浙江科技学院应用物理学专业培养方案

一、培养目标

本专业培养具有较扎实的物理学基础和相关应用领域的专门知识，具有较强实践能力和创新意识，具有能在应用物理学科、交叉学科以及相关科学技术领域从事研究、教学、新技术开发与应用以及管理基础的人才。本专业部分毕业生适合在相关学科领域进一步深造。

二、培养要求

本专业学生主要学习物理学和特定专业方向的基本知识与原理、基本实验技能与技术，接受科学思维和物理学研究方法的训练，具有良好的科学精神、科学素养、科学作风和创新意识，具备一定的独立获取知识的能力、实践能力和技术开发能力。为能服务于国家经济建设和社会发展对技术开发、新材料开发、应用研究等应用性人才的需求，本专业分光电技术应用和材料物理两个专业方向。通过本专业的学习，毕业生应具备以下要求：

1、素质要求

（1）思想道德素质：热爱祖国，拥护中国共产党的领导，树立科学的世界观、人生观和价值观；具有责任心和社会责任感；具有法律意识，自觉遵纪守法；热爱本专业、注重职业道德修养；具有诚信意识和团队精神。

（2）文化素质：具有一定的文学艺术修养、人际沟通修养和现代意识。

（3）专业素质：具有较为扎实的数学、物理和计算机基础，学会科学思维和科学研究方法；具备应用物理学中某一专门方面（如光电技术、材料物理等方向）的知识和技能进行技术开发、应用研究、教学和相关管理工作的能力；了解相近专业以及应用领域的一般原理和知识；了解我国科学技术、知识产权等方面的方针、政策和法规；了解应用物理的理论前沿、应用前景和最新发展动态以及相关高新技术产业的发展状况；掌握资料查询、文献检索及运用现代信息技术获取最新参考文献的基本方法；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、参与学术交流能力。具备求实创新意识和严谨的科学素养。

（4）身心素质：具有较好的身体素质和心理素质。"

2、能力要求

（1）获取知识的能力：具有较强的分析、归纳、抽象、演绎推理、空间想象、准确计算等能力，具有良好的自学能力以及获取新知识的能力；

（2）知识应用与实践能力：具有综合应用知识解决实际问题能力、综合实验能力、数据处理能力、数值计算能力、专业软件应用能力、计算机技术应用能力、光电技术应用能力、材料分析测试能力等。

（3）创新能力：具有创造性思维能力，有一定的科技开发与研究能力，以及对新知识、新技术具有着较强的求知欲望和良好的接受能力；

（4）交流协作及组织管理能力：具有较强的专业知识表达能力、良好的团结协作能力，较强的组织管理能力以及较好的人际交往、社会适应能力。

3、知识要求

（1）工具性知识：①要求学生掌握一门外语，具有听、说、读、写的基本能力。②要求学生掌握计算机软件、硬件技术的基本知识，熟练掌握计算机基本操作、程序设计和办公自动化的基本技能；熟练掌握文献查阅检索技能，以及科技论文的写作。③具有良好的数学基础，如矢量与微积分初步等；学会一些实用的数学工具软件如 MATLAB 等；掌握数值计算处理和分析等基本知识。

（2）人文社会科学知识：①要求学生能用马克思主义的世界观和方法论武装头脑，树立正确的世界观、人生观和价值观。②要求学生有一定的人文社科知识与艺术修养。③具有一定的经营

管理意识，掌握一定的合作技巧及金融、管理技术和经济分析工具。④初步掌握锻炼身体的基本技术，养成科学锻炼身体的习惯，身体健康，达到大学体育合格标准。

（3）自然科学知识：掌握自然科学（数学、物理等）的基本理论和方法，并会利用其分析问题和解决问题。

（4）专业知识：①应用物理与工程技术的基础理论如基础物理、理论物理、光电子学等。②基本动手能力的培养与锻炼，如基础物理实验、模电数电实验、材料与等离子体实验和光电器件显示与检测实验等。③能运用所学的专业知识和技能拓展分析解决实际问题，光电技术方向学生具备光电技术分析、应用与检测等能力，材料物理方向学生具备材料分析与测试、半导体器件设计与制备等能力。

三、知识、能力和素质实现矩阵

要求内容		配套主要课程或教育培养措施	备注
知识要求	专业知识：较为系统地掌握物理学领域的基本理论、基本实验技能以及所需的各种基础知识。	通过专业主干课程、拓展复合课程、实验实践应用等环节来实现	打好扎实的专业基础，了解应用物理学相关专业方向的前沿、发展动态、应用前景以及相关高新技术产业的发展状况。
	工具知识：掌握外语、计算机及信息技术、数学基础、专利申请等方面知识	大学英语、高等数学、线性代数、C 语言程序设计、计算机辅助设计 通过《大学英语》、《计算机基础》、专业双语教学课程的学习、科技英语讲座、举行英语演讲比赛、参加英语等级考试、专业文献翻译等环节来实现。	外语方面要求：达到熟练阅读和翻译专业文献并进行简单交流；计算机方面要求：达到熟练应用计算机并基本掌握数学基础和常用软件。
	人文社科知识	通过“思政”类课程和思政社会实践等课外社会实践活动等环节实现	具有一定的哲学、政治学、法学、心理学、经济管理等方面的知识。
	其它自然科学和相关工程技术的基础知识	通过模拟电子技术、数字电子技术、信号与系统等拓展复合课程来实现	为拓展应用作准备
能力要求	获取知识的能力	通过听课学习、练习、应用的反复操练来实现	具有自学能力、获取和加工处理信息的能力。
	应用知识的能力：具备较强的实验和工程实践能力	通过基础实验和专业实验提高实验能力和动手能力；通过认识实习、金工实习、社会实践、课程设计、毕业实习等阶段递进式的实习，以及创新实践活动和导师指导下的科研活动，逐步提高工程实践能力。	具有综合应用知识解决问题的能力、实验和工程实践能力，计算机及信息技术应用能力。
	具备一定的交流合作和组织管理能力	通过参加工程实践、科技竞赛、科研项目、志愿者活动、学会社团活动、社会实习等锻炼和培养学生的交流合作和组织管理能力。	具有一定的技术管理能力，具有较好的书面和口头表达能力、与人沟通能力、团队协作能力和活动策划能力
	创新能力	通过理论教学与实际应用的结合，如科研实践、应用技术课程设计、团队协作等环节来实现	具有一定的创造性思维能力、科学研究能力、技术开发能力。

素质要求	思想品德素质	通过“思政”类课程和课外社会实践活动等环节实现	具有良好的公民意识、法制意识、政治素质、思想素质、道德品质、诚信品质。能维护和履行公民道德纲要，为社会做出贡献
	专业素质	通过专业主干课程的学习、实验实践的锻炼、专业思想教育、参加专业学术报告、集中性实践环节、毕业论文的完成以及参加各类物理竞赛和计算机程序设计竞赛等环节来实现。	具有科学思维方法、科学精神、创新意识、技术应用意识和工程技术素养。
	人文素质	通过选修除自然科学与工程技术外素质类课程群来实现	具有文化素养、艺术素养、现代意识、全球意识、团队精神
	身心素质	体育、体质健康训练、大学生心理健康教育、户外活动、运动会、各类比赛、军事训练等环节实现	具有良好的身体素质和心里素质

四、主干学科

物理学

五、主要课程

基础物理、数学物理方法、量子力学、理论力学、光电材料导论、电磁场与电磁波、光电子学、传感原理与检测技术、热力学与统计物理、微电子学、专业英语。

双语教学课程：应用光学、电光源与显示器件基础、激光技术及应用（德国）

自学或讨论课程：科学技术史、计算机网络技术及应用

六、主要实践环节

军训、社会实践、基础物理实验、近代物理实验、电子技术实验、材料与等离子体实验、光电器件与检测实验、光电子信息技术实验、应用技术实践、毕业设计（论文）

七、毕业学分要求

1、学制：实行弹性学制，本科基本学制一般为 4 年，可提前 1 年毕业，最长不超过 8 年。

2、授予学位：本科毕业，授理学学士学位。

3、本专业毕业最低学分要求：169.0 学分。

八、学分结构要求

课程设置及修读类型		学分及占比	
		学分	学分比例
理论教学环节	基础层次（必修）	42	占理论课总学分的 36.4%
	专业层次（必修）	43	占理论课总学分的 37.2%
	拓展复合层次（选修）	30.5	占理论课总学分的 26.4%
	小计	115.5	68.30%
实践教学环节	必修	53.5	31.70%
合计		169	100.00%

Undergraduate Program in

Applied Physics

I. Training Objectives

This program is to cultivate expertises with solid foundations of physics and related applications, strong practical ability and sense of innovation, who can engage in research, teaching, development of new technologies in Applied Physics, cross-disciplinary, and related fields in science and technology. Part of the graduates are suitable for further education in the relevant disciplines.

II. Training Standards

The students in this program major in physics and specific basic knowledge and principles, basic experimental skills and technology, and receive scientific thinking and research methods in physics, together with a good spirit of science, scientific literacy, scientific style and sense of innovation. The students should gain the abilities of acquiring knowledge independently, practical ability and technical development capabilities, in order to meet the requirements of technology development, new materials development, applied talents in national economic construction and social development. This program is divided into two directions, the applications of optoelectronic technologies and material physics. The graduates should meet the following requirements.

1. Quality Requirements

(1) Ideological and moral qualities. Love the motherland, support the leadership of the Communist Party of China, establish a scientific attitude of the world, life and values; with strong sense of social responsibility, legal awareness, abiding by the law; love this program, focus on professional ethics; has a sense of integrity and teamwork spirit.

(2) Cultural qualities. With literary and artistic accomplishment, interpersonal communication training and modern consciousness.

(3) Professional quality. With solid foundation in mathematics, physics and computer sciences; learn scientific thinking and research methods; have the knowledge and skills of a specialized aspect of Applied Physics (such as optoelectronic technology, materials physics) and abilities to do technology development, applied research and teaching, as well as management; understand the general principles and knowledge of related programs and application fields; Be aware of policies, guidelines, and laws of China's science, technology, and intellectual property; understand frontiers of theories in applied physics, application prospects and the latest developments, as well as related high-tech industry development; master data query, document retrieval and use of modern information technology to obtain the latest references; with certain capabilities in experimental design, creating experimental conditions, induction, consolidation, analysis of the experimental results, writing, participating in academic communications. Have a realistic sense of innovation and rigorous scientific literacy.

(4) Physical and mental qualities. Have good physical and mental qualities.

2. Capacity requirements

(1) The ability to acquire knowledge: With strong analysis, induction, abstract, deductive reasoning, spatial imagination, accurate calculation ability, as well as good self-learning ability, and the capability to acquire new knowledge.

(2) Application of knowledge and practical ability. The abilities of comprehensively applying knowledge to solve practical problems, comprehensive experiments, data processing, numerical computation, professional software application, computer technology application, photoelectric technology application, materials analysis testing.

(3) Innovative ability. With creative thinking skills, as well as certain amount of science and

technology development and research capabilities. Has a strong desire for knowledge and a good ability to accept new knowledge and technology.

(4) Exchange, cooperation, organization and management capability. Has a strong expertise skills, good group cooperation ability, strong organization and management skills, as well as good interpersonal communication capability, social adaptability.

3. Knowledge requirements

(1) Instrumental knowledge. ① Students are required to master a foreign language, including listening, speaking, reading and writing skills. ②Students are required to grasp the basic knowledge of computer software and hardware technologies, proficiency in basic computer operations, program design and the basic skills of office automation; master literature retrieval skills, as well as writing of scientific papers. ③ Has a solid mathematical basis, such as vector manipulation, calculus; learn some practical mathematical tools such as MATLAB; grasp the numerical calculation processing, analysis, and etc.

(2) Knowledge of humanities and social sciences. □ Students can use the Marxist attitude and methodology to arm our minds, and establish a correct outlook of life and values. ②Students should have a certain knowledge of Humanities and Social Sciences and artistic accomplishment. ③ Gain certain management awareness, to master certain skills of cooperation and financial management techniques and economic analysis tools. ④ Obtain preliminary techniques of physical exercise, to develop a scientific exercise habits, physical health, and finally meet the college sports criteria.

(3) Natural science knowledge. Master the basic theories and methods of the natural science (mathematics, physics, etc.), and make use of them to analyze and solve problems.

(4) Knowledge of program. ① The basic theories of applied physics and engineering, such as basic physics, theoretical physics, optoelectronics. ② Basic hands-on ability and exercise, such as basic physics experiments, Analog/Digital electronic circuits experiments, materials and plasma experiments, as well as optoelectronic devices and detection experiments. ③ Be able to apply what they have learned program knowledge and skills to analyze and solve practical problems. For example, the students in the direction of the photoelectric technology has photoelectric technical analysis, application and detection capabilities, while the students in the direction of material physics has the ability of testing and analyzing materials, designing and preparing semiconductor devices."

III. Realization Matrix of Knowledge, Ability and Quality

Contents		The Main Courses or Education Training Strategy	Notes
Knowledge	Specialty knowledge: master the basic theory of physics, the basic experimental skills, and basic knowledge.	To be realized via major courses, extended courses, laboratory practical applications and so on.	Lay a solid foundation of specialty, understanding majors forefront of developments of Applied Physics, application prospects, and related high-tech industries development.
	Tools of knowledge: master a foreign language, computer and information technology, mathematical foundation, patent applications, etc.	University English, mathematics, linear algebra, C language programming, CAD. Realized via learning English Language, basic computer fundamentals, bilingual courses, and helding German speech contest, participating in the German exams, literature translations ect.	Foreign language requirements: achieve proficiency in reading and translating professional literature and simple communication; Computer requirements: achieve proficiency in the application of computer and basic grasp of the foundations of mathematics and common softwares.
	Knowledge of Humanities and Social Sciences	Implemented via the "ideological and political courses, as well as social practice and other extra-curricular activities.	Be able to gain a certain knowledge in philosophy, political science, law, psychology, economic management, and etc.

	Other basics knowledges in natural sciences and related engineering techniques.	Realized by extended courses like analog electronics, digital electronics, signal and information and so on.	Be prepared for possible extension.
Ability	Ability to acquire knowledge	To be realized by lectures,practices, and applications.	With self-learning ability, and the ability of acquiring and processing information.
	Ability to apply knowledge: have strong ability in experimental and engineering practice.	Enhance experimental and practical ability through basic and professional experiments; Improve practical engineering ability via awareness, metalworking, social practice, curriculum design, graduation internship, as well as innovative practice activities and research activities under the guidance of tutors.	Comprehensive knowledge application and problem-solving skills, experimental and engineering practice ability, computer and information technology application ability.
	Have a certain exchange, cooperation and organization management capabilities	Improving exchanging, cooperation, organization and management skills by participating engineering practice, science and technology contests, research projects, volunteer activities, students community activities, social practice, etc.	With certain technical management capacity, with good written and verbal communication skills, the ability to communicate with people, teamwork and activity strategizing capabilities
	Innovative ability	Realized by combining theoretical teaching and practical applications, such as the practice of scientific research, applied technology curriculum design, teamwork and so on.	With some creative thinking ability, the ability of scientific research, as well as technology development capabilities.
Quality	Ideological and moral qualities	Implemented via "Ideological and political" courses and extra-curricular social practices.	With good citizenship, legal awareness, political and ideological quality, moral character, integrity. Be able to Maintain and fulfill their civic moral framework, and make contributions to the society.
	Professional quality	Realized by participating main courses of study program, experimental and practical exercises, ideological education, academic coferences, strengthened practical activities, Bachelor thesis, as well as various physical contests and computer programming contests, etc.	Scientific way of thinking, the spirit of science, innovation, technology, application awareness and engineering technology capability.
	Humanistic quality	To be realized via taking part in courses in addition to the courses of natural science and technology.	Cultural awareness, artistic accomplishment, modern consciousness, global awareness, as well as teamwork.
	Physical and mental qualities	Sports, physical health training, mental health education, outdoor activities, sports meeting, military training, as well as various competitions.	With good physical and psychological fitness.

IV Major disciplines

Physics

V. Core Courses

Fundamental Physics, Methods of Mathematical Physics, Quantum Mechanics, Theoretical Mechanics, Introduction to photoelectric materials, Electroagnetic Fields and Electromagetic waves, Optoelectronics, Thermodynamics and Statistical Physics, Microelectronics, Physics in English.

Bilingual courses: Applied Optics, The basis of electric light source and display devices, Laser technology and its application (Germany)

Self-studying or discussion courses: History of Science and Technology, Computer network technology and applications

VI. Main Internship and Practice

Military Theory and Training, Social Practice, Basic Physics Experiment, Experiment of Modern Physics, Experiment in Electronic Technology, Experiment of Material and Plasma, Experiment of Optoelectronic Devices and Testing, Experiment of Photoelectronic Information Technology, Applied Technology Practice, Undergraduate Thesis.

VII. Length of Schooling, Degree and Credits Requirements for Graduation

1．Length of Schooling：This is a Bachelor Degree of Science programme.The length of schooling generally lasts four years.But if students take extra courses,they can graduate one year in advance or they have a maximum of 8 years to finish the Bachelor Degree of Science programme.

2．Degree Conferred：Bachelor of Science.

3．The Minimum Graduation Credits：169.0

VIII．Credits Structure and Ratio：

The curriculum Provision and Study Type		Credits	Credits Ratios
Theory Teaching	Basic Level（Required）	42	36.4% of the total theoretial credits
	Specialty Level（Required）	43	37.2% of the total theoretial credits
	Expand and Recombination Level（Optional）	30.5	26.4% of the total theoretial credits
	Total	115.5	68.30%
Practice Teaching	Required	53.5	31.70%
Total		169	100%

课程设置与学时安排（表一）

专业名称：应用物理学

课程层次	课程性质	课程代码	课程名称	学分	总学时	课内教学			考试学期	各学期周学时分配								备注
						理论学时	实验学时	实践学时		第一学年		第二学年		第三学年		第四学年		
										长 1	长 2	长 3	长 4	长 5	长 6	长 7	长 8	
										16 周	16 周	16 周	16 周	16 周	16 周	16 周	16 周	
基础层次	必修	26115001	中国近现代史纲要 Outline of Contemporary Chinese History	2	32	24		8	2		2							
		26115002	思想道德修养与法律基础 Fundamentals of Morality and Law	3	48	36		12	1	3								
		26115003	马克思主义基本原理概论 Introduction to Fundamental Principles of Marxism	3	48	36		12	4				3					
		26115004	毛泽东思想和中国特色社会主义理论体系概论 Introduction to Mao Zedong's Thought and Theoretical System of Socialism with Chinese Characteristics	4	64	48		16	3			4						
		25215069	大学语文 College Chinese	2	32	32				2								
		26115201-26115204	形势与政策 Situation and Policy	2	32	32				长 1-4 讲座								
		31117082-31117083	大学生职业发展与就业指导 1-2 Career planning and guidance for college students 1-2	1	16	16					2				2			
		27116385	大学生心理健康教育 Mental Health Education for College Students	1	16	16				2								
		13116007-13116010	体育 1-4 Physical Education 1-4	4	128			128	1-4	2	2	2	2					
		25114359-25114361	大学英语 2-4 College English 2-4	12	192	192			1-3	4	4	4						实施分级教学
		25114360-25114362	大学英语 3-5 College English 3-5	12	192	192			1-3	4	4	4						
		10111024 10111025	高等数学 A Advanced Mathematics Level A	10	160	160			1-2	6	4							
		02113020	C 语言程序设计 C Programming	4	64	40	24		2		4							
		10111035	线性代数 B Linear Algebra Level B	2	32	32			2		2							
		18113049	科技文献检索 Retrieval of Science and Technology Literature	1	16	8		8							2			
基础层次合计				51.0	880	672	24	184		19.0	20.0	10.0	5.0	0.0	4.0	0.0	0.0	

课程设置与学时安排（表一续一）

专业名称：应用物理学

课程层次	课程性质	课程代码	课程名称	学分	总学时	课内教学			考试学期	各学期周学时分配								备注
						理论学时	实验学时	实践学时		第一学年		第二学年		第三学年		第四学年		
										长 1	长 2	长 3	长 4	长 5	长 6	长 7	长 8	
										16 周	16 周	16 周	16 周	16 周	16 周	16 周	16 周	
专业层次	必修	10134001 - 10134003	基础物理 1-3 Basic Physics 1-3	15	240	240			1~3	4	6	5						
		10134005	数学物理方法 Methods of Mathematical Physics	4	64	64			3			4						
		10134007	光电子学 Optoelectronics	3	48	48			6						3			
		10134008	传感原理与检测技术 Sensor Principle and Technology of Measurement	4	64	52	12		5					4				
		10134010	光电材料导论 Introduction to Photoelectricity Materials	3	48	32	16		5					3				
		10134011	量子力学 Quantum Mechanics	4	64	64			5					4				
		10134012	理论力学 Theoretical Mechanics	2	32	32			4				2					
		10134013	热力学与统计物理 Thermodynamics and Statistical Physics	2	32	32			4				2					
		10234001	电磁场与电磁波 Electromagnetics Field and Electromagnetics Wave	3	48	48			4				3					
		10234005	专业英语 English for Physics	2	32	32								2				
		10234002	微电子学 Microelectronics	3	48	48			6						3			
	专业层次合计			45	720	692	28	0		4.0	6.0	9.0	7.0	13.0	6.0	0.0	0.0	
拓展复合层次	专业拓展（按模块选修）	模块 1（光电技术方向）	10334003	应用光学 Applied Optics	2	32	32										4		模块选一，自选的块选应修最学：中“激技应用”课由方遣员课。在已择模内够选的少分其程德派人授
			10334004	电光源与显示器件基础 Light Sources and Display Devices	2	32	32									2			
			10134009	固体物理 Solid State Physics	3	48	48			6						3			
			10334019	激光技术应用 Application of Laser Technology	2.5	40	40										5		
			10334018	数理金融与投资概论 Mathematical Finance and Investment Introduction	2.5	40	40										5		
			10234006	计算物理及应用 Computational Physics and Application	4	64	32	32								4			
			10234008	光纤原理及应用 Principle and Application of Fiber-optical	2.5	40	40									2.5			
			10334017	数字集成电路原理与设计 Principle and Design of Digital Integrated Circuits	3	48	48										6		
		小计			21.5	344	312	32	0		0	0	0	0	0	11.5	20	0	
		至少选修学分			9.0	144	128	16	0		0	0	0	0	0	6	6	0	

课程设置与学时安排 （表一续二）

专业名称：应用物理学

课程层次	课程性质		课程代码	课程名称	学分	总学时	课内教学			考试学期	各学期周学时分配								备注
							理论学时	实验学时	实践学时		第一学年		第二学年		第三学年		第四学年		
											长 1	长 2	长 3	长 4	长 5	长 6	长 7	长 8	
											16 周	16 周	16 周	16 周	16 周	16 周	16 周	16 周	
拓展复合层次	专业拓展（按模块选修）	模块 2（材料物理方向）	10334007	材料物理 Materials Physics	2.5	40	40									2.5			
			10334020	光伏材料与器件 Photovoltaic Materials and Devices	2.5	40	40										5		
			10134009	固体物理 Solid State Physics	3	48	48			6						3			
			10334009	近代材料分析与测试 Test and Analysis Neoteric Materials	3	48	32	16									6		
			10334018	数理金融与投资概论 Mathematical Finance and Investment Introduction	2.5	40	40										5		
			10234006	计算物理及应用 Computational Physics and Application	4	64	32	32								4			
			10334021	电介质物理 Dielectric Physics	2.5	40	40									2.5			
			10334016	半导体器件物理 Physics of Semiconductor Devices	2.5	40	40									2.5			
			小计		22.5	360	312	48	0		0	0	0	0	0	14.5	16	0	
			至少选修学分		9.0	144	128	16	0		0	0	0	0	0	6	6	0	
	专业拓展至少选修学分				9.0	144	128	16	0		0	0	0	0	0	6	6	0	
拓展复合层次	专业复合（跨专业选修）		10334001	现代物理与应用技术专题 Lecture on Advanced Physics and Technology	2	32	32								2				
			02122050	模拟电子技术 Analog Electronic Technology	4	64	64			3			4						
			02122052	数字电子技术 Digital Electronic Technology	3.5	56	56			4				3.5					
			10234004	单片机原理与接口技术 Microcomputer Principle and Interface Technology	2	32	22	10							4				
			10234009	信号与系统 Signals and Systems	2.5	40	32	8							2.5				
			10234003	结构与物性 Structures and Properties	3	48	48			7							6		
			10334008	计算机网络技术及应用 Computer Network Technology and Application	2	32	16	16							2				
			10134016	计算机辅助设计 Computer Assistant Design	2.5	40	12	28					2.5						
			小计		21.5	344	282	62	0		0	0	6.5	3.5	10.5	0	6	0	
			专业复合至少选修学分		15.5	248	203	45	0		0	0	6.5	3.5	2.5	0	6	0	
	专业拓展复合至少选修学分合计				24.5	392	321	71	0		0	0	6.5	3.5	2.5	6	12	0	
	公共拓展复合	选修	自然科学拓展及工程技术拓展课程群	至少选修 2 学分	2	32	32												
			除自然科学拓展及工程技术拓展之外的课程群	至少选修 4 学分	4	64	64												
			公共拓展复合至少选修学分		6	96	96	0	0										
	拓展复合层次课程至少选修学分合计				30.5	488	417	71	0		0	0	6.5	3.5	2.5	6	12	0	
（基础层次+专业层次+拓展复合层次）合计					126.5	2088	1781	123	184		23.0	26.0	25.5	15.5	15.5	16.0	12.0	0	

实践教学安排（表二）

课程代码	所属模块	实践教学活动名称	学分	周或学时	按学期分配（周或周学时）											备注
					第一学年			第二学年			第三学年			第四学年		
					长 1	长 2	短 1	长 3	长 4	短 2	长 5	长 6	短 3	长 7	长 8	
31461014	公共实践	大学始业教育 Induction of university life	1	1	1											
13461013		军事理论及训练 Military Theory and Training	3	3	3											
13461015		体质健康训练 Health Training	0.5	16							2			2		
31463007		思政社会实践 Ideological Social Practice	2	2						2						
31467084		大学生职业发展与就业指导实践 Practice of career planning and guidance for college students	1	22		22										
10451403	基础实验	近代物理实验 Experiment of Modern Physics	2	32					2							
10451401		基础物理实验 1 Basic Physics Experiment 1	3	48		3										
10451402		基础物理实验 2 Basic Physics Experiment 2	2	32				2								
37451352		模拟电子技术实验 Experiment in Digital Electronic Technology	1.5	24				1.5								
37451353		数字电子技术实验 Experiment in Analog Electronic Technology	1.5	24					1.5							
10451404	专业实验	材料与等离子体实验 Experiment of Material and Plasma	1	16							1					
10451405		光电器件与检测实验 Experiment of Optoelectronic Devices and Testing	2	32								2				
10451406		光电子信息技术实验 Experiment of Photoelectronic Information Technology	2	32									2			
10444401	专项设计	应用技术课程设计 Curriculum Design of Applied Techniques	2	2									2			根据兴趣选择至少 1 个专项
10444402		半导体器件设计 Design of Semiconductor Devices	2	2									2			
31441022	基础实践	认识实习 Cognition Practice	0.5	1			1									
37442002		金工实习 B Metalworking Practice B	2	2		2										
10443402	专业实践	技术实习 Technology Practice	4.5	9										9		10-18 周
10445402		毕业设计（论文） Graduate Project (Thesis)	8	16											16	1-16 周
31462009	第二课堂(竞赛/论文/项目/专利) Extracurricular Teaching		3													
合计			42.5	314	4	27	1	3.5	3.5	2	3	2	4	11	16	