思主义基本原理 Marxism Philosophy	3	48			8		1-6		
		1060003130	军事理论 Military Theory	1	32			16		1-4		
		4210001110	体育 1 Physical Education I	1	32					1		
		4210002110	体育 2 Physical Education II	1	32					2	体育 1	
		4210003110	体育 3 Physical Education III	1	32					3	体育 2	
		4210004110	体育 4 Physical Education IV	1	32					4	体育 3	
		1050001130	心理健康教育 Mental Health Education	1	16					1-2		
		4030002110	大学英语 A1 College English A I	3	64				16	1		
		4030003110	大学英语 A2 College English A II	3	64				16	2	大学英语 A1	
		4030004110	大学英语 A3 College English A III	3	64				16	3	大学英语 A2	
		4030005110	大学英语 A4 College English A IV	3	64				16	4	大学英语 A3	
		4120017110	大学计算机基础 Foundation of Computer	2	32		12			1		
		程序设计语言课程组(三选一，3 学分) Courses of Computer Program Design (select one out of three, Credits: 3)										

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Number	课 程 名 称 Course Title	学 分 Crs	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major	
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur				
		4120023110	计算机程序设计基础(C 语言) Fundamentals of Computer Program Design(C)	3	48		12			2			
		4120024110	计算机程序设计基础(FORTRAN 语言) Fundamentals of Computer Program Design(FORTRAN)	3	48		12			2			
		4120025110	计算机程序设计基础(VB 语言) Fundamentals of Computer Program Design(VB)	3	48		12			2			
		小 计 Subtotal			35	736		24	64	64			
	选修课 Elective Courses	创新创业类 Innovation and Entrepreneurship Courses			全校学生要求至少取得 9 学分，建议在每个类别中分别至少选修一门课程。 All students are required to obtain at least nine credits, and suggested to select at least one course in five categories respectively.								
		人文社科类 Arts and Social Science Courses											
		经济管理类 Economy and Management Courses											
		科学技术类 Science and Technology Courses											
		艺术体育类 Art and Physical Education Courses											
	学 科 大 类 课 程 Basic Disciplinary Courses	必修课程 Required Courses	4090070110	专业导论 Introduction to Automotive Support Engineering	1	16					1		
			4050229110	线性代数 Linear Algebra	2.5	40					2		
			4050063110	高等数学 A 上 Advanced Mathematics A I	5	80					1		
			4050064110	高等数学 A 下 Advanced Mathematics A II	5	80					2	高等数学 A 上	
4080039110			工程图学 A 上 Engineering Graphics A I	3.5	56					2		*	
4080040110			工程图学 A 下 Engineering Graphics A II	2.5	40					3	工程图学 A 上	*	
4050024110			大学物理 C Physics C	4.5	72					2			
4050224110			物理实验 B Physics Lab. B	1	32	32				3			
4050058110			概率论与数理统计 B Probability and Mathematics Statistic B	3	48					3			
4100009110			电工与电子技术基础 A1 Electrical Engineering A I	3.5	56	10				3			
4100010110			电工与电子技术基础 A2 Electrical Engineering A II	3.5	56	10				4	电工与电子技术基础 A1		
4080078110			金属工艺学 B Metallurgical Technology B	2.5	40	4				4		*	
4080054110			互换性与测量技术 B Interchangeability and Measurement B	2	32	4				5			
小 计 Subtotal			39.5	648	60								

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Number	课 程 名 称 Course Title	学分 Cr	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur			
	选修课 Elective Courses	4050144110	普通化学 General Chemistry	3	48	18				1		
		4050053020	复变函数与积分变换 C Complex Analysis & Integration Transformation	2	32					3		
		4090024110	汽车 CAD/CAE Computer Aided Design and Engineering of Automobile and Engine	2	32		10			5		
		4090021110	流体动力学基础 C Fluid Mechanics Elements C	2	32					5		
		4090064110	热工基础 Elements of Thermodynamics	2	32	2				5		
		4090075110	轨道车辆概论 Introduction to Railway Vehicle	2	32					5		
		4090003020	电机学基础 Fundamentals of Electrical Machinery	2	32	2				5		
		4070039110	测试技术基础 Fundamentals of Testing Techniques	2	32					6	电工与电子技术基础 A2	
		小 计 Subtotal		17	272	22	10					
		修读说明: 要求至少选修 5 学分, 普通化学”课学分可用修读的“无机化学”课学分冲抵。 NOTE: Minimum subtotal credits: 5, "General Chemistry" credits are available to study "Inorganic Chemistry" to offset.										
专 业 课 Specialized Courses	必修课 Required Courses	4050129110	理论力学 A Theoretical Mechanics A	4.5	72					3	高等数学 A 下	
		4080062110	机械原理 Mechanic Principle	3.5	56	4				4	工程图学 A 下	
		4050016110	材料力学 B Materials Mechanics B	4.5	72					4	高等数学 A 下	
		4050017110	材料力学 B 实验 Experiment of Materials Mechanics B	1	32	32				4	材料力学 B	
		4080060110	机械设计 Mechanic Design	4	64	6				5	机械原理	
		4070449120	金属学及热处理 Metallography and Heat Treatment	3.5	56	4				5	金属工艺学 B	
		4070013110	材料成型原理 Principle of Material Forming	5	80					5	理论力学 A 金属学及热处理	
		4070163110	电弧焊基础 Fundamentals of Arc Welding	2.5	40	4				5	材料成型原理	
		4100006110	单片机原理及接口技术 A Principle and Application of Microcomputer A	3	48	8				6	大学计算机基础	
		4070011110	材料成型控制工程基础 Fundamentals of Material Forming Control and Engineering	2.5	40	4				6	电工与电子技术基础 A2	
		4070316130	弧焊电源 Arc Welding Power	2.5	40	4				6	材料成型原理	
		4070314130	焊接结构 Welding Structure	2.5	40					6	材料成型原理	
		4070172110	CAD/CAM 基础 A Fundamentals of CAD/CAM(A)	2.5	40		8			6	大学计算机基础 计算机程序设计基础(C 语言)	

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Number	课 程 名 称 Course Title	学分 Cr	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur			
选修课 Elective Courses		4070239110	焊接自主设计实验 Experiment on Independent Design of Welding	1	32	32				7	材料成型原理	
		小 计 Subtotal		42.5	712	98	8					
		4070126110	焊接数值模拟 Numerical Simulation of Welding	2	32		4			7	CAD/CAM 基础 A	
		4070227120	材料焊接性 Materials Weldability	2	32					6	材料成型原理	
		4070170110	焊接工装设计 Welding Fixture Design	2	32					6	材料成型原理	
		4070154110	压力焊与钎焊 Pressure and Braze Welding	2	32					7	材料成型原理	
		4070168110	焊接质量检测与评价 Welding Quality Inspection and Evaluation	2	32					7	材料成型原理	
		4070169110	高能束焊 High-energy Beam Welding	2	32					7	材料成型原理	
		4070171110	国际焊接标准 International Welding Standards	2	32					7	材料成型原理	
		4070167110	焊接结构设计 with 生产 Welding Structure design and production	2	32					7	材料成型原理	
		4070165110	材料及其焊接行为 Material and its Welding Behavior	1	16					7	材料成型原理	
		4070001110	高效焊接 Efficient Welding	2	32					7	材料成型原理	
		4070085110	喷涂与喷焊 Spraying and Spray Welding	1	16					7	材料成型原理	
		小 计 Subtotal		20	320		4					
		修读说明：要求至少选修 15 学分 NOTE: Minimum subtotal class credits: 15.										

九、集中性实践教学环节建议进程表

IX Practice Schedule

课程编号 Course Number	实践环节名称 Practice Courses Name	周数 Weeks	学分 Cr	建议修读学期 Suggested Term	第二专业 Second Major
1060001110	军事训练 Military Training	3	1.5	1	
4080024110	机械制造工程实训 B Training on Mechanical Manufacturing	4	4	3	
4100069110	电工电子实习 B Practice of Electrical Engineering & Electronics B	1	1	4	
4080149110	机械原理课程设计 Practice for Mechanic Principle	1.5	1.5	4	
4080147110	机械设计课程设计 Practice for Mechanical Design	3	3	5	
4070238110	焊接工程实训 Training on Welding Engineering	1	1	5	
4070240110	焊接工艺制定训练 Training on Welding Process Developing	1	1	6	

课程编号 Course Number	实践环节名称 Practice Courses Name	周数 Weeks	学分 Crts	建议修读学期 Suggested Term	第二专业 Second Major
4070241110	焊接结构设计与生产训练 Welding Structure design and production Training	2	2	6	
4070243110	专业实习 Practice of Specialty	3	3	6	
4070266120	岗位实习 Internship	5	5	7	
4070265120	毕业论文 Graduation Thesis	17	11	8	
小 计 Subtotal		41.5	34		

十、其它要求

X Other Demands

《形势与政策》课程，平均每学期 16 学时，一般按专题进行，在第七学期末考核，计 2 个课外学分，具体由学校学生发展指导中心负责组织落实。

Situation & Policy, a 16 hours/term with 2 credits course, is taught according to topics and tested at the end of the 7th term . The course will be arranged by the University Students' Affairs' Department in each school.