

光电信息科学与工程专业 2017 版本本科培养方案

Undergraduate Education Plan for Specialty in Photoelectric Information Science and Engineering(2017)

专业名称	光电信息科学与工程	主干学科	物理学、光学工程
Major	Photoelectric Information Science and Engineering	Major Disciplines	Physics, Optical Engineering
计划学制	四年	授予学位	理学学士
Duration	4 Years	Degree Granted	Bachelor of Science
所属大类	电子信息类（理学）	大类培养年限	1.5 年
Disciplinary	Electronic information-majors(Science)	Duration	1.5 years

最低毕业学分规定

Graduation Credit Criteria

课程分类 Course Classification 课程性质 Course Nature	通识教育课程 Public Basic Courses	专业教育课程 Specialized Courses	个性课程 Personalized Course	集中性实践教学环节 Practice Courses	课外学分 Study Credit after Class	总学分 Total Credits
必修课 Required Courses	29	74	\	21.5	\	170
选修课 Elective Courses	9.	20.5	6	\	10	

一、培养目标与毕业要求

I Educational Objectives & Requirement

（一） 培养目标

本专业通过人文素养、职业规范、专业知识、实践技能和职业发展能力的专业教育和综合训练，培养具有现代科学意识和国际视野、理论基础扎实、专业口径宽、具备较强实践能力和创新精神，能适应社会经济发展需要，可从事光电信息技术、光电材料与器件、光通信、光电检测与传感、图像与信息处理等技术领域的科学研究、产品设计与制造、科技开发与应用的的高素质专门人才。

学生毕业 5 年左右能达到以下目标：

- （1）有良好的职业素养和社会责任感，有意愿并有能力服务社会；
- （2）具有深厚的光电信息基础知识和理论，具备系统化的专业技能和实践能力，能够独立从事光电信息科学与技术研究、光电信息系统集成、设计及开发、技术支持及生产管理工作；
- （3）能利用多重技术手段和方法综合分析和解决复杂工程问题，能够在工作团队中担任技术骨干或组织管理角色。
- （4）能够通过继续教育或其它学习渠道更新知识，实现能力和技术水平的提升。

Educational Objectives

In this major, the professional educating and the comprehensive training of humanistic quality, professional norms, professional knowledge, practical skills and career development ability, will be both conducted. Especially, modern scientific consciousness, international perspective, solid theoretical basis, wide professional caliber, high practical ability and innovative spirit, will be all involved in training to adapt to the demands of social and economic development. The high-quality specialized personnel to be trained can engage in the scientific research, the product design & manufacture, the scientific and technological

development and application in the fields of optoelectronic information technology, optoelectronic material and device, optical communication, optoelectronic detecting and sensing, image and information processing and other related.

The students graduated for around 5 years are predicted to achieve the goals below:

1. Relatively high professional quality and sense of social responsibility; willing and capable to serve the society;
2. Capable of solid optoelectronic information fundamental knowledge and theoretics; capable of systematic professional skills and practical ability; can individually engage in the jobs of the research in optoelectronic information science and technology, the integration, design and development, technique support and production management of the optoelectronic information systems;
3. Be able to comprehensively analyze and solve complex engineering problems by using different technical means and methods; be able to play technical key or organizational management roles in work teams;
4. Capable of improvements on knowledge renewal, implement ability and technical level through continuous education.

（二） 毕业要求

1. 工程知识：能够将数学、自然科学、工程基础和专业知用于解决光电信息领域的复杂工程问题。

1.1 掌握数学和物理知识，能对光电信息领域的工程问题进行理论建模和推演。

1.2 掌握电子技术和光电信息技术的基本原理和实验方法，并能用于解决光电信息领域的工程问题。

1.3 掌握工程技术基础知识，熟悉光电信息工程领域的技术标准，并能用于解决光电信息领域的工程问题。

2. 问题分析：能够应用数学、自然科学和工程科学的基本原理，识别、表达、并通过文献研究分析光电信息领域的复杂工程问题，以获得有效结论。

2.1 能针对特定的工程问题开展文献资料的收集和整理，并能对实现方案及关键技术进行分析和总结。

2.2 能够运用图纸、图表和文字等对光电信息领域的复杂工程问题进行有效表达。

3. 设计（开发）解决方案：能够设计（开发）针对光电信息领域的复杂工程问题的解决方案，设计满足特定需求的光电信息系统、光电器件（模块）或工艺流程，并能够在设计环节中体现创新意识，考虑社会、健康、安全、法律、文化以及环境等因素。

3.1 能够应用光学和信息科学的基本原理和方法进行光电系统、光电器件或功能模块方案设计。

3.2 能够根据特定需求进行设计，并在设计环节能综合考虑方案的安全性、经济性等要求。

3.3 在解决复杂工程问题时能综合考虑各种影响因素，体现创新性。

4. 研究：能够基于自然科学基本原理和光电信息技术相关知识，采用科学方法对光电信息领域的复杂工程问题进行研究，包括理论计算、实验验证、数据分析和处理，并得出合理有效的结论。

4.1 能就工程中所涉及的科学问题进行理论分析和实验研究。

4.2 能客观地处理和分析实验数据，能对研究结果进行归纳形成有效结论，并能持续提出新的科学问题和研究方案。

5. 使用现代工具：能够针对光电信息领域的复杂工程问题，开发、选择与使用恰当的技术、资源、现代工程工具和信息技术工具，包括对复杂工程问题的预测与模拟，并能认识和理解其优势与不足。

5.1 掌握必要的计算机基础知识和至少一门计算机编程语言，能对复杂工程问题中各要素间的逻辑关系进行模拟分析。

5.2 熟练使用光电信息领域基本的计算、仿真、设计和开发软件及测试工具。

- 5.3 理解实际工程问题的复杂性及数值模拟结果的局限性,能针对实际问题提出相应的优化方案。
6. 工程与社会:能够基于光电信息工程相关的背景知识和标准,评价专业工程实践和复杂工程问题解决方案对社会、健康、安全、法律以及文化的影响,并理解应承担的责任。
- 6.1 能够评价光电信息工程项目的设计和运行的方案,以及复杂工程问题的解决方案。
- 6.2 能够评价光电信息工程项目方案对社会、健康、安全、法律以及文化的影响,并树立工程师的社会责任意识。
7. 环境和可持续发展:能够理解和评价针对光电信息领域复杂工程问题的工程实践对环境、社会可持续发展的影响。
- 7.1 理解光电信息领域复杂工程问题的材料、设计、开发等对环境的影响,并能进行相应的评价。
- 7.2 理解社会可持续发展的内涵和光电信息工程实践对社会可持续发展的影响,树立可持续发展的意识。
8. 职业规范:了解中国国情、具有人文社会科学素养、社会责任感,能够在工程实践中理解并遵守工程职业道德和行为规范,做到责任担当、贡献国家、服务社会。
- 8.1 了解中国国情,具有良好的人文社会科学素养。
- 8.2 理解光电信息工程实践中的工程伦理和职业道德规范,具有高度的社会责任感和服务意识。
9. 个人和团队:在解决光电信息领域的复杂工程问题时,能够在多学科组成的团队中承担个体、团队成员或负责人的角色。
- 9.1 具有团队合作意识和大局意识,有良好的执行力,能正确处理个人与团队的关系。
- 9.2 在多专业团队中具有统筹安排、任务分解和组织实施的初步能力。
10. 沟通:能够就光电信息工程领域的复杂工程问题与业界同行及社会公众进行有效沟通和交流,包括撰写报告和设计文稿、陈述发言、表达或回应指令。具备一定的国际视野,能够在跨文化背景下进行沟通和交流。
- 10.1 具有良好的书面和口头表达能力,能与业界同行及社会公众进行光电信息技术和知识的有效沟通和交流。
- 10.2 熟练掌握至少一门外语,具有一定的国际视野,能在跨文化背景下进行沟通和交流。
11. 项目管理:在与光电信息领域相关的多学科环境中理解、掌握、应用工程管理原理与经济决策方法,具有一定的组织、管理和领导能力。
- 11.1 掌握工程管理原理和经济决策方法,并能运用于光电信息工程项目的方案策划、设计、成本、运行管理和环境评价等环节中。
- 11.2 具有对与光电信息工程项目实践相关的人、事、物的组织、管理和领导能力。
12. 终身学习:具有自主学习和终身学习的意识,具有提高自主学习和适应光电信息工程新发展的能力。
- 12.1 理解和主动关注社会发展方向和光电信息工程行业的发展趋势。
- 12.2 具有强健的体魄、良好的自我管理能力和自主学习能力,能随着光电信息工程行业的发展进行自我能力提升。

Requirement

1. Engineering Knowledge: be able to solve complex engineering problems in the field of optoelectronic information by employing mathematic, natural scientific, engineering fundamental and professional knowledge.
- 1.1 Be able to model and deduce theoretically the engineering problems in the field of optoelectronic information, through mastering the mathematic and physical knowledge.
- 1.2 Be able to solve the engineering problems in the field of optoelectronic information, through mastering the fundamental theorems and experimental methods related to electronic technology and optoelectronic techniques.
- 1.3 Be able to solve the engineering problems in the field of optoelectronic information, through

mastering the fundamental knowledge of the engineering techniques and knowing about the technical standards in the field of optoelectronic information engineering.

2. Problem Analysis: be able to recognize, express and analyze the complex engineering problems in the field of optoelectronic information based on literature research, by employing the fundamental theorems of applied mathematics, natural science and engineering science, thus valid conclusion will be obtained.

2.1 Be able to collect and sort out the literature materials in accordance with the specific engineering problems, then to analyze and conclude the implementation scheme and its key technology.

2.2 Be able to effectively express the complex engineering problems in the field of optoelectronic information, by using drawings, figures, tables and words.

3. Solution Scheme of Design (Development): be able to design (develop) the solution scheme of the complex engineering problems in the field of optoelectronic information, to design the optoelectronic information systems, optoelectronic devices (blocks) or technological process meeting the specific needs, thus will reflect the innovative consciousness in the design link with considerable factors of society, health, safety, law, culture, environment, etc..

3.1 Be able to design the optoelectronic information systems, optoelectronic devices or functional block scheme, by employing the fundamental theorems and methods of optics and information science.

3.2 Be able to design meeting the specific needs, thus to comprehensively consider the safety and economy of the scheme in the design link.

3.3 Be able to comprehensively consider the different kinds of affected factors when solving the complex engineering problems, thus will reflect the innovation.

4. Research: be able to do research on the complex engineering problems in the field of optoelectronic information by using scientific methods, based on the fundamental theorems of natural science and the related knowledge of optoelectronic information technology, including the theoretical computation, experimental proof, data analysis and process, thus the effective and valid conclusion will be obtained.

4.1 Be able to do research on the theoretical analysis and experiment in accordance with the scientific problems related with the engineering.

4.2 Be able to process and analyze the experimental data objectively, to conclude the research results, and to continuously propose the novel scientific problems and research schemes.

5. Use modern tools: be able to develop, choose and employ suitable technology, resource, modern engineering tools and information technological tools in accordance with the complex engineering problems in the field of optoelectronic information, involving the prediction and simulation for the complex engineering problems, thus will recognize and understand their advantages and disadvantages.

5.1 Be able to simulate and analyze the logistic relationship between different factors in the field of the complex engineering problems, through mastering the necessary computer fundamental knowledge and at least one language of the computer programming.

5.2 Be able to proficiently use the basic tools of computation, simulation, software design and development, and tests in the field of optoelectronic information.

5.3 Be able to propose the corresponding optimization scheme for the practical problems, upon the understanding of the complex for the practical engineering problem and the limitation of the design simulation results.

6. Engineering and Society: based on the background knowledge and standards related to the optoelectronic information engineering, be able to evaluate the influence of the professional engineering practice and the solution scheme of the complex engineering problems on society, health, safety, law and culture, with the understanding of the responsibilities that should be undertaken.

6.1 Be able to evaluate the design and operation scheme of the optoelectronic information engineering

projects, and the solution scheme of the complex engineering problems.

6.2 Be able to evaluate the influence of the optoelectronic information engineering project scheme on society, health, safety, law and culture, thus establishing the consciousness of the social responsibilities.

7. Environment and Sustainable Development: be able to understand and evaluate the influence of engineering practice in accordance with the complex engineering problems in the field of the optoelectronic information, on the sustainable development of the society and the environment.

7.1 Understand the influence of the material, design and development in accordance with the complex engineering problems in the field of the electronic information on the environment, and give the evaluation.

7.2 Understand the connotation of the sustainable development in society and the influence of the optoelectronic information engineering practice on it, thus establishing the consciousness of the sustainable development.

8. Professional Norms: be able to understand and follow the engineering professional ethics and the behavioral norms, upon knowing the Chinese national conditions, having the quality of humanistic social science and social responsibilities.

8.1 Know the Chinese national conditions, and have the well quality of humanistic social science.

8.2 Understand the engineering ethics and professional moral norms in the practice of optoelectronic information engineering, and have strong social responsibilities and service consciousness.

9. Individual and Team: be able to play different roles as an individual, a team member or the person-in-charge in the team composed of multi-disciplines, when solving the complex engineering problems in the field of optoelectronic information.

9.1 Capable of the consciousness of the teamwork and the overall situation, the strong implementation capacity, and be able to treat the relationship between the individual and the team.

9.2 Capable of comprehensive arrangement, task decomposition, organization and implementation in a multi-disciplinary team.

10. Communication: be able to effectively communicate and exchange ideas in accordance with the complex engineering problems in the field of optoelectronic information engineering, with the peers in the same professional areas and the public people, involving report writing, manuscript design, statement presenting, expression and instruction replying; Capable of some international perspective, communicating and exchanging under the background of cross-culture.

10.1 Capable of well abilities both in writing and oral, thus be able to effectively communicate and exchange ideas related to optoelectronic information technology and knowledge with the peers in the same professional areas and the public people.

10.2 Capable of some international perspective and be able to communication and exchange ideas under the background of cross-culture, through mastering proficiently at least one foreign language.

11. Project Management: Understand, master and apply the engineering management theorems and the economic decision making methods in the multi-disciplinary environment related to the field of optoelectronic information; capable of some organization, management and leadership.

11.1 Be able to plan scheme, manage design, cost, and operation, and evaluate environment in the project links of the optoelectronic information engineering, through mastering the engineering management theorems and economic decision making methods.

11.2 Capable of organization, management and leadership of people, affair and object, related to the project practice of the optoelectronic information engineering.

12. Life-Long-Study: capable of self-study and life-long-study consciousness, and improvements on self-study and adaptation of new development on optoelectronic information engineering.

12.1 Understand and pay close attention to the social developing directions and developing trends of the

optoelectronic information engineering profession.

12.2 Be able to self-improve abilities with the developing of the optoelectronic information engineering profession, and capable of strong physique, well self-management and self-study abilities.

附：培养目标实现矩阵

	目标 1	目标 2	目标 3	目标 4		目标 1	目标 2	目标 3	目标 4
毕业要求 1.1		√	√		毕业要求 6.2	√		√	
毕业要求 1.2		√	√		毕业要求 7.1	√	√	√	
毕业要求 1.3			√		毕业要求 7.2	√	√		
毕业要求 2.1		√		√	毕业要求 8.1	√			
毕业要求 2.2		√	√		毕业要求 8.2	√			
毕业要求 3.1		√	√		毕业要求 9.1	√		√	
毕业要求 3.2		√	√		毕业要求 9.2	√		√	
毕业要求 3.3		√	√		毕业要求 10.1		√		√
毕业要求 4.1		√	√		毕业要求 10.2				√
毕业要求 4.2		√	√	√	毕业要求 11.1		√	√	
毕业要求 5.1		√	√		毕业要求 11.2	√		√	
毕业要求 5.2		√	√	√	毕业要求 12.1		√		√
毕业要求 5.3		√	√	√	毕业要求 12.2		√		√
毕业要求 6.1		√	√						

二、专业核心课程与专业特色课程

II Core Courses and Characteristic Courses

(一) 专业核心课程:

专业核心课程：应用光学、物理光学、量子力学、电动力学、激光原理与技术、光电技术、光纤通信原理与技术等。

Core Courses: Applied Optics, Physical Optics, Quantum Mechanics, Electrodynamics, Principles and Techniques of Laser, Optoelectronics Technology, Fiber Communication Theory and Technology etc.

(二) 专业特色课程:

专业特色课程：光纤传感技术、半导体材料与新型光电器件、光电综合实训等。

Characteristic Courses: Fiber Optical Sensing Technology, Semiconductor materials and new optoelectronic devices, Photoelectric comprehensive training etc.

附：毕业要求实现矩阵:

			光电信息与工程专业毕业要求																										
			1.1	1.2	1.3	2.1	2.2	3.1	3.2	3.3	4.1	4.2	5.1	5.2	5.3	6.1	6.2	7.1	7.2	8.1	8.2	9.1	9.2	10.1	10.2	11.1	11.2	12.1	12.2
专业核心课程	专业特色课程	课程名称															√			√		√	√						
		思想道德修养与法律基础																		√	√								
		中国近现代史纲要																		√	√								
		毛泽东思想和中国特色社会主义理论体系概论																		√	√								
		马克思主义基本原理																	√	√	√								
		军事理论																		√	√								
		体育 1-4																											√
		通识选修课程																		√	√	√	√	√	√	√			
		大学英语 1-4																							√	√			
		C 程序设计基础										√	√																
		计算机基础与 C 程序设计综合实验										√	√																
		高等数学上、下	√																										
		专业导论		√																								√	
		工程图学					√																						
		线性代数	√																										
		概率论与数理统计	√																										
		大学物理上、下	√								√																		
		电路理论		√																									
		物理实验上、下	√								√	√																	
		模拟电子技术基础		√																									

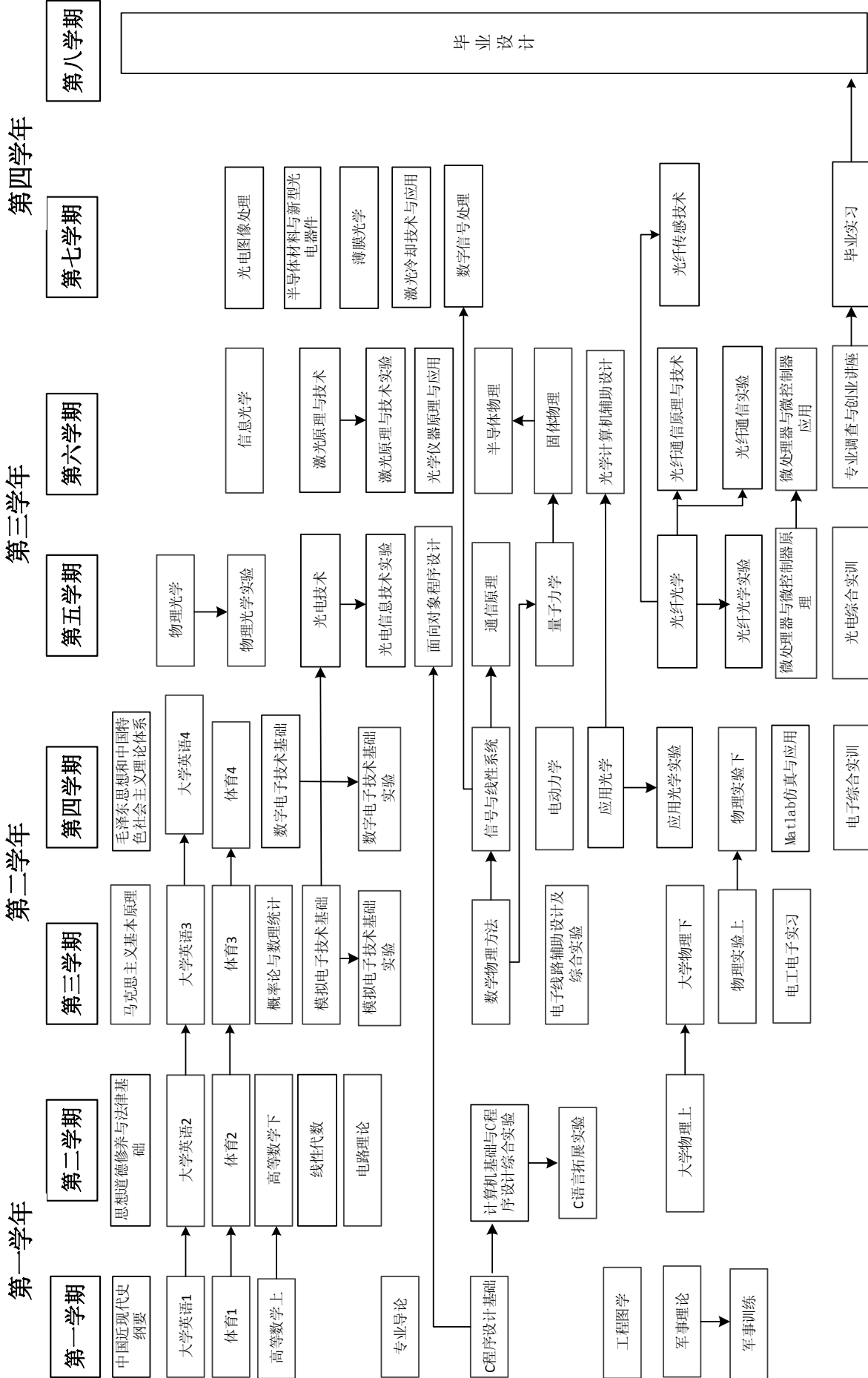
			光电信息科学与工程专业毕业要求																											
			1.1	1.2	1.3	2.1	2.2	3.1	3.2	3.3	4.1	4.2	5.1	5.2	5.3	6.1	6.2	7.1	7.2	8.1	8.2	9.1	9.2	10.1	10.2	11.1	11.2	12.1	12.2	
专业 核心 课程	专业 特色 课程	课程名称		√																										
		模拟电子技术基础实验		√																										
		数学物理方法	√			√					√																			
		数字电子技术基础		√																										
		数字电子技术基础实验		√																										
		C 语言拓展实验										√	√																	
√		应用光学		√		√		√				√																		
		应用光学实验		√		√		√				√																		
		信号与线性系统	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√													
√		电动力学	√								√		√																	
√		物理光学	√			√	√	√	√	√	√	√	√	√	√	√	√							√	√					
		物理光学实验	√			√	√	√	√	√	√	√	√	√	√	√	√							√	√					
√		量子力学	√								√												√	√						
		光纤光学		√	√			√			√		√	√	√	√								√	√					
		光纤光学实验		√	√			√			√		√	√	√	√								√	√					
√		光电技术		√		√		√				√											√	√	√	√				
		光电信息技术实验		√		√		√				√											√	√	√	√				
√		光纤通信原理与技术		√		√		√				√											√	√	√	√				
		光纤通信实验		√		√		√				√											√	√	√	√				
√		激光原理与技术	√	√	√	√	√	√	√	√	√	√				√														

			光电信息科学与工程专业毕业要求																										
专业 核心 课程	专业 特色 课程	课程名称	1.1	1.2	1.3	2.1	2.2	3.1	3.2	3.3	4.1	4.2	5.1	5.2	5.3	6.1	6.2	7.1	7.2	8.1	8.2	9.1	9.2	10.1	10.2	11.1	11.2	12.1	12.2
		激光原理与技术实验	√	√	√	√	√	√	√	√	√	√	√		√														
	√	光纤传感技术		√	√	√	√	√	√		√				√	√								√		√		√	
		电子线路辅助设计及综合实验		√		√			√					√		√													
		Matlab 仿真与应用						√					√	√															
		微处理器与微控制器原理		√				√																					
		光学计算机辅助设计		√		√		√				√		√	√														
		通信原理		√	√	√	√	√	√		√	√		√		√			√						√			√	
		信息光学	√	√				√			√			√															
		固体物理	√			√			√	√		√		√	√				√						√		√		
		面向对象程序设计											√	√															
		微处理器与微控制器应用		√				√																					
		半导体物理	√	√							√	√																	
		数字信号处理	√	√	√	√	√	√	√	√	√	√	√	√	√									√				√	
		光电图像处理	√	√	√	√	√	√	√	√	√	√	√	√	√	√									√				√
		薄膜光学	√			√	√	√	√	√	√	√	√	√	√	√		√	√						√				
		激光冷却技术与应用	√			√													√									√	
	√	半导体材料与新型光电器件		√		√	√	√			√							√											
		光学仪器原理及应用		√	√	√	√	√	√	√	√	√	√	√	√	√												√	
		军事训练																		√	√	√	√						√

专业 核心 课程	专业 特色 课程	课程名称	光电信息科学与工程专业毕业要求																										
			1.1	1.2	1.3	2.1	2.2	3.1	3.2	3.3	4.1	4.2	5.1	5.2	5.3	6.1	6.2	7.1	7.2	8.1	8.2	9.1	9.2	10.1	10.2	11.1		11.2	12.1
		电工电子实习	√	√	√							√																	
		电子综合实训	√	√	√				√				√																
	√	光电综合实训	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√			√	√	√	√	√	√	√	√
		专业调查与创业讲座	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√			√	√	√	√	√	√	√
		毕业实习	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√				√	√	√	√	√	√	√	√
		毕业设计	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√				√	√	√	√	√	√	√	√

三、课程教学进程图

III Teaching Process Map



四、 理论教学建议进程表

IV Theory Course Schedule

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	
			总学时 Tot hrs.	实验 Exp.	上机 Ope- ration	实践 Prac- tice	课外 Extra- cur			
(一) 通识教育必修课程 General Education Required Courses										
4220001110	思想道德修养与法律基础 Morals, Ethics and Fundamentals of Law	3	48			8		2		
4220002110	中国近现代史纲要 Outline of Contemporary and Modern Chinese History	2	32					1		
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		4		
4220005110	马克思主义基本原理 Marxism Philosophy	3	48			8		3		
1060003130	军事理论 Military Theory	1	32			16		1		
4210001170	体育 1 Physical Education I	1	26					1		
4210002170	体育 2 Physical Education II	1	34					2		
4210003170	体育 3 Physical Education III	1	34					3		
4210004170	体育 4 Physical Education IV	1	34					4		
4030002180	大学英语 1 College English I	3	60				12	1		
4030003180	大学英语 2 College English II	2	44				12	2	大学英语 1	
4030004180	大学英语 3 College English III	2	44				12	3	大学英语 2	
4030004180	大学英语 4 College English IV	2	44				12	4	大学英语 3	
4120335170	C 程序设计基础 Fundamentals of Computer Program Design(C)	2	32					1		
4120336170	计算机基础与 C 程序设计综合实验 Comprehensive Experiment on Fundamentals of Computer and Program Design(C)	1	32	32				1		
小 计 Subtotal		29	640	32	0	64	48			

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
			总学时 Tot hrs.	实验 Exp.	上机 Ope- ration	实践 Prac- tice	课外 Extra- cur		
(二) 通识教育选修课程 General Education Elective Courses									
创新创业类 Innovation and Entrepreneurship Courses		要求至少取得 9 个学分,且必须选修艺术体育类课程中的艺术类 相关课程并取得至少 2 个学分,在创新创业类课程中至少选修 一门课程, 在人文社科类或经济管理类课程中至少选修一门。 Students are required to obtain at least 9 credits, which must cotain art courses of 2 credits from the category of Art and Physical Education Courses,at least one course from the category of Innovation and Entrepreneurship Courses, and at least one course from the category of Arts and Social Science Courses or the category of Economy and Management Courses.							
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									
(三) 专业教育必修课程 Basic Disciplinary RequiredCourses									
4050451130	专业导论 Introduction of Specialty	1	16					1	
4080373170	工程图学 B Engineering Graphics	3.5	72				16	1	
4050063110	高等数学 A 上 Advanced Mathematics I	5	80					1	
4050064110	高等数学 A 下 Advanced Mathematics II	5	80					2	高等数学上
4050229110	线性代数 Linear Algebra	2.5	40					2	
4050601170	C 语言拓展实验 Development Experiments on C Language	0.5	16		16			2	C 程序设计 基础
4110018110	电路理论 Circuit Principle	4	64	8				2	
4050058110	概率论与数理统计 B Probability and Mathematics Statistic	3	48					3	
4050021110	大学物理 A 上 Physics I	3.5	56					2	
4050022110	大学物理 A 下 Physics II	3.5	56					3	大学物理上
4050466130	物理实验 A 上 Physics Lab I	1	32	32				3	
4050467130	物理实验 A 下 Physics Lab II	1	32	32				4	物理实验上
4110049110	模拟电子技术基础 B Fundamentals of Analog Electronic Circuit	3.5	56					3	
4110051110	模拟电子技术基础实验 Experiments of Analog Electronic Circuit	0.5	16	16				3	

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
			总学时 Tot hrs.	实验 Exp.	上机 Ope- ration	实践 Prac- tice	课外 Extra- cur		
4050182110	数学物理方法 A Method Of Mathematical Physics	4.5	72					3	
4110067110	数字电子技术基础 B Fundamentals of Digital Electronic Circuit	3.5	56					4	
4110068110	数字电子技术基础实验 Experiments of Digital Electronic Circuit	0.5	16	16				4	
4050242110	应用光学 Applied Optics	2.5	40					4	
4050243110	应用光学实验 Experiment on Applied Optics	0.5	16	16				4	应用光学
4050231110	信号与线性系统 Signal and Liner System	4	64	8				4	数学物理方法
4050602170	电动力学 B Electrodynamics	2.5	40					4	
4050639170	物理光学 C Physical Optics	3	48					5	
4050416120	物理光学实验 Experiment on Physical Optics	0.5	16	16				5	物理光学
4050640170	量子力学 E Quantum Mechanics	2.5	40					5	数学物理方法
4050079110	光电技术 B Optoelectronic Technology	2.5	40					5	模拟电子技术基础
4050081110	光电信息技术实验 A Experiment on Optoelectronic Information Technology	1	32	32				5	光电技术
4050084110	光纤光学 Fiber Optics	2	32					5	
4050641170	光纤光学实验 Experiment on Fiber Optics	0.5	16	16				5	光纤光学
4050087110	光纤通信原理与技术 B Fiber Communication Theory and Technology	2.5	40					6	光纤光学
4050642170	光纤通信实验 Experiment on Fiber Communication	0.5	16	16				6	光纤通信原理与技术 B
4050103110	激光原理与技术 A Principles and Techniques of Laser	3	48					6	
4050104110	激光原理与技术实验 A Experiment on Principles and Techniques of Laser	0.5	16	16				6	激光原理与技术
小 计 Subtotal		74	1312	224	16	0	16		

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
			总学时 Tot hrs.	实验 Exp.	上机 Ope- ration	实践 Prac- tice	课外 Extra- cur		
(四) 专业教育选修课程 Specialized Elective Courses									
4050610170	电子线路辅助设计及综合实验 Computer Aided Design of Electronic Circuit	1.5	48	24	24			3	
4050003110	Matlab 仿真与应用 Matlab Simulation and Application	1	32		32			4	
4050643170	微处理器与微控制器原理 D Theory of Microprocessor and Microcontroller B	3.5	56	8				5	
4050190110	通信原理 B Principles of Communication B	3.5	56	8				5	信号与线性 系统
4050089110	光学计算机辅助设计 Computer Aided Design of Optical System	1	32		32			6	应用光学
4050421120	信息光学 A Informational Optics	3	48	16				6	
4050612170	固体物理 D Solid State Physics	2.5	40					6	量子力学
4050603170	面向对象程序设计 D Object Oriented Programming	3.5	56		8			5	C 程序设计 基础
4050682170	微处理器与微控制器应用 C Application of Microprocessor and Microcontroller	3	48	16				6	微处理器与 微控制器原 理 B
4050613170	半导体物理 C Semiconductor Physics	2.5	40					6	固体物理
4110071110	数字信号处理 A Digital Signal Processing	4	64	10				7	信号与线性 系统
4050080110	光电图像处理 Photoelectric Image Processing	2	32					7	
4050644170	半导体材料与新型光电器件 Semiconductor materials and new optoelectronic devices	2.5	40					7	
4050013110	薄膜光学 Thin Film Optics	2	32					7	
4050645170	光纤传感技术 B Fiber Optic Sensing Technology	2	32	16				7	光纤光学
小 计 Subtotal		37.5	656	98	96	0	0		
修读说明：要求至少选修 20.5 学分。 NOTE: Minimum subtotal credits:20.5.									

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
			总学时 Tot hrs.	实验 Exp.	上机 Ope- ration	实践 Prac- tice	课外 Extra- cur		
(五) 个性课程 Personalized Electice Courses									
4050386120	光学仪器原理及应用 Principles and Application of Optical Instrument	2	32					6	
4050392120	激光冷却技术与应用 Technology and Application of lasing cooling	2	32					7	
修读说明：学生从以上个性课程和学校发布的个性课程目录中选课，要求至少选修 6 学分。 NOTE: Sudents can select courses from above and other personalized courses in catalog, and are required to obtain at least 6 credits.									

五、 集中性实践教学环节

V Practice Schedule

课程编号 Course Number	实践环节名称 Practice Courses Name	学分 Crs	周数 Weeks	建议修读学期 Suggested Term
1060002110	军事训练 Military Training	1.5	3	1
4100068110	电工电子实习 A Practice of Electrical Engineering and Electronics	2	2	3
4050616170	电子综合实训 C Comprehensive Training of Electronics	1	1	4
4050646170	光电综合实训 Photoelectric comprehensive training	2	2	5
4050673170	光信科专业调查与创业讲座 Professional Investigation and Entrepreneurship Lecture	2	2	6
4050277110	毕业实习 Internship	2	2	7
4050430120	毕业设计 Graduate Design	11	17	8
小 计 Subtotal		21.5	29	

六、其它要求

VI Recommendations on Course Studies

- 1、《形势与政策》和《心理健康教育》课程为课外必修课程，分别计 2 个和 1 个课外学分。
- 2、学生选修的通识选修课程和从学校发布的个性课程目录中选修的个性课程，要求与本专业培养方案内设置的课程内容不重复。
- 3、在专业选修课程中，建议将电子线路辅助设计与综合实验、微处理器与微控制器原理、微处理器与微控制器应用、通信原理、面向对象程序设计作为共选课程；侧重于光电系统与信息处理方向的同学建议系统修读光纤传感技术、数字信号处理和光电图像处理等课程；侧重于光电子器件及集成技术方向的同学建议系统修读光学计算机辅助设计、固体物理、半导体物理、信息光学、薄膜光学、半导体材料与新型光电器件等课程。

1.Situation & Policy (2 credits) and Mental Health Education (1 credit) are the required extracurricular

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
			总学时 Tot hrs.	实验 Exp.	上机 Ope- ration	实践 Prac- tice	课外 Extra- cur		

courses.

2.The selected General Education Elective Courses and Personalized Elective Courses from the courses program by university must be different from the major undergraduate education plan in content.

3.Theory of Microprocessor and Microcontroller , Application of Microprocessor and Microcontroller, Principles of Communication, Object Oriented Programming are recommended as shared elective courses. Therefore, students oriented in Optoelectronic System and Information Processing are suggested to take Fiber Optical Sensing Technology, Digital Signal Processing and Photoelectric Image Processing, etc. While students oriented in Optoelectronic Device and Integration are suggested to take Computer Aided Design of Optical System, Solid State Physics , Semiconductor Physics, Informational Optics, Thin Film Optics, Semiconductor materials and new optoelectronic devices, etc.

学院教学责任人：何 朗
专业培养方案责任人：胡昌奎

电子信息科学与技术专业 2017 版本本科培养方案

Undergraduate Education Plan for Specialty in Electronic Information Science and Technology (2017)

专业名称	电子信息科学与技术	主干学科	物理学、电子科学与技术、 计算机科学与技术
Major	Electronic Information Science and Technology	Major Disciplines	Physics, Electronic Science and Technology, Computer Science and Technology
计划学制	四年	授予学位	理学学士
Duration	4 Years	Degree Granted	Bachelor of Science
所属大类	电子信息类（理学）	大类培养年限	1.5 年
Disciplinary	Electronic Information(Science)	Duration	1.5 years

最低毕业学分规定

Graduation Credit Criteria

课程分类 Course Classification 课程性质 Course Nature	通识教育课程 Public Basic Courses	专业教育课程 Specialized Courses	个性课程 Personalized Course	集中性实践 教学环节 Practice Courses	课外学分 Study Credit after Class	总学分 Total Credits
必修课 Required Courses	29	74	\	21.5	\	170
选修课 Elective Courses	9	20.5	6	\	10	

一、培养目标与毕业要求

I Educational Objectives & Requirement

（一） 培养目标

本专业通过人文素养、职业规范、专业知识、实践技能和职业发展能力的专业教育和综合训练，培养具有现代科学意识和国际视野、理论基础扎实、专业口径宽、具备较强实践能力和创新精神，能适应社会经济发展需要，可在电子、信息、计算机及相关领域从事科学研究、产品设计与开发、技术支持以及生产技术管理的高素质专门人才。

学生毕业 5 年左右能达到以下目标：

- （1）有良好的职业素养和社会责任感，有意愿并有能力服务社会；
- （2）具有深厚的电子信息基础知识和理论，具备系统化的专业技能和实践能力，能够从事电子信息系统研究、设计、开发、集成及应用等工作；
- （3）能利用多重技术手段和方法综合分析和解决复杂工程问题，能够在工作团队中担任技术骨干或组织管理角色。
- （4）能够通过继续教育或其它学习渠道更新知识，实现能力和技术水平的提升。

Educational Objectives

In this major, the professional educating and the comprehensive training of humanistic quality, professional norms, professional knowledge, practical skills and career development ability, will be both conducted. Especially, modern scientific consciousness, international perspective, solid theoretical basis,

wide professional caliber, high practical ability and innovative spirit, will be all involved in training to adapt to the demands of social and economic development. The high-quality specialized personnel to be trained can engage in the scientific research, the product design & development, the technique support and the productive technology management in the fields of electronics, information, computer, and other related.

The students graduated for around 5 years are predicted to achieve the goals below:

1. Relatively high professional quality and sense of social responsibility; willing and capable to serve the society;
2. Capable of solid electronic information fundamental knowledge and theoretics; capable of systematic professional skills and practical ability; can engage in the jobs of the research, the design, the development, the integration and the application in the field of electronic information systems;
3. Be able to comprehensively analyze and solve complex engineering problems by using different technical means and methods; be able to play technical key or organizational management roles in work teams;
4. Capable of improvements on knowledge renewal, implement ability and technical level through continuous education.

（二） 毕业要求

1. 工程知识：能够将数学、自然科学、工程基础和专业知用于解决电子信息领域的复杂工程问题。

1.1 掌握数学和物理知识，能对电子信息领域的工程问题进行理论建模和推演。

1.2 掌握电子信息技术和计算机技术的基本原理和实验方法，并能用于解决电子信息领域的工程问题。

1.3 掌握工程技术基础知识，熟悉电子信息工程领域的技术标准，并能用于解决电子信息领域的工程问题。

2. 问题分析：能够应用数学、自然科学和工程科学的基本原理，识别、表达、并通过文献研究分析电子信息领域的复杂工程问题，以获得有效结论。

2.1 能针对特定的工程问题开展文献资料的收集和整理，并能对实现方案及关键技术进行分析和总结。

2.2 能够运用图纸、图表和文字等对电子信息领域的复杂工程问题进行有效表达。

3. 设计（开发）解决方案：能够设计（开发）针对电子信息领域的复杂工程问题的解决方案，设计满足特定需求的电子信息系统、电子器件（模块）或工艺流程，并能够在设计环节中体现创新意识，考虑社会、健康、安全、法律、文化以及环境等因素。

3.1 能够应用电子和信息科学的基本原理和方法进行电子信息系统、电子器件或功能模块方案设计。

3.2 能够根据特定需求进行设计，并在设计环节能综合考虑方案的安全性、经济性等要求。

3.3 在解决复杂工程问题时能综合考虑各种影响因素，体现创新性。

4. 研究：能够基于自然科学基本原理和电子信息技术相关知识，采用科学方法对电子信息领域的复杂工程问题进行研究，包括理论计算、实验验证、数据分析和处理，并得出合理有效的结论。

4.1 能就工程中所涉及的科学问题进行理论分析和实验研究。

4.2 能客观地处理和分析实验数据，能对研究结果进行归纳形成有效结论，并能持续提出新的科学问题和研究方案。

5. 使用现代工具：能够针对电子信息领域的复杂工程问题，开发、选择与使用恰当的技术、资源、现代工程工具和信息工具，包括对复杂工程问题的预测与模拟，并能认识和理解其优势与不足。

5.1 掌握必要的计算机基础知识和至少一门计算机编程语言，能对复杂工程问题中各要素间的逻辑关系进行模拟分析。

- 5.2 熟练使用电子信息领域基本的计算、仿真、设计和开发软件及测试工具。
- 5.3 理解实际工程问题的复杂性及设计仿真结果的局限性,能针对实际问题提出相应的优化方案。
- 6. 工程与社会:能够基于电子信息工程相关的背景知识和标准,评价专业工程实践和复杂工程问题解决方案对社会、健康、安全、法律以及文化的影响,并理解应承担的责任。
 - 6.1 能够评价电子信息工程项目的设计和运行的方案,以及复杂工程问题的解决方案。
 - 6.2 能够评价电子信息工程项目方案对社会、健康、安全、法律以及文化的影响,并树立工程师的社会责任意识。
- 7. 环境和可持续发展:能够理解和评价针对电子信息领域复杂工程问题的工程实践对环境、社会可持续发展的影响。
 - 7.1 理解电子信息领域复杂工程问题的材料、设计、开发等对环境的影响,并能进行相应的评价。
 - 7.2 理解社会可持续发展的内涵和电子信息工程实践对社会可持续发展的影响,树立可持续发展的意识。
- 8. 职业规范:了解中国国情、具有人文社会科学素养、社会责任感,能够在工程实践中理解并遵守工程职业道德和行为规范,做到责任担当、贡献国家、服务社会。
 - 8.1 了解中国国情,具有良好的人文社会科学素养。
 - 8.2 理解电子信息工程实践中的工程伦理和职业道德规范,具有高度的社会责任感和服务意识。
- 9. 个人和团队:在解决电子信息领域的复杂工程问题时,能够在多学科组成的团队中承担个体、团队成员或负责人的角色。
 - 9.1 具有团队合作意识和大局意识,有良好的执行力,能正确处理个人与团队的关系。
 - 9.2 在多专业团队中具有统筹安排、任务分解和组织实施的初步能力。
- 10. 沟通:能够就电子信息工程领域的复杂工程问题与业界同行及社会公众进行有效沟通和交流,包括撰写报告和设计文稿、陈述发言、表达或回应指令。具备一定的国际视野,能够在跨文化背景下进行沟通和交流。
 - 10.1 具有良好的书面和口头表达能力,能与业界同行及社会公众进行电子信息技术和知识的有效沟通和交流。
 - 10.2 熟练掌握至少一门外语,具有一定的国际视野,能在跨文化背景下进行沟通和交流。
- 11. 项目管理:在与电子信息领域相关的多学科环境中理解、掌握、应用工程管理原理与经济决策方法,具有一定的组织、管理和领导能力。
 - 11.1 掌握工程管理原理和经济决策方法,并能运用于电子信息工程项目的方案策划、设计、成本、运行管理和环境评价等环节中。
 - 11.2 具有对与电子信息工程项目实践相关的人、事、物的组织、管理和领导能力。
- 12. 终身学习:具有自主学习和终身学习的意识,具有提高自主学习和适应光电信息工程新发展的能力。
 - 12.1 理解和主动关注社会发展方向和电子信息工程行业的发展趋势。
 - 12.2 具有强健的体魄、良好的自我管理能力和自主学习能力,能随着电子信息工程行业的发展进行自我能力提升。

Requirement

- 1. Engineering Knowledge: be able to solve complex engineering problems in the field of electronic information by employing mathematic, natural scientific, engineering fundamental and professional knowledge.
 - 1.1 Be able to model and deduce theoretically the engineering problems in the field of electronic information, through mastering the mathematic and physical knowledge.
 - 1.2 Be able to solve the engineering problems in the field of electronic information, through mastering the fundamental theorems and experimental methods related to electronic information and computer techniques.

1.3 Be able to solve the engineering problems in the field of electronic information, through mastering the fundamental knowledge of the engineering techniques and knowing about the technical standards in the field of electronic information engineering.

2. Problem Analysis: be able to recognize, express and analyze the complex engineering problems in the field of electronic information based on literature research, by employing the fundamental theorems of applied mathematics, natural science and engineering science, thus valid conclusion will be obtained.

2.1 Be able to collect and sort out the literature materials in accordance with the specific engineering problems, then to analyze and conclude the implementation scheme and its key technology.

2.2 Be able to effectively express the complex engineering problems in the field of electronic information, by using drawings, figures, tables and words.

3. Solution Scheme of Design (Development): be able to design (develop) the solution scheme of the complex engineering problems in the field of electronic information, to design the electronic information systems, electronic devices (blocks) or technological process meeting the specific needs, thus will reflect the innovative consciousness in the design link with considerable factors of society, health, safety, law, culture, environment, etc..

3.1 Be able to design the electronic information systems, electronic devices or functional block scheme, by employing the fundamental theorems and methods of electronics and information science.

3.2 Be able to design meeting the specific needs, thus to comprehensively consider the safety and economy of the scheme in the design link.

3.3 Be able to comprehensively consider the different kinds of affected factors when solving the complex engineering problems, thus will reflect the innovation.

4. Research: be able to do research on the complex engineering problems in the field of electronic information by using scientific methods, based on the fundamental theorems of natural science and the related knowledge of electronic information technology, including the theoretical computation, experimental proof, data analysis and process, thus the effective and valid conclusion will be obtained.

4.1 Be able to do research on the theoretical analysis and experiment in accordance with the scientific problems related with the engineering.

4.2 Be able to process and analyze the experimental data objectively, to conclude the research results, and to continuously propose the novel scientific problems and research schemes.

5. Use modern tools: be able to develop, choose and employ suitable technology, resource, modern engineering tools and information technological tools in accordance with the complex engineering problems in the field of electronic information, involving the prediction and simulation for the complex engineering problems, thus will recognize and understand their advantages and disadvantages.

5.1 Be able to simulate and analyze the logistic relationship between different factors in the field of the complex engineering problems, through mastering the necessary computer fundamental knowledge and at least one language of the computer programming.

5.2 Be able to proficiently use the basic tools of computation, simulation, software design and development, and tests in the field of electronic information.

5.3 Be able to propose the corresponding optimization scheme for the practical problems, upon the understanding of the complex for the practical engineering problem and the limitation of the design simulation results.

6. Engineering and Society: be able to evaluate the influence of the professional engineering practice and the solution scheme of the complex engineering problems on society, health, safety, law and culture, with the understanding of the responsibilities that should be undertaken.

6.1 Be able to evaluate the design and operation scheme of the electronic information engineering

projects, and the solution scheme of the complex engineering problems.

6.2 Be able to evaluate the influence of the electronic information engineering project scheme on society, health, safety, law and culture, thus establishing the consciousness of the social responsibilities.

7. Environment and Sustainable Development: be able to understand and evaluate the influence of engineering practice in accordance with the complex engineering problems in the field of the electronic information, on the sustainable development of the society and the environment.

7.1 Understand the influence of the material, design and development in accordance with the complex engineering problems in the field of the electronic information on the environment, and give the evaluation.

7.2 Understand the connotation of the sustainable development in society and the influence of the electronic information engineering practice on it, thus establishing the consciousness of the sustainable development.

8. Professional Norms: be able to understand and follow the engineering professional ethics and the behavioral norms, upon knowing the Chinese national conditions, having the quality of humanistic social science and social responsibilities.

8.1 Know the Chinese national conditions, and have the well quality of humanistic social science.

8.2 Understand the engineering ethics and professional moral norms in the practice of electronic information engineering, and have strong social responsibilities and service consciousness.

9. Individual and Team: be able to play different roles as an individual, a team member or the person-in-charge in the team composed of multi-disciplines, when solving the complex engineering problems in the field of electronic information.

9.1 Capable of the consciousness of the teamwork and the overall situation, the strong implementation capacity, and be able to treat the relationship between the individual and the team.

9.2 Capable of comprehensive arrangement, task decomposition, organization and implementation in a multi-disciplinary team.

10. Communication: be able to effectively communicate and exchange ideas in accordance with the complex engineering problems in the field of electronic information engineering, with the peers in the same professional areas and the public people, involving report writing, manuscript design, statement presenting, expression and instruction replying; Capable of some international perspective, communicating and exchanging under the background of cross-culture.

10.1 Capable of well abilities both in writing and oral, thus be able to effectively communicate and exchange ideas related to electronic information technology and knowledge with the peers in the same professional areas and the public people.

10.2 Capable of some international perspective and be able to communication and exchange ideas under the background of cross-culture, through mastering proficiently at least one foreign language.

11. Project Management: Understand, master and apply the engineering management theorems and the economic decision making methods in the multi-disciplinary environment related to the field of electronic information; capable of some organization, management and leadership.

11.1 Be able to plan scheme, manage design, cost, and operation, and evaluate environment in the project links of the electronic information engineering, through mastering the engineering management theorems and economic decision making methods.

11.2 Capable of organization, management and leadership of people, affair and object, related to the project practice of the electronic information engineering.

12. Life-Long-Study: capable of self-study and life-long-study consciousness, and improvements on self-study and adaptation of new development on optoelectronic information engineering.

12.1 Understand and pay close attention to the social developing directions and developing trends of the

electronic information engineering profession.

12.2 Be able to self-improve abilities with the developing of the electronic information engineering profession, and capable of strong physique, well self-management and self-study abilities.

附：培养目标实现矩阵

	目标 1	目标 2	目标 3	目标 4		目标 1	目标 2	目标 3	目标 4
毕业要求 1.1		√	√		毕业要求 6.2	√		√	
毕业要求 1.2		√	√		毕业要求 7.1	√	√	√	
毕业要求 1.3			√		毕业要求 7.2	√	√		
毕业要求 2.1		√		√	毕业要求 8.1	√			
毕业要求 2.2		√	√		毕业要求 8.2	√			
毕业要求 3.1		√	√		毕业要求 9.1	√		√	
毕业要求 3.2		√	√		毕业要求 9.2	√		√	
毕业要求 3.3		√	√		毕业要求 10.1		√		√
毕业要求 4.1		√	√		毕业要求 10.2				√
毕业要求 4.2		√	√	√	毕业要求 11.1		√	√	
毕业要求 5.1		√			毕业要求 11.2	√		√	
毕业要求 5.2		√	√		毕业要求 12.1		√		√
毕业要求 5.3		√	√		毕业要求 12.2		√		√
毕业要求 6.1	√		√						

二、专业核心课程与专业特色课程

II Core Courses and Characteristic Courses

(一) 专业核心课程

专业核心课程：通信原理、电动力学、微波技术与天线、微处理器与微控制器原理、面向对象程序设计、射频电路仿真与设计

Core Courses: Communication Principles, Electrodynamics, Microwave Technology and Antenna, Theory of Microcontroller and Microprocessor, Object-Oriented Programming, RF Circuit Simulation and Design

(二) 专业特色课程

专业特色课程：固体物理、量子力学、射频识别技术与应用、电磁兼容与信号完整性、微波遥感技术

Characteristic Courses: Solid State Physics, Quantum Mechanics, RFID Technology & Applications, EMC & Signal Integrity, Microwave Remote Sensing Technology

附：毕业要求实现矩阵

			电子信息科学与技术专业毕业要求																											
专 业 核 心 课 程	专 业 特 色 课 程	课程名称	1.1	1.2	1.3	2.1	2.2	3.1	3.2	3.3	4.1	4.2	5.1	5.2	5.3	6.1	6.2	7.1	7.2	8.1	8.2	9.1	9.2	10.1	10.2	11.1	11.2	12.1	12.2	
		思想道德修养与法律基础															√				√	√	√							
		中国近现代史纲要																			√	√								
		毛泽东思想和中国特色社会主义理论体系概论																			√	√								
		马克思主义基本原理																	√		√	√								
		军事理论																			√	√								
		体育 1-4																							√				√	
		通识选修课程															√	√	√	√	√	√	√	√						
		心理健康教育																			√	√	√							
		大学英语 1-4																						√	√					
		高等数学	√																											
		C 程序设计基础											√	√																
		计算机基础与 C 程序设计综合实验											√	√																
		专业导论		√																								√		
		工程图学					√																							
		线性代数	√																											
		概率论与数理统计	√																											

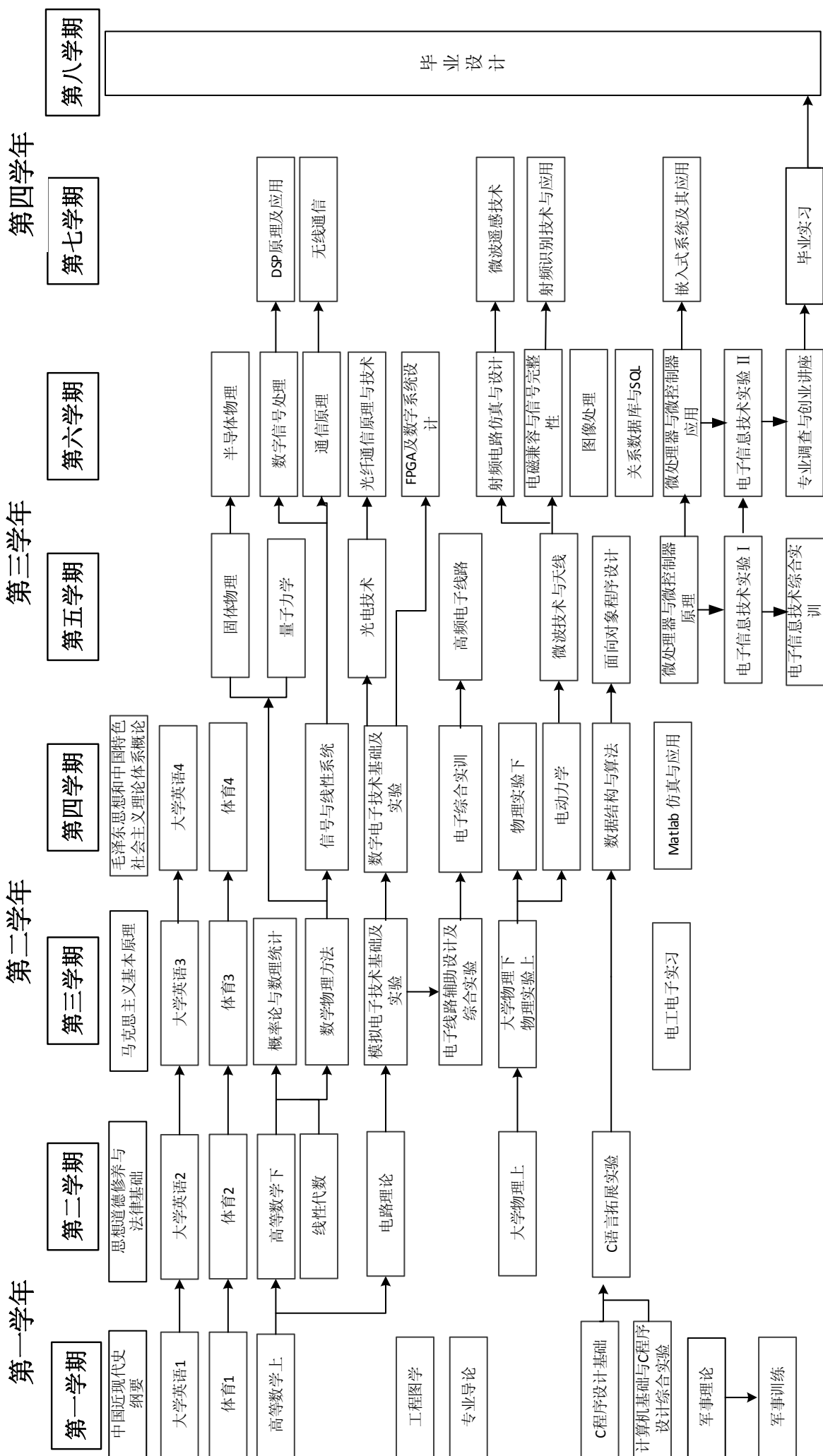
			电子信息科学与技术专业毕业要求																											
			1.1	1.2	1.3	2.1	2.2	3.1	3.2	3.3	4.1	4.2	5.1	5.2	5.3	6.1	6.2	7.1	7.2	8.1	8.2	9.1	9.2	10.1	10.2	11.1	11.2	12.1	12.2	
专 业 核 心 课 程	专 业 特 色 课 程	课程名称																												
		大学物理	√							√																				
		电路理论		√																										
		物理实验	√							√	√																			
		模拟电子技术基础		√																										
		模拟电子技术基础实验		√																										
		数学物理方法	√			√				√																				
		数字电子技术基础		√																										
		数字电子技术基础实验		√																										
		C 语言拓展实验										√	√																	
√		电动力学	√	√		√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	
		信号与线性系统	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√													
		数据结构与算法		√					√				√	√	√															
√		面向对象程序设计		√					√				√	√								√	√							
		量子力学	√								√												√	√	√					
√		微处理器与微控制器原理		√		√						√	√																	
		光电技术		√		√	√	√	√		√											√		√	√	√				
		光电技术实验		√	√	√	√	√	√		√											√		√	√					
√		微波技术与天线	√		√		√	√		√								√	√											

			电子信息科学与技术专业毕业要求																											
			1.1	1.2	1.3	2.1	2.2	3.1	3.2	3.3	4.1	4.2	5.1	5.2	5.3	6.1	6.2	7.1	7.2	8.1	8.2	9.1	9.2	10.1	10.2	11.1	11.2	12.1	12.2	
专业核心课程	专业特色课程	课程名称		√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√					
		通信原理	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	
		数字信号处理		√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	
		微处理器与微控制器应用		√		√		√				√	√																	
		电子信息技术实验			√			√				√		√																
	√	射频识别技术与应用	√	√	√	√	√	√	√	√	√	√	√	√	√										√			√		
	√	射频电路仿真与设计		√	√		√	√		√	√	√	√	√	√			√				√								
		电子线路辅助设计及综合实验		√			√						√			√														
	√	固体物理	√				√		√	√		√	√	√	√			√	√	√				√	√			√		
		Matlab 仿真与应用				√						√																		
		高频电子线路	√	√	√			√																						
		关系数据库与 SQL		√					√				√	√	√															
		半导体物理	√	√							√	√																		
		FPGA 及数字系统设计		√		√		√				√	√	√	√	√										√		√	√	
		光纤通信原理与技术	√	√				√												√							√			
		图像处理	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√		√	√	√	√	√	√	√	√	√	
	√	电磁兼容与信号完整性	√	√	√	√	√	√	√	√	√	√	√	√	√										√			√		
		嵌入式系统及其应用		√				√																				√		
		DSP 原理及应用	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√		√	√	√	√	√	√	√	√	√	

		电子信息科学与技术专业毕业要求																											
专 业 核 心 课 程	专 业 特 色 课 程	课程名称	1.1	1.2	1.3	2.1	2.2	3.1	3.2	3.3	4.1	4.2	5.1	5.2	5.3	6.1	6.2	7.1	7.2	8.1	8.2	9.1	9.2	10.1	10.2	11.1	11.2	12.1	12.2
		无线通信		√	√	√	√	√	√	√	√	√		√	√	√			√		√			√				√	√
	√	微波遥感技术	√	√		√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
		军事训练																		√	√		√						√
		电子综合实训		√	√	√	√	√						√															
		电工电子实习		√	√	√	√	√						√															
		电子信息工程技术综合实训	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√				√	√			√	√	√
		专业调查与创业讲座	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√		√	√			√	√	√
		毕业实习	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√				√	√			√	√	√
		毕业设计	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√			√	√			√	√	√

三、课程教学进程图

III Teaching Process Map



四、 理论教学建议进程表

IV Theory Course Schedule

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
			总学时 Tot hrs.	实验 Exp.	上机 Ope- ration	实践 Prac- tice	课外 Extra- cur		
(一) 通识教育必修课程 General Education Required Courses									
4220001110	思想道德修养与法律基础 Morals, Ethics and Fundamentals of Law	3	48			8		2	
4220002110	中国近现代史纲要 Outline of Contemporary and Modern Chinese History	2	32					1	
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		4	
4220005110	马克思主义基本原理 Marxism Philosophy	3	48			8		3	
1060003130	军事理论 Military Theory	1	32			16		1	
4210001170	体育 1 Physical Education I	1	26					1	
4210002170	体育 2 Physical Education II	1	34					2	
4210003170	体育 3 Physical Education III	1	34					3	
4210004170	体育 4 Physical Education IV	1	34					4	
4030002180	大学英语 1 College English I	3	60				12	1	
4030003180	大学英语 2 College English II	2	44				12	2	大学英语 1
4030004180	大学英语 3 College English III	2	44				12	3	大学英语 2
4030004180	大学英语 4 College English IV	2	44				12	4	大学英语 3
4120335170	C 程序设计基础 Fundamentals of C Program Design	2	32					1	
4120336170	计算机基础与 C 程序设计综合实验 Comprehensive Experiment on Fundamentals of Computer and C Program Design	1	32	32				1	
小 计 Subtotal		29	640	32	0	64	48		

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
			总学时 Tot hrs.	实验 Exp.	上机 Ope- ration	实践 Prac- tice	课外 Extra- cur		
(二) 通识教育选修课程 General Education Elective Courses									
创新创业类 Innovation and Entrepreneurship Courses		要求至少取得 9 个学分，且必须选修艺术体育类课程中的艺术类 相关课程并取得至少 2 个学分，在创新创业类课程中至少选修一 门课程，在人文社科类或经济管理类课程中至少选修一门。 Students are required to obtain at least 9 credits, which must cotain art courses of 2 credits from the category of Art and Physical Education Courses,at least one course from the category of Innovation and Entrepreneurship Courses, and at least one course from the category of Arts and Social Science Courses or the category of Economy and Management Courses.							
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									
(三) 专业教育必修课程 Basic Disciplinary RequiredCourses									
4050451130	专业导论 Introduction of Specialty	1	16					1	
4080373170	工程图学 B Engineering Graphics	3.5	72				16	1	
4050063110	高等数学 A 上 Advanced Mathematics I	5	80					1	
4050064110	高等数学 A 下 Advanced Mathematics II	5	80					2	高等数学上
4050601170	C 语言拓展实验 Development Experiments of C Language	0.5	16		16			2	C 程序设计 基础
4050229110	线性代数 Linear Algebra	2.5	40					2	
4110018110	电路理论 Circuit Principle	4	64	8				2	
4050021110	大学物理 A 上 Physics I	3.5	56					2	
4050022110	大学物理 A 下 Physics II	3.5	56					3	大学物理上
4050466130	物理实验 A 上 Physics Lab. I	1	32	32				3	
4050467130	物理实验 A 下 Physics Lab. II	1	32	32				4	物理实验上
4050058110	概率论与数理统计 B Probability and Mathematics Statistic	3	48					3	
4110049110	模拟电子技术基础 B Fundamentals of Analog Electronic Circuit	3.5	56					3	
4110051110	模拟电子技术基础实验 Experiments of Analog Electronic Circuit	0.5	16	16				3	

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
			总学时 Tot hrs.	实验 Exp.	上机 Ope- ration	实践 Prac- tice	课外 Extra- cur		
4050182110	数学物理方法 A Method Of Mathematical Physics	4.5	72					3	
4110067110	数字电子技术基础 B Fundamentals of Digital Electronic Circuit	3.5	56					4	
4110068110	数字电子技术基础实验 Experiments of Digital Electronic Circuit	0.5	16	16				4	
4050231110	信号与线性系统 Signal and Liner System	4	64	8				4	数学物理方法
4050602170	电动力学 B Electrodynamics	2.5	40					4	
4050603170	面向对象程序设计 D Object Oriented Programming	3.5	56		8			5	C 程序设计基础
4050604170	微处理器与微控制器原理 C Theory of Microcontroller and Microprocessor	3	48					5	数字电子技术基础
4050605170	微波技术与天线 C Microwave Technology and Antenna	2.5	40					5	电动力学
4050606170	电子信息技术实验 I Experiment on Electronic Information Technology I	0.5	16	16				5	微处理器与微控制器原理
4050607170	电子信息技术实验 II Experiment on Electronic Information Technology II	0.5	16	16				6	微处理器与微控制器应用
4050190110	通信原理 B Communication Principles	3.5	56	8				6	信号与线性系统
4110071110	数字信号处理 A Digital Signal Processing	4	64	10				6	信号与线性系统
4050197110	微处理器与微控制器应用 B Application of Microcontroller and Microprocessor	2	32					6	微处理器与微控制器原理
4050608170	射频电路仿真与设计 RF Circuit Simulation and Design	1	32	32				6	微波技术与天线
4050609170	射频识别技术与应用 C RFID Technology & Applications	1	32	32				7	

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
			总学时 Tot hrs.	实验 Exp.	上机 Ope- ration	实践 Prac- tice	课外 Extra- cur		
小 计 Subtotal		74	1304	226	24	0	10		
(四) 专业教育选修课程 Specialized Elective Courses									
4050610170	电子线路辅助设计及综合实验 Computer Aided Design of Electronic Circuit and Comprehensive Experiment	1.5	48	24	24			3	
4050167110	数据结构与算法 C Data Structures and Algorithms	2.5	40		6			4	C 程序设计 基础
4050003110	Matlab 仿真与应用 Matlab Simulation and Application	1	32		32			4	
4050612170	固体物理 D Solid State Physics	2.5	40					5	数学物理方法
4110031110	高频电子线路 C High-Frequency Electronic Circuits	3	48	8				5	模拟电子技术 基础
4050133110	量子力学 B Quantum Mechanics	3	48					5	数学物理方法
4050681170	光电技术 A Optoelectronic Technology	3.5	56	16				5	数字电子技术 基础
4050078110	关系数据库与 SQL Principles of Relational Database and SQL	2.5	40					6	
4050613170	半导体物理 C Semiconductor Physics	2.5	40					6	量子力学
4050367120	FPGA 及数字系统设计 FPGA and Design of Digital System	1	32	32				6	数字电子技术 基础
4050087110	光纤通信原理与技术 B Fiber Communication Theory and Technology	2.5	40					6	光电技术
4050192110	图像处理 A Image Process	2.5	40					6	信号与线性 系统
4050146110	嵌入式系统及其应用 C Embedded System and Application	2	32					7	微处理器与 微控制器应用
4050615170	无线通信 B Wireless Communication	2	32					7	通信原理
4050105110	DSP 原理及应用 B DSP Theory and Application	2	32					7	数字信号处 理

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
			总学时 Tot hrs.	实验 Exp.	上机 Ope- ration	实践 Prac- tice	课外 Extra- cur		
小 计 Subtotal		34	600	80	62	0	0		
修读说明：要求至少选修 20.5 学分。 NOTE: Minimum subtotal credits:20.5									
(五) 个性课程 Personalized Electice Courses									
4050614170	电磁兼容与信号完整性 EMC & Signal Integrity	2.5	40					6	电动力学
4050265110	微波遥感技术 Microwave Remote Sensing Technology	2	32					7	微波技术与 天线
修读说明：学生从以上个性课程和学校发布的个性课程目录中选课，要求至少选修 6 学分。 NOTE: Sudents can select courses from above and other personalized courses in catalog, and are required to obtain at least 6 credits.									

五、集中性实践教学环节

V Practice Schedule

课程编号 Course Number	实践环节名称 Practice Courses Name	学分 Crs	周数 Weeks	建议修读学期 Suggested Term
1060002110	军事训练 Military Training	1.5	3	1
4100068110	电工电子实习 A Practice of Electrical Engineering and Electronics	2	2	3
4050616170	电子综合实训 C Comprehensive Training of Electronics	1	1	4
4050617170	电子信息技术综合实训 Comprehensive Training of Electronic Information Technology	2	2	5
4050672170	电信科专业调查与创业讲座 Professional Investigation and Entrepreneurship Lecture	2	2	6
4050276110	毕业实习 Internship	2	2	7
4050429120	毕业设计 Graduate Design	11	17	8
小 计 Subtotal		21.5	29	

六、其它要求

VI Recommendations on Course Studies

1、在专业选修课程中，侧重于无线电物理方向的学生建议系统修读高频电子线路、量子力学、固体物理、光电技术、半导体物理、无线通信等课程；侧重于通信与信息处理方向的学生建议修读数据结构与算法、光纤通信原理与技术、图像处理、关系数据库与 SQL、无线通信、嵌入式系统及其应用、DSP 原理与应用等课程。

2、《形势与政策》和《心理健康教育》课程为课外必修课程，分别计 2 个和 1 个课外学分。

3、学生选修的通识选修课程和从学校发布的个性课程目录中选修的个性课程，要求与本专业培养方案内设置的课程内容不重复。

1. When taking specialized courses, students oriented in radio Physics are suggested to choose High-Frequency Electronic Circuits, Quantum Mechanics, Solid State Physics, Optoelectronic Technology, Semiconductor Physics, Wireless Communication, etc. While students oriented in communication and information processing are suggested to choose Data Structures and Algorithms, Fiber Communication Theory and Technology, Image Processing, Principles of Relational Database and SQL, Wireless Communication, Embedded System and Application, DSP Theory and Application, etc.

2. Situation & Policy (2 credits) and Mental Health Education (1 credit) are the required extracurricular courses.

3. The selected General Education Elective Courses and Personalized Elective Courses from the courses program by university must be different from the major undergraduate education plan in content.

学院教学责任人：何 朗

专业培养方案责任人：胡昌奎

信息与计算科学专业 2017 版本本科培养方案

Undergraduate Education Plan for Specialty in Information and Computing Science (2017)

专业名称	信息与计算科学	主干学科	数学
Major	Information and Computing Science	Major Disciplines	Science
计划学制	四年	授予学位	理学学士
Duration	4 Years	Degree Granted	Bachelor of Science
所属大类	数学类	大类培养年限	1.5 年
Disciplinary	Mathematics	Duration	1.5 years

最低毕业学分规定

Graduation Credit Criteria

课程分类 Course Classification 课程性质 Course Nature	通识教育课程 Public Basic Courses	专业教育课程 Specialized Courses	个性课程 Personalized Course	集中性实践教学环节 Practice Courses	课外学分 Study Credit after Class	总学分 Total Credits
必修课 Required Courses	29	71.5	\	22.5	\	170
选修课 Elective Courses	9	22	6	\	10	

一、培养目标与毕业要求

I Educational Objectives & Requirement

(一) 培养目标

本专业培养具有良好的道德、科学与文化素养，具有扎实的数学基础，掌握信息与计算科学的基本理论、方法和技能，受到科学研究的初步训练，具有一定国际视野，能运用数学知识和熟练的计算机技能解决实际问题，能够适应数学与计算科学发展需求进行知识更新，能够在数学和计算科学等相关领域从事科学研究或在科技、教育、信息产业、经济金融、行政管理等部门从事研究、教学、应用开发和管理等工作的人才。

毕业 5 年左右能够达到：

- (1) 具备良好的敬业精神、社会责任感，关注当代全球和社会问题，有意愿并有能力服务于社会；
- (2) 能够独立从事与数学、信息与计算科学相关领域的教育、科研、系统开发与应用等工作；
- (3) 能够在一个科研团队或技术团队中担任技术骨干或管理工作；
- (4) 能够通过继续教育或其它学习渠道更新知识，实现综合能力和技术的提升。

Educational Objectives:

This line is for applicants who have decided to take mathematics seriously, build a solid foundation in theoretical mathematics, with a strong inclination to graduate. The graduates who have the moral, scientific and cultural qualities of professional training, master the basic theory,

information science and computer science methods and skills. With the rudimentary training of scientific research and some international perspective, the graduates are capable to use mathematical knowledge and computer skills to solve practical problems, and adapt the needs of knowledge renewal of the development of mathematics and computational science, and other related fields, such as information industry, financial industry, administration, teaching and so on.

In five years after their graduation, they might

1. Have good professionalism, social responsibility, focusing on contemporary global and social problems, willing and capable of serving the society;
2. Be able to work independently in mathematical related fields, or independently engaged in information and computing science and related fields;
3. Be able to serve as a technical backbone or manager in a scientific team or a technical team;
4. Be able to update knowledge through continuing education or other learning channels to improve the comprehensive ability and technology.

(二) 毕业要求

- (1) 思想及职业规范：具有良好的思想道德素质和身体心理素质；具有良好的社会公德，自觉遵守社会行为规范；具有较强的法律意识，在法律法规规定的范畴内，按确定的相关标准和程序要求开展工作；具有良好的职业道德规范，自觉遵守职业行为准则。
- (2) 数学基础及科学素质：具有扎实的数学基础，接受过良好的科学研究的训练，能够理解信息与计算科学专业知识，具有将自然科学、社会科学与信息技术三者结合在一起的思想与能力；掌握基本的科学方法，树立科学思想，崇尚科学精神。
- (3) 学习能力：具有较强的获取知识、终身学习的能力，能够紧跟信息与计算科学领域最新技术发展趋势，了解和学习本领域的最新技术知识和技术成果，不断提升自己的专业水平；具备收集、分析、判断、归纳和选择国内外相关技术信息的能力，不断补充自己的专业知识。
- (4) 研究能力：能够运用自然科学及所学信息与计算科学的专业知识，采用科学方法对复杂实际问题或工程问题进行分析、推理、证明和计算；能够建立模型、解释数据、设计实验并编程实现，并通过信息综合得到有效的结论。
- (5) 计算机能力：能够运用计算机进行科学计算和研究，能够使用数学软件并具有算法分析与设计能力和较强的编程能力，具有一定的软件开发的能力，能够对复杂问题进行建模、算法设计、数值计算和分析。
- (6) 沟通能力：能够对复杂问题与同行及社会公众进行有效沟通和交流，包括撰写报告和设计文稿、陈述发言、清晰表达并能够回应反馈，具备一定的国际视野，能够在跨文化背景下进行沟通和交流。
- (7) 英语能力：熟练掌握英语，能够阅读本专业的外文资料，能够运用英语进行表达、沟通和交流。
- (8) 交叉科学研究能力：掌握自然科学知识和控制理论等相关的工程技术知识。
- (9) 创新能力：具有较强的创新意识和应用数学进行创新建模的初步能力；具有创新的理念和创新欲望；具有扎实的专业基础知识，良好科学的学习习惯和独立思考习惯。
- (10) 综合素养：具有适应国家建设所需要的各种文化素质，包括文化素养、文学艺术修养、了解历史学、哲学、思想道德、艺术、法学、社会学、心理学等方面的知识。
- (11) 社会责任感：具有较强的社会责任感，在环境保护、节约资源、公共安全、社会服务、社会福利、公共卫生、社会秩序等方面体现对社会的责任。
- (12) 个人与团队：具备团队合作精神，能够在多学科背景下承担个体、团队成员以及负责人

的角色，并具备一定的协调、管理、竞争与合作的初步能力。

Graduation Requirement:

1. Have a good moral quality, physical and psychological quality; good social ethics, abide by social norm; with a strong awareness of laws, work in accordance with the relevant standards and procedures to determine the occupation requirements within the provisions of laws and regulations; with good moral standards, consciously abide by the occupation behavior criterion.
2. Have a solid foundation of mathematics, received good training in scientific research, understand the knowledge of information and computing science, with the natural science, the social science, the information technology; master the basic scientific method, scientific thoughts and scientific spirit.
3. Has strong ability to acquire knowledge and lifelong learning, to keep up with the development of information and Computing Science in the field of new technology trends, understand and learn the latest technology in the field of knowledge and technology, and constantly improve their professional level; have the ability of collection, analysis, judgment, induction to select relevant technical information.
4. Capable to use the professional knowledge of natural science, information science and computation science, using scientific methods to complex problems or engineering problem, reasoning, proof and calculation; to establish models, interpretation of data, experimental designs and programming, obtain the conclusion through effective information.
5. To carry out scientific calculation and research on the use of computer, able to use mathematical software, grasp algorithm analysis, have strong programming ability, certain ability of software development.
6. Able to effectively communicate with the peers and the public on complex issues, including writing reports, presenting project, clearly expressing viewpoints.
7. Proficient in English, can read the foreign language information of the major, and use English for expression and communication.
8. Master the related engineering knowledge of natural science and control theory.
9. With strong creativity and the ability of using applied mathematics to innovate modeling; have innovative ideas and desire, have solid professional knowledge, good scientific learning habits and independent thinking habits.
10. Have all kinds of cultural qualities which are suitable for national construction, including cultural accomplishment, literature and art accomplishment, knowledge of history, philosophy, ideology and morality, art, law, sociology, psychology and so on.
11. Have strong sense of social responsibility and embodies social responsibility in environmental protection, resource conservation, public safety, social services, social welfare, public health and social order.
12. With team spirit, able to act as individual, team member or leaders in a multidisciplinary background team, have a certain ability of cooperation, management and competition.

附：培养目标实现矩阵

	培养目标 1	培养目标 2	培养目标 3	培养目标 4
毕业要求 1	√			
毕业要求 2		√		
毕业要求 3		√		√
毕业要求 4		√	√	√
毕业要求 5		√		
毕业要求 6			√	
毕业要求 7			√	√
毕业要求 8		√	√	
毕业要求 9				
毕业要求 10	√		√	√
毕业要求 11	√		√	
毕业要求 12			√	

二、专业核心课程与专业特色课程

II Core Courses and Characteristic Courses

(一) 专业核心课程:

数学分析, 高等代数, 常微分方程, 数据结构与算法, 数值分析, 概率论与数理统计, 实变函数。

Core Courses: Mathematical Analysis, Advanced Algebra, Ordinary Differential Equations , Data Structure and Algorithms, Numerical Analysis, Probability and Statistics, Real Variable Function.

(二) 专业特色课程:

数学模型, 数据分析, 计算机图形学, 信息安全技术与密码学。

Characteristic Courses: Mathematical Model , Dada Analysis , Computer Graphics , Information Safety and Cryptography.

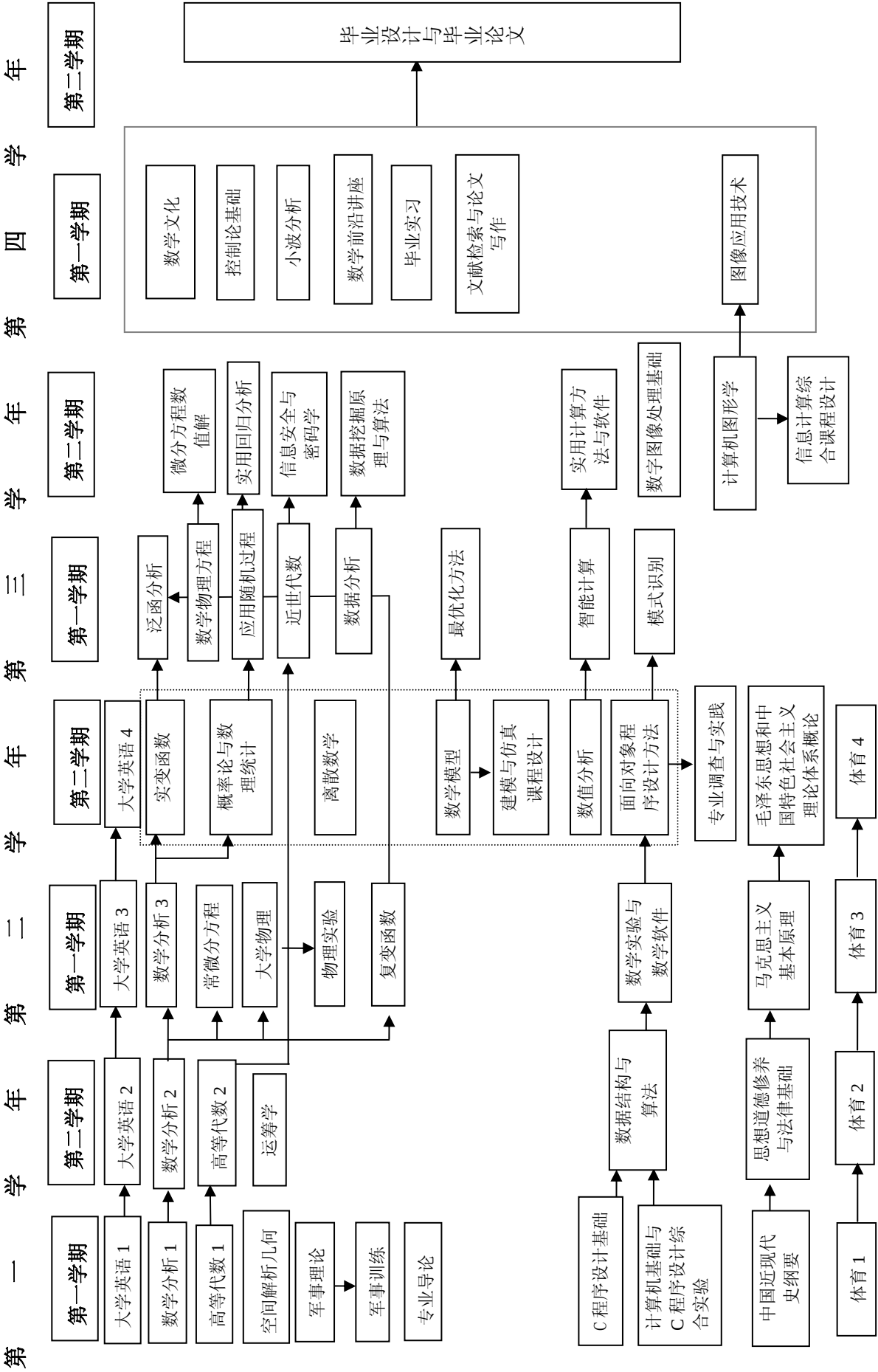
附: 毕业要求实现矩阵:

专业 核心 课程	专业 特色 课程	课程名称	信息与计算科学专业毕业要求											
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
		思想道德修养与法律基础	√									√	√	
		中国近现代史纲要	√									√	√	
		毛泽东思想和中国特色社会主义理论体系概论	√									√	√	
		马克思主义基本原理	√									√	√	
		军事理论	√											
		体育 1-4	√											

专业 核心 课程	专业 特色 课程	课程名称	信息与计算科学专业毕业要求											
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
		大学英语 1-4							√					
		C 程序设计基础				√	√							
		计算机基础与 C 程序设计综合实验				√	√							
		专业导论		√	√									
√		数学分析 1-3		√	√									
√		高等代数 1-2		√	√									
		空间解析几何		√	√									
√		常微分方程		√	√									
		数据结构与算法			√	√	√							
		大学物理								√				
		物理实验								√				
√		实变函数		√	√									
		数学实验与数学软件				√	√							
		运筹学		√	√	√					√			
√		数值分析		√	√	√					√			
		面向对象程序设计方法				√	√							
		离散数学			√	√	√				√			
√		概率论与数理统计		√	√									
		复变函数与积分变换		√	√									
	√	数据分析			√	√	√							
		数学物理方程		√	√									
		微分方程数值解			√		√							
	√	信息安全与密码学		√	√									
	√	数学模型			√	√	√	√		√	√			√
		近世代数		√	√									
		应用随机过程		√	√									
		智能计算		√	√	√	√							
		模式识别			√	√	√	√		√	√			√

专业 核心 课程	专业 特色 课程	课程名称	信息与计算科学专业毕业要求											
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
		最优化方法		√	√	√	√			√	√			
		泛函分析		√	√									
		数据挖掘原理与算法			√	√	√			√	√			√
		实用计算方法与软件			√		√							
		实用回归分析			√	√	√							
		数字图像处理基础			√	√	√				√			
	√	计算机图形学			√	√	√				√			
		图像应用技术			√	√	√				√			
		控制论基础		√	√									
		小波分析		√	√									
		数学文化			√							√		
		数学前沿讲座			√	√								
		文献检索与论文写作	√			√		√						
		军事训练	√											
		专业调查与实践	√					√						√
		建模与数值仿真课程设计				√	√				√			
		数据信息处理课程设计				√	√				√			
		信息计算综合课程设计				√	√				√			
		毕业实习	√					√					√	√
		毕业设计						√				√		√

三、课程教学进程图III Teaching Process Map



四、 理论教学建议进程表

IV Theory Course Schedule

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
			总学时 Tot hrs.	实验 Exp.	上机 Ope- ration	实践 Prac- tice	课外 Extra- cur		
(一) 通识教育必修课程 General Education Required Courses									
4220001110	思想道德修养与法律基础 Morals, Ethics and Fundamentals of Law	3	48			8		2	
4220002110	中国近现代史纲要 Outline of Contemporary and Modern Chinese History	2	32					1	
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		4	
4220005110	马克思主义基本原理 Marxism Philosophy	3	48			8		3	
1060003130	军事理论 Military Theory	1	32				16	1	
4210001170	体育 1 Physical Education I	1	26					1	
4210002170	体育 2 Physical Education II	1	34					2	
4210003170	体育 3 Physical Education III	1	34					3	
4210004170	体育 4 Physical Education IV	1	34					4	
4030002180	大学英语 1 College English I	3	60				12	1	
4030003180	大学英语 2 College English II	2	44				12	2	大学英语 1
4030004180	大学英语 3 College English III	2	44				12	3	大学英语 2
4030004180	大学英语 4 College English IV	2	44				12	4	大学英语 3
4120335170	C 程序设计基础 Fundamentals of Computer Program Design(C)	2	32					1	
4120336170	计算机基础与 C 程序设计综合实验 Fundamentals of Computer and Comprehensive Experiment of C Programming	1	32	32				1	
小 计 Subtotal		29	640	32	0	48	64		

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
			总学时 Tot hrs.	实验 Exp.	上机 Ope- ration	实践 Prac- tice	课外 Extra- cur		
(二) 通识教育选修课程 General Education Elective Courses									
创新创业类 Innovation and Entrepreneurship Courses		要求至少取得 9 个学分,且必须选修艺术体育类课程中的艺术类相关课程并取得至少 2 个学分,在创新创业类课程中至少选修一门课程,在人文社科类或经济管理类课程中至少选修一门。 Students are required to obtain at least 9 credits, which must cotain art courses of 2 credits from the category of Art and Physical Education Courses,at least one course from the category of Innovation and Entrepreneurship Courses, and at least one course from the category of Arts and Social Science Courses or the category of Economy and Management Courses.							
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									
(三) 专业教育必修课程 Basic Disciplinary RequiredCourses									
4050450130	专业导论 Introduction to Specialty	1	16					1	
4050175110	数学分析 1 Mathematical Analysis I	5	80					1	
4050176110	数学分析 2 Mathematical Analysis II	6	96					2	数学分析 1
4050177110	数学分析 3 Mathematical Analysis III	5	80					3	数学分析 2
4050647170	高等代数 A1 Advanced Algebra1 I	4	64					1	
4050680170	高等代数 A2 Advanced Algebra II	4	64					2	高等代数 1
4050359120	空间解析几何 Geometry in Space	2.5	40					1	
4050654170	数据结构与算法 B Data Structure & Algorithms	3	48		8			2	C 程序设计基础
4050019110	常微分方程 Ordinary Differential Equations	3	48					3	数学分析 2
4050649170	复变函数 A Complex Analysis	3	48					3	数学分析 2
4050463130	大学物理 B Physics	5	80					3	数学分析 2
4050224110	物理实验 B Physics Lab.	1	32	32				4	大学物理
4050465130	实变函数 A Real Variable Function	3.5	56					4	数学分析 3
4050650170	数值分析 D Numerical Analysis	3.5	56		8			4	

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
			总学时 Tot hrs.	实验 Exp.	上机 Ope- ration	实践 Prac- tice	课外 Extra- cur		
4050651170	面向对象程序设计方法 B Object-oriented programming method	3.5	56		24			4	
4050652170	离散数学 B Discrete Mathematics	3	48					4	
4050057110	概率论与数理统计 A Probability and Statistics	4.5	72					4	数学分析 3
4050165110	数据分析 Data Analysis	3	48					5	概率论与数理统计
4050408120	数学物理方程 Equations of Mathematical Physics	2.5	40					5	数学分析 3
4050579130	微分方程数值解 Numerical Solution of Differential Equations	2.5	40					6	
4050656170	信息安全与密码学 Information Safety and Cryptography	3	48					6	
小 计 Subtotal		71.5	1160	32	40	0	0		
(四) 专业教育选修课程 Specialized Elective Courses									
4050254110	运筹学 A Operation Research	3	48					2	高等代数 1
4050180110	数学实验与数学软件 A Mathematical experiments & Software	2	32		12			3	C 程序设计基础
4050655170	数学模型 B Mathematical Model	3	48		8			4	运筹学
4050571130	近世代数 A Modern Algebra	3	48					5	
4050244110	应用随机过程 B Applied Stochastic Processes	3	48					5	
4050258110	智能计算 A Artificial Computation	2	32					5	数值分析
4050572130	模式识别 C Pattern Recognition	3	48		8			5	
4050262110	最优化方法 Optimization Methods	2.5	40		8			5	
4050375120	泛函分析 Functional Analysis	3	48					5	实变函数
4050657170	数据挖掘原理与算法 C Data mining principles and algorithms	3	48		8			6	
4050479130	实用计算方法与软件 Practical Calculation Method and Software	3	48		16			6	

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
			总学时 Tot hrs.	实验 Exp.	上机 Ope-ration	实践 Prac-tice	课外 Extra-cur		
4050407120	实用回归分析 B Applied Regression Analysis	3	48		8			6	概率论与数理统计
4050487130	数字图像处理基础 Digital Image Processing	3	48		8			6	
4050474130	计算机图形学 A Computer Graphics	3	48		8			6	
4050658170	小波分析 B Wavelet Analysis	2	32					7	
4050127110	控制论基础 The Foundation of Control Theory	2	32					7	
4050659170	数学文化 Mathematics Culture	2	32					7	
4050491130	图像应用技术 Image Application Technology	2	32					7	
4050676170	数学前沿讲座 Lecture of Mathematics Frontier	1	16					7	
4050674170	文献检索与论文写作 Literature Retrieval and Thesis Writing	1	16					7	
小 计 Subtotal		49.5	792	0	84	0	0		
修读说明：要求至少选修 22 学分。 NOTE: Minimum subtotal credits:22.									
(五) 个性课程 Personalized Elective Courses									
修读说明：学生从学校发布的个性课程目录中选课，要求至少选修 6 学分。 NOTE: Students can select courses from the personalized courses in catalog, and are required to obtain at least 6 credits.									

五、集中性实践教学环节

V Practice Schedule

课程编号 Course Number	实践环节名称 Practice Courses Name	学分 Crs	周数 Weeks	建议修读学期 Suggested Term
1060002110	军事训练 Military Training	1.5	3	1
4050321110	专业调查与实践 Understanding of Specialty	2	2	4 (暑期)
4050441120	建模与数值仿真课程设计 B Design of Modeling and Numeric Simulation	2	2	4
4050445120	数据信息处理课程设计 B Course Design for Data Processing	2	2	5
4050499130	信息计算综合课程设计 Course Design for Information and Computation	2	2	6

课程编号 Course Number	实践环节名称 Practice Courses Name	学分 Crs	周数 Weeks	建议修读学期 Suggested Term
4050275110	毕业实习 Graduation Practice	2	2	7
4050684170	毕业论文 Graduation Thesis	11	17	8
小 计 Subtotal		22.5	30	

六、其它要求

VI Recommendations on Course Studies

- 1、《形势与政策》和《心理健康教育》课程为课外必修课程，分别计 2 个和 1 个课外学分。
 - 2、学生选修的通识选修课程和从学校发布的个性课程目录中选修的个性课程，要求与本专业培养方案内设置的课程内容不重复。
- 1.Situation & Policy (2 credits) and Mental Health Education (1 credit) are the required extracurricular courses.
 - 2.The selected General Education Elective Courses and Personalized Elective Courses from the courses program by university must be different from the major undergraduate education plan in content.

学院教学责任人:何 朗
专业培养方案责任人:万 源

统计学专业 2017 版本本科培养方案

Undergraduate Education Plan for Specialty in Statistics (2017)

专业名称	统计学	主干学科	统计学，数学
Major	Statistics	Major Disciplines	Statistics, Mathematics
计划学制	四年	授予学位	理学学士
Duration	4 Years	Degree Granted	Bachelor of Science
所属大类	数学类	大类培养年限	1.5 年
Disciplinary	Mathematics	Duration	1.5 years

最低毕业学分规定

Graduation Credit Criteria

课程分类 Course Classification 课程性质 Course Nature	通识教育课程 Public Basic Courses	专业教育课程 Courses in Specialty	个性课程 Personalized Course	集中性实践 Practice Courses	课外学分 Extracurricular Credits	总学分 Total Credits
必修课 Required Courses	29	71	\	24.5	\	170
选修课 Elective Courses	9	20.5	6	\	10	

I Educational Objectives & Requirement

(一) 培养目标

本专业通过在人文素养、数学和统计学专业知识、实践能力和职业发展能力等各方面的综合培训，培养适合在企业、事业单位和经济、管理、金融、医药、IT等部门从事统计调查、统计信息管理、数量分析等开发、应用和管理的工作，或在科研、教育部门从事研究和教学工作的专业人才。本方案培养学生达到以下目标：

- (1) 具有良好的人文素养和社会职业道德，能主动承担社会责任，积极服务社会，具备严谨、吃苦耐劳的品质。
- (2) 具有深厚的统计学和数学专业的基础知识和理论，具有全面系统的数据处理技能和社会实践能力，能够胜任统计学相关行业的管理、研究和数据开发等方面的工作。
- (3) 能够掌握大数据处理的技术和有关方法理论，掌握解决复杂数据的处理方法，能在工作团队中作为技术骨干或管理者发挥作用。
- (4) 具有良好的科学思维和科学方法，具有能够适应社会发展和变革的能力，具有国际和现代化的视野，对统计学发展的前沿技术高度敏感，能够推动统计学的创新发展。

This major is to supply a professional education and comprehensive training in all kinds of aspects including the humanities, mathematics and statistics, practical and vocational developing ability. The students are expected to be qualified as senior specialized talents to engage in statistical investigation, statistical information management, quantitative analysis etc. in the fields of business, industry, management science, economy, finance, science research, education, and so on.

Professional training objectives consist of:

1. Training graduates to have good humanistic quality and social professional ethics, have the initiative to shoulder social responsibilities, serve the society actively, and have the rigorous and hardworking quality.

2. Making graduates have deep knowledge and theory of statistics and mathematics, and master comprehensive data processing skills and social practice ability. Graduates can be competent for management, research, and data development in statistical industries.
3. Let graduates be able to master the related technology and theory of handling big data, have the ability to solve complex data, and can play a role in the work team as a technical backbone or manager.
4. Training graduates to develop good scientific thinking and scientific methods, and can adapt to social development and transformation. The graduates are expected to have the international and modern vision, be highly sensitive to the frontier technology of statistical development, and promote the innovation and development of statistics.

(二) 毕业要求

- (1) 统计专业知识：掌握概率论的基本知识，统计理论和推断的基本方法，统计计算的知识，以及统计建模等方法。
- (2) 应用能力：能够将数学、统计学等专业知识应用于解决复杂社会问题，如能够设计（开发）满足社会具体某一领域特定需要的数据处理和分析的研究方案。
- (3) 创新能力：能够综合考虑社会实际应用、环境、文化等因素，提出创新性的解决复杂社会问题的数据统计分析方案。
- (4) 研究能力：能够基于科学原理、采用科学方法对统计学专业的复杂问题进行研究，包括试验设计、收集、处理、分析与解释数据，并通过信息综合得到合理有效的结论。
- (5) 具备现代化工具的运用能力：掌握必要的计算机基础和至少一门计算机编程语言，能够针对复杂社会经济问题，开发、选择与使用恰当的统计方法、技术、资源和工具，实现对问题的分析、预测与模拟，并能够理解其局限性。
- (6) 统计与社会：能够基于统计学相关背景知识和标准，评价社会经济项目的设计、运行的方案，包括其对社会、健康、安全、法律以及文化的影响，并理解数据工程师、管理者应承担的责任。
- (7) 环境和可持续发展：能够通过数据处理和分析，正确理解、解释和评价社会经济实践活动对环境、社会可持续发展的影响。
- (8) 职业规范：了解中国国情、具有人文社会科学素养、社会责任感，能够在社会实践中理解并遵守职业道德和行为规范，做到责任担当、贡献国家、服务社会。
- (9) 团队协作能力：在解决统计相关复杂问题时，能够在多学科组成的团队中承担个体、团队成员或负责人的角色。
- (10) 沟通能力：具有良好的书面和口头表达能力，能够就统计学专业的复杂问题与业界同行及社会公众进行有效沟通和交流，包括撰写报告和设计文稿、陈述发言、表达或回应指令。熟练掌握至少一门外语，具备一定的国际视野，能够在跨文化背景下进行沟通和交流。
- (11) 项目管理：在与统计学专业相关的多学科环境中理解、掌握、应用管理学原理与经济决策方法，具有一定的组织、管理和领导能力。
- (12) 终身学习：具有自主学习和终身学习的意识，主动关注行业和社会发展方向，具有自主学习统计学专业新发展的能力。

For the graduates, the following knowledge and ability should be obtained:

1. Statistics knowledge: Mastering the fundamentals of probability theory, statistical reasoning and inferential methods, statistical computing, and statistical modeling etc.
2. Application ability: Having the ability to use mathematics, statistics, and other professional knowledge to solve the complex social problems. For example, be able to design (or develop) suitable research approach of processing and analyzing data to meet the specific social needs.
3. Innovation ability: Having the ability to propose innovative statistical analysis scheme to solve complex social problems by taking consideration of social environment, cultural and other factors.

4. Researchability: Be able to do some statistical research based on scientific principles and methods, including experimental design, collection, processing, analysis and interpretation of data, and can get reasonable and effective conclusions through information synthesis.
5. The ability to use modernization tools: Mastering the basic computer skills and at least one computer programming language, by which the analysis, prediction and simulation of complex social problems can be realized. And more, the limitations of the tragedies are also understood.
6. Statistics and society: Based on statistics related background knowledge and standards, to evaluate the design and operation plan of socio-economic projects, including its impact on society, health, safety, law and culture, and understand the responsibilities of statistical engineers.
7. Environment and sustainable development: To understand, explain and evaluate the impact of social and economic practices on environment and social sustainable development through data processing and analysis.
8. Professional norms: Understanding China's national conditions, having humanities and social literacy and social responsibility, understanding and abiding by professional ethics and behavior standards in social practice, and contributing to the country and serving the society.
9. Teamwork ability: Be able to undertake the roles of individuals, team members, or leaders in a multidisciplinary team in solving complex problems related to statistics.
10. Communication skills: Having a good written and oral expression ability, and mastering skills of communicate and exchange ideas the public, including report writing and presentation design, speaking, expressing, or responding to commands. Mastering at least one foreign language, having a certain international vision, and be able to communicate and exchange under the cross-cultural background.
11. Project management: Be able to understand, master, and apply management principles and economic decision-making methods in a multidisciplinary problem. Furthermore, obtaining certain organization, management and leadership skills.
12. Lifelong learning: Having the consciousness of self-learning and lifelong learning, having the initiative to focus on the development direction of industry and society, and having the ability of self-learning the new development of statistics.

附：培养目标实现矩阵

	培养目标 1	培养目标 2	培养目标 3	培养目标 4
毕业要求 1		√	√	
毕业要求 2		√	√	
毕业要求 3		√	√	
毕业要求 4				√
毕业要求 5			√	√
毕业要求 6	√			
毕业要求 7	√	√	√	
毕业要求 8	√			
毕业要求 9	√			
毕业要求 10	√	√		√
毕业要求 11	√		√	
毕业要求 12			√	√

二、专业核心课程与专业特色课程

II Core Courses and Characteristic Courses

(一) 专业核心课程:

数学分析、高等代数、概率论、数理统计

Core Courses:

Mathematical Analysis, Advanced Algebra, Probability Theory, Mathematical Statistics

(二) 专业特色课程:

随机过程、实用回归分析、时间序列分析、多元统计分析、抽样调查

Characteristic Courses:

Stochastic Processes, Applied Regression analysis, Time Series Analysis, Multivariate Statistical Analysis, Sampling Survey

附: 毕业要求实现矩阵:

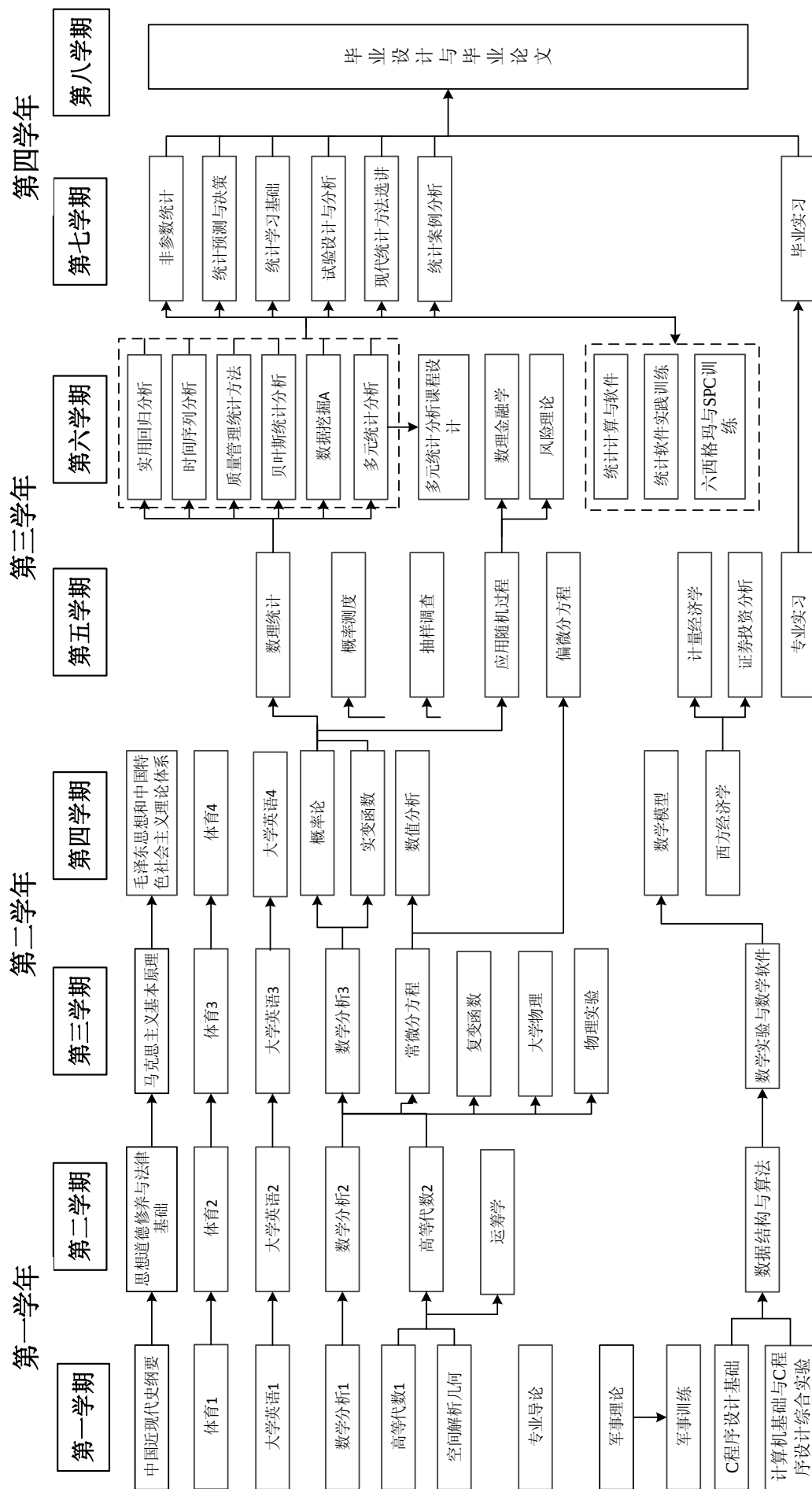
专业 核心 课程	专业 特色 课程	课程名称	统计学专业毕业要求											
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
		思想道德修养与法律基础						√		√				
		中国近现代史纲要						√		√				
		毛泽东思想和中国特色社会主义理论体系概论						√		√				
		马克思主义基本原理						√		√				
		军事理论						√		√				
		体育 1-4							√	√				
		大学英语 1-4						√				√		√
		C 程序设计基础		√			√							
		计算机基础与 C 程序设计综合实验		√			√							
		专业导论	√			√		√	√	√	√		√	√
√		数学分析	√	√	√	√								√
√		高等代数	√	√	√	√								√
		空间解析几何	√	√	√	√								√
		常微分方程	√	√	√	√								√
		数学实验与数学软件			√	√	√							
		大学物理	√	√	√	√		√						
		物理实验	√	√	√	√								
		复变函数	√	√	√	√								√
		运筹学	√	√	√	√								√
		数据结构与算法		√	√	√	√							
		实变函数	√	√	√	√								√

专业 核心 课程	专业 特色 课程	课程名称	统计学专业毕业要求											
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
√		概率论	√	√	√	√								√
√		数理统计	√	√	√	√								√
	√	抽样调查		√	√	√	√	√				√	√	
	√	应用随机过程	√	√	√	√								√
	√	多元统计分析	√	√	√	√							√	
	√	实用回归分析		√	√	√		√	√					
	√	时间序列分析		√	√	√								√
		数值分析	√	√	√	√	√							√
		偏微分方程	√	√	√	√								√
		数学模型	√	√	√	√	√		√		√	√	√	√
		西方经济学		√	√			√	√					√
		计量经济学		√	√			√	√					√
		证券投资分析			√			√		√				√
		概率测度	√	√	√	√								
		数理金融学		√	√	√								√
		统计计算与软件					√							√
		数据挖掘			√	√	√						√	√
		质量管理统计方法		√	√	√		√	√				√	
		非参数统计	√	√	√	√								√
		贝叶斯统计分析	√	√	√	√								
		统计预测与决策		√	√	√								
		统计学习基础				√	√							
		风险理论	√		√			√	√	√			√	
		试验设计与分析		√	√	√		√		√				
		现代统计方法选讲				√								√
		军事训练			√					√				
		专业实习	√	√	√		√	√		√	√	√		
		多元统计分析课程设计		√	√		√					√		
		统计软件实践训练			√		√							

专业 核心 课程	专业 特色 课程	课程名称	统计学专业毕业要求											
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
		六西格玛与 SPC 训练			√		√							
		统计案例分析			√		√	√			√	√		
		毕业实习						√		√	√	√	√	
		毕业设计		√	√	√	√	√	√			√	√	√

三、课程教学进程图

III Teaching Process Map



四、 理论教学建议进程表

IV Theory Course Schedule

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
			总学时 Tot hrs.	实验 Exp.	上机 Ope- ration	实践 Prac- tice	课外 Extra- cur		
(一) 通识教育必修课程 General Education Required Courses									
4220001110	思想道德修养与法律基础 Morals, Ethics and Fundamentals of Law	3	48			8		2	
4220002110	中国近现代史纲要 Outline of Contemporary and Modern Chinese History	2	32					1	
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		4	
4220005110	马克思主义基本原理 Marxism Philosophy	3	48			8		3	
1060003130	军事理论 Military Theory	1	32			16		1	
4210001170	体育 1 Physical Education I	1	26					1	
4210002170	体育 2 Physical Education II	1	34					2	
4210003170	体育 3 Physical Education III	1	34					3	
4210004170	体育 4 Physical Education IV	1	34					4	
4030002180	大学英语 1 College English I	3	60				12	1	
4030003180	大学英语 2 College English II	2	44				12	2	大学英语 1
4030004180	大学英语 3 College English III	2	44				12	3	大学英语 2
4030004180	大学英语 4 College English IV	2	44				12	4	大学英语 3
4120335170	C 程序设计基础 Fundamentals of C Programming	2	32					1	
4120336170	计算机基础与 C 程序设计综合实验 Foundations of Computer and C Language Programming Experiments	1	32	32				1	C 程序设计基础
小 计 Subtotal		29	640	32	0	64	48		

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
			总学时 Tot hrs.	实验 Exp.	上机 Ope- ration	实践 Prac- tice	课外 Extra- cur		
(二) 通识教育选修课程 General Education Elective Courses									
创新创业类 Innovation and Entrepreneurship Courses		要求至少取得 9 个学分, 且必须选修艺术体育类课程中的艺术类 相关课程并取得至少 2 个学分, 在创新创业类课程中至少选修一 门课程, 在人文社科类或经济管理类课程中至少选修一门。 Students are required to obtain at least 9 credits, which must cotain art courses of 2 credits from the category of Art and Physical Education Courses,at least one course from the category of Innovation and Entrepreneurship Courses, and at least one course from the category of Arts and Social Science Courses or the category of Economy and Management Courses.							
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									
(三) 专业教育必修课程 Basic Disciplinary RequiredCourses									
4050450130	专业导论 Introduction to Specialty	1	16					1	
4050175110	数学分析 1 Mathematical Analysis I	5	80					1	
4050176110	数学分析 2 Mathematical Analysis II	6	96					2	数学分析 1
4050177110	数学分析 3 Mathematical Analysis III	5	80					3	数学分析 2
4050647170	高等代数 A1 Advanced Algebra I	4	64					1	
4050680170	高等代数 A2 Advanced Algebra II	4	64					2	高等代数 1
4050359120	空间解析几何 space analytic geometry	2.5	40					1	
4050019110	常微分方程 Ordinary Differential Equations	3	48					3	数学分析 2
4050654170	数据结构与算法 B Data Structure & Algorithms	3	48		8			2	C 程 序 设 计基础
4050463130	大学物理 B Physics	5	80					3	数学分析 1
4050224110	物理实验 B Physics Lab.	1	32	32				4	大学物理
4050649170	复变函数 A Complex Function	3	48					3	数学分析 2
4050465130	实变函数 A Functions of A Real Variable	3.5	56					4	数学分析 3
4050473130	概率论 B Probability	4	64					4	数学分析 3

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
			总学时 Tot hrs.	实验 Exp.	上机 Ope- ration	实践 Prac- tice	课外 Extra- cur		
4050482130	数理统计 B Mathematical Statistics	4	64					5	概率论
4050020110	抽样调查 Sampling Survey	3	48					5	概率论
4050500130	应用随机过程 A Applied Stochastic Processes	4	64					5	概率论
4050372120	多元统计分析 B Multivariate Statistical Analysis	3.5	56		8			6	数理统计
4050407120	实用回归分析 B Applied Regression Analysis	3	48		8			6	数理统计
4050405120	时间序列分析 B Time Series Analysis	3.5	56		8			6	数理统计
小 计 Subtotal		71	1152	32	32	0	0		
(四) 专业教育选修课程 Specialized Elective Courses									
4050254110	运筹学 A Operation Research	3	48					2	高等代数 1
4050180110	数学实验与数学软件 A Mathematical Experiments & Softwares	2	32		12			3	C 程序设计基础
4050184110	数值分析 A Numerical Analysis	4	64		8			4	常微分方程
4050655170	数学模型 B Mathematical Model	3	48		8			4	
4010097110	西方经济学 B West Economics	3	48					4	
4050662170	偏微分方程 A Partial Differential Equation	3	48					5	常微分方程
4010056110	计量经济学 Econometrics	3.5	56	8				5	西方经济学
4010214130	证券投资分析 A Security Investment Analysis	3	48					5	
4050663170	概率测度 A Probability Measure	3	48					5	概率论
4050173110	数理金融学 A Mathematical Finance	3	48					6	应用随机过程
4050664170	统计计算与软件 Statistical Computation and Software	3	48		16			6	数理统计

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
			总学时 Tot hrs.	实验 Exp.	上机 Ope- ration	实践 Prac- tice	课外 Extra- cur		
4050169110	数据挖掘 A Data Mining	3	48					6	
4050257110	质量管理统计方法 Statistical Method in Quality Management	3	48					6	数理统计
4050009110	贝叶斯统计分析 Bayesian Statistical Analysis	3	48					6	数理统计
4050377120	风险理论 A Risk Theory	3	48					6	应用随机过程
4050038110	非参数统计 Nonparametric Statistics	3	48					7	数理统计
4050191110	统计预测与决策 Statistical Forecasts and Decisions	3	48					7	数理统计
4050665170	统计学习基础 Fundamentals of Statistical Learning	3	48					7	数理统计
4050164110	试验设计与分析 A Experimental Design and Analysis	3	48					7	数理统计
4050496130	现代统计方法选讲 Selective Modern Mathematical Methods	2	32					7	
小 计 Subtotal		59.5	952	8	32	0	0		
修读说明：要求至少选修 20.5 学分。 NOTE: Minimum subtotal credits:20.5.									
(五) 个性课程 Personalized Elective Courses									
修读说明：学生从学校发布的其它个性课程目录中选课，要求至少选修 6 学分。 NOTE: Students can select courses from the other personalized courses in catalog, and are required to obtain at least 6 credits.									

五、集中性实践教学环节

V Practice Schedule

课程编号 Course Number	实践环节名称 Practice Courses Name	学分 Crs	周数 Weeks	建议修读学期 Suggested Term
1060002110	军事训练 Military Training	1.5	3	1
4050502130	统计学专业实习 Practice of Special	2	2	5
4050284110	多元统计分析课程设计 A Design of Course	2	2	6
4050666170	统计软件实践训练 Practical Training for Statistical Software	2	2	6

课程编号 Course Number	实践环节名称 Practice Courses Name	学分 Crs	周数 Weeks	建议修读学期 Suggested Term
4050667170	六西格玛与 SPC 训练 6 Sigma and SPC Training	1	1	6（暑期）
4050488130	统计案例分析 C Statistical Cases and Analysis	2	2	7
4050279110	毕业实习 Practice for Graduation	3	3	7
4050435120	毕业设计 Graduate Thesis	11	17	8
小 计 Subtotal		24.5	32	

六、其它要求

VI Recommendations on Course Studies

- 1、《形势与政策》和《心理健康教育》课程为课外必修课程，分别计 2 个和 1 个课外学分。
- 2、学生选修的通识选修课程和从学校发布的个性课程目录中选修的个性课程，要求与本专业培养方案内设置的课程内容不重复。

1.Situation & Policy (2 credits) and Mental Health Education (1 credit) are the required extracurricular courses.

2.The selected General Education Elective Courses and Personalized Elective Courses from the courses program by university must be different from the major undergraduate education plan in content.

学院教学责任人：何 朗
专业培养方案责任人：彭幸春

工程力学专业 2017 版本本科培养方案

Undergraduate Education Plan for Engineering Mechanics (2017)

专业名称	工程力学	主干学科	工程力学
Major	Engineering Mechanics	Major Disciplines	Engineering Mechanics
计划学制	四年	授予学位	工学学士
Duration	4 Years	Degree Granted	Bachelor of Engineering

最低毕业学分规定

Graduation Credit Criteria

课程分类 Course Classification 课程性质 Course Nature	通识教育课程 Public Basic Courses	专业教育课程 Specialized Courses	个性课程 Personalized Course	集中性实践教学环节 Practice Courses	课外学分 Study Credit after Class	总学分 Total Credits
必修课 Required Courses	29	61.5	\	29.5	\	170
选修课 Elective Courses	9	25	6	\	10	

一、培养目标与毕业要求

I Educational Objectives & Requirement

(一) 培养目标

工程力学专业培养具有高度的社会责任感，良好的科学、文化素养，系统掌握力学基础知识、基本理论和基本技能，富有创新意识和实践能力，身心健康，能够在力学及相关科学或工程领域从事教育、科研、技术等工作的高素质专门人才。本方案培养学生达到以下目标：

- (1) 具有良好的人文素养和工程职业道德，具备严谨求实和吃苦耐劳的工程师品质，能主动承担社会责任并积极服务于社会。
- (2) 具有深厚的工程力学专业基础知识和理论，具备基本的力学实验技能和数值建模计算的能力，具备系统化的专业技能和实践能力，能胜任力学及其相关行业工程技术应用、管理、研究或开发工作。
- (3) 能利用多重技术手段和方法综合分析和解决复杂工程问题，能够在工作团队中作为技术骨干或管理者发挥作用。
- (4) 能适应社会发展及变革，了解学科前沿与发展趋势，具备创新精神和国际化视野，能够通过继续教育或其它学习渠道更新知识，实现能力和技术水平的提升。

Educational objectives

Mechanical engineering professional program trains talents with high sense of social responsibility, good scientific and cultural quality system, to master the basic knowledge of mechanics, basic theory and basic skills, innovative consciousness and practical ability, physical and mental health, to engage in education, scientific research, technical work in mechanics and related science or engineering talents. The students achieve the following goals:

1. Have a good humanities and engineering occupation morality, with rigorous and hard-working engineer quality, to undertake the social responsibility and actively serving the society.
2. Have a profound professional knowledge of Engineering Mechanics and theoretical mechanics, experimental skills and ability of numerical modeling basic calculation, with system of professional skills and practical ability, can be competent for the mechanics and related industry applications, engineering and technology management, research or development work.
3. Be able to use multiple technical means and methods to analyze and solve complex engineering problems, can be used as the technical backbone or management team work to play a role.
4. Be able to adapt to the social development and change, to understand the frontier and development trend, with the spirit of innovation and international perspective, to update knowledge through continuing education or other learning channels, the ability to achieve and improve the technology level.

(二) 毕业要求

- (1) **工程知识:** 能够将数学、自然科学、工程基础和力学专业知识用于解决复杂工程问题。
- (2) **问题分析:** 能够应用数学、自然科学和力学的基本原理, 结合对科技文献的研究结果, 识别、表达、并通过文献研究分析复杂工程问题, 以获得有效结论。
- (3) **设计(开发)解决方案:** 能够设计针对复杂工程问题的解决方案, 设计满足特定需求的系统、单元(部件)或工艺流程, 并能够在设计环节中体现创新意识, 考虑社会、健康、安全、法律、文化以及环境等因素。
- (4) **研究:** 能够基于科学原理并采用科学方法对复杂工程问题进行研究, 包括设计实验、分析与解释数据、并通过信息综合得到合理有效的结论。
- (5) **使用现代工具:** 能够针对复杂工程问题, 开发、选择与使用恰当的技术、资源、现代工程工具和信息技术工具, 包括对复杂工程问题的预测与模拟, 并能够理解其局限性。
- (6) **工程与社会:** 能够基于工程相关背景知识进行合理分析, 评价专业工程实践和复杂工程问题解决方案对社会、健康、安全、法律以及文化的影响, 并理解应承担的责任。
- (7) **环境和可持续发展:** 能够理解和评价针对复杂工程问题的专业工程实践对环境、社会可持续发展的影响。
- (8) **职业规范:** 具有人文社会科学素养、社会责任感, 能够在工程实践中理解并遵守工程职业道德和规范, 履行责任。
- (9) **个人和团队:** 能够在多学科背景下的团队中承担个体、团队成员以及负责人的角色。
- (10) **沟通:** 能够就复杂工程问题与业界同行及社会公众进行有效沟通和交流, 包括撰写报告和设计文稿、陈述发言、清晰表达或回应指令。并具备一定的国际视野, 能够在跨文化背景下进行沟通和交流。
- (11) **项目管理:** 理解并掌握工程管理原理与经济决策方法, 并能在多学科环境中应用。
- (12) **终身学习:** 具有自主学习和终身学习的意识, 有不断学习和适应发展的能力。

Graduate requirements

1. **Engineering knowledge:** apply mathematics, natural science, engineering mechanics foundation and professional knowledge to solve complex engineering problems.
2. **Problem analysis:** the basic principle can be applied using mathematics, natural science and mechanics, combined with the research results of scientific literature, identification, expression, and through literature research and analysis of complex engineering problems, in order to obtain the effective conclusion.
3. **Design (development) solution:** to design solutions to complex engineering problems, designed to meet the specific needs of the system, the unit (or components) process, and can reflect the sense of

innovation in the design process, considering the social, health and safety, legal, cultural and environmental factors.

4. **Research:** to study based on the principle of science and research on complex engineering problems by using scientific methods, including experimental design, analysis and interpretation of data, and get the rational conclusion through comprehensive information.
5. **The use of modern tools:** for complex engineering problems, development, selection and use of appropriate technology, resources, modern engineering tools and information technology tools, including the prediction and simulation of complex engineering problems, and to understand its limitations.
6. **Engineering and society:** be able to reasonably analyze related background knowledge based on the evaluation of professional engineering practice and complex engineering solutions to social, health, safety, law and culture, and understand the responsibilities.
7. **Environmental and sustainable development:** can affect the understanding and evaluation of professional engineering practice for complex engineering problems on the sustainable development of environment and society.
8. **Specification:** with the humanities and social science literacy, social responsibility, to comply with the occupation morals and norms of Engineering in engineering practice and understanding, and take responsibility.
9. **Individual and team:** assume individual, team members and responsible role in a multidisciplinary context to the team.
10. **Communication:** to communicate and exchange for complex engineering problems with industry peers and the public, including report writing and presentation, design statement and clear expression or respond to instructions. And have a certain international vision, able to communicate and exchange in the cross cultural background.
11. **Project management:** to understand and grasp the decision making method of project management and economic principle, and can be used in a multidisciplinary environment.
12. **Lifelong learning:** has the consciousness of independent learning and lifelong learning, be able to learn continuously and to adapt to the development.

附：培养目标实现矩阵

	培养目标 1	培养目标 2	培养目标 3	培养目标 4
毕业要求 1		√		
毕业要求 2		√	√	
毕业要求 3		√	√	
毕业要求 4		√	√	
毕业要求 5		√	√	
毕业要求 6	√		√	
毕业要求 7			√	√
毕业要求 8	√			
毕业要求 9	√		√	
毕业要求 10	√		√	√
毕业要求 11		√		√
毕业要求 12				√

二、专业核心课程与专业特色课程

II Core Courses and Characteristic Courses

(一) 专业核心课程:

理论力学、材料力学、弹性力学、结构力学、计算力学、振动力学、流体力学、实验力学

Core Courses:

Theoretical Mechanics, Mechanics of Materials, Elastic Mechanics, Structural Mechanics, Computational Mechanics, Vibration Mechanics, Fluid Mechanics, Experimental mechanics.

(二) 专业特色课程:

混凝土结构设计原理、混凝土结构力学分析、钢结构力学分析、复合材料力学与结构设计、有限元分析与应用、土力学与基础工程

Characteristic Courses:

Principle of Concrete Structure Design, Mechanics Analysis of Concrete Structures, Mechanical Analysis of Steel Structures, Mechanics of Composite Materials and Structural Design, FEM Analysis and Application, Soil Mechanics and Fundamental Engineering

附：毕业要求实现矩阵:

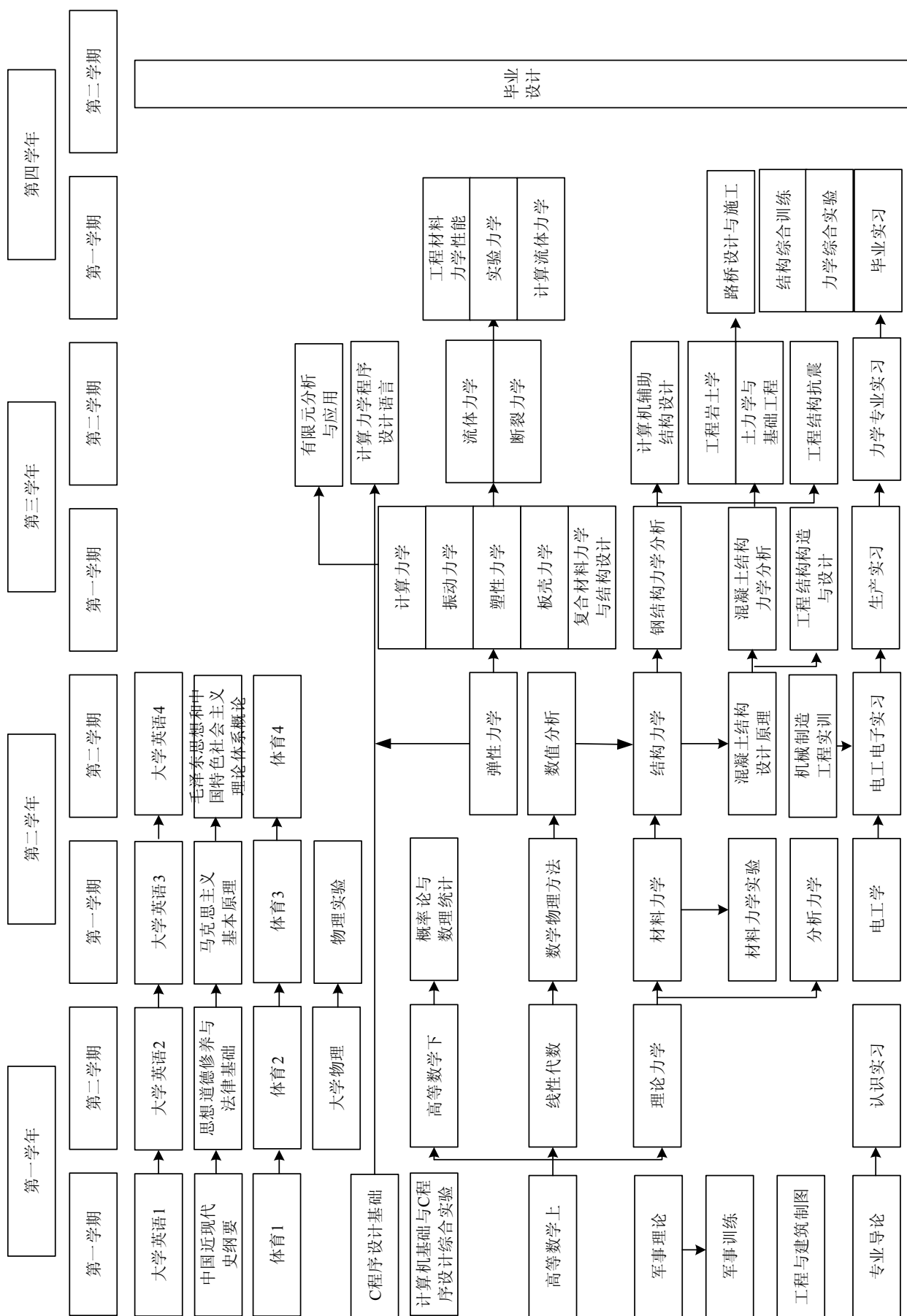
专业 核心 课程	专业 特色 课程	课程名称	工程力学专业毕业要求											
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
		中国近现代史纲要			√			√	√					
		思想道德修养与法律基础			√			√		√			√	
		马克思主义基本原理			√			√	√			√		
		毛泽东思想和中国特色社会主义理论体系概论			√			√	√					
		军事理论									√			
		体育									√			
		大学英语				√						√		√
		C 程序设计基础					√							√
		计算机基础与 C 程序设计综合实验					√							√
		专业导论	√	√		√	√	√						
		工程与建筑制图	√				√							
		高等数学	√			√								
		线性代数	√											
		概率论与数理统计	√											
		电工学	√											
		大学物理	√											
		物理实验	√											

专业 核心 课程	专业 特色 课程	课程名称	工程力学专业毕业要求											
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
√		理论力学	√	√	√	√								
√		材料力学	√	√	√	√								
		材料力学实验				√	√							
		数学物理方法	√											
√		弹性力学	√	√	√	√								
√		结构力学	√	√	√	√								
√		计算力学	√	√	√	√								
√		振动力学	√	√	√	√								
√		流体力学	√	√	√	√								
√		实验力学			√	√	√	√						
		分析力学	√	√	√	√								
		数值分析	√	√	√	√								
	√	混凝土结构设计原理	√	√	√	√								
		工程结构构造与设计	√	√	√	√		√						
		板壳力学	√	√	√	√								
		塑性力学	√	√	√	√								
	√	钢结构力学分析	√	√	√	√								
	√	混凝土结构力学分析	√	√	√	√								
	√	复合材料力学与结构设计	√	√	√	√								
		断裂力学	√	√	√	√								
		计算力学程序设计语言	√		√		√							
	√	有限元分析与应用	√	√	√	√								
	√	土力学与基础工程	√	√	√	√								
		工程结构抗震	√	√	√	√								
		工程岩土学	√	√	√	√								
		工程材料力学性能	√	√	√	√								
		计算机辅助结构设计	√	√	√	√	√							
		计算流体力学	√	√	√	√								
		路桥设计与施工	√	√	√	√								

专业 核心 课程	专业 特色 课程	课程名称	工程力学专业毕业要求											
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
		军事训练									√	√		
		认识实习	√				√		√					
		机械制造工程实训	√		√									
		电工电子实习	√		√									
		生产实习			√		√							
		力学专业实验		√	√		√							
		毕业实习			√					√	√	√		
		结构综合训练		√	√	√	√							
		力学综合实验		√	√		√							
		毕业设计		√	√	√	√	√	√	√		√		√

三、课程教学进程图

III Teaching Process Map



四、 理论教学建议进程表

IV Theory Course Schedule

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
			总学时 Tot hrs.	实验 Exp.	上机 Ope- ration	实践 Prac- tice	课外 Extra- cur		
(一) 通识教育必修课程 General Education Required Courses									
4220002110	中国近现代史纲要 Outline of Contemporary and Modern Chinese History	2	32					1	
4220001110	思想道德修养与法律基础 Morals, Ethics and Fundamentals of Law	3	48			8		2	
4220005110	马克思主义基本原理 Marxism Philosophy	3	48			8		3	
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		4	
1060003130	军事理论 Military Theory	1	32			16		1	
4210001170	体育 1 Physical Education I	1	26					1	
4210002170	体育 2 Physical Education II	1	34					2	
4210003170	体育 3 Physical Education III	1	34					3	
4210004170	体育 4 Physical Education IV	1	34					4	
4030002180	大学英语 1 College English I	3	60				12	1	
4030003180	大学英语 2 College English II	2	44				12	2	大学英语 1
4030004180	大学英语 3 College English III	2	44				12	3	大学英语 2
4030004180	大学英语 4 College English IV	2	44				12	4	大学英语 3
4120335170	C 程序设计基础 Foundation of C Program Design	2	32					1	
4120336170	计算机基础与 C 程序设计综合实验 Computer Basis and Comprehensive Experiments for C Program Design	1	32	32				1	
小 计 Subtotal		29	640	32	0	64	48		

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
			总学时 Tot hrs.	实验 Exp.	上机 Ope- ration	实践 Prac- tice	课外 Extra- cur		
(二) 通识教育选修课程 General Education Elective Courses									
创新创业类 Innovation and Entrepreneurship Courses		要求至少取得 9 个学分，且必须选修艺术体育类课程中的艺术类相关课程并取得至少 2 个学分，在创新创业类课程中至少选修一门课程，在人文社科类或经济管理类课程中至少选修一门。 Students are required to obtain at least 9 credits, which must cotain art courses of 2 credits from the category of Art and Physical Education Courses,at least one course from the category of Innovation and Entrepreneurship Courses, and at least one course from the category of Arts and Social Science Courses or the category of Economy and Management Courses.							
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									
(三) 专业教育必修课程 Basic Disciplinary RequiredCourses									
4050259110	专业导论 Introduction to Engineering Mechanics	1	16					1	
4130567170	工程与建筑制图 Engineering and Architectural Drawing	3	48					1	
4050063110	高等数学 A 上 Advanced Mathematics I	5	80					1	
4050064110	高等数学 A 下 Advanced Mathematics II	5	80					2	高等数学上
4050229110	线性代数 Linear Algebra	2.5	40					2	
4050129110	理论力学 A Theoretical Mechanics	4.5	72					2	
4050463130	大学物理 B Physics	5	80					2	
4050224110	物理实验 B Physics Lab.	1	32	32				3	大学物理
4050058110	概率论与数理统计 B Probability and Mathematics Statistic	3	48					3	
4100008110	电工学 Electronic Technology	3	48	8				3	
4050016110	材料力学 B Mechanics of Materials	4.5	72					3	理论力学
4050017110	材料力学 B 实验 Experiments of Materials Mechanics	1	32	32				3	
4050618170	数学物理方法 C Mathematical Physics Methods	2.5	40					3	高等数学 线性代数
4050025110	弹性力学 A Mechanics of Elasticity	4	64					4	理论力学 材料力学

课程编号 Course Number	课 程 名 称 Course Title	学分 Crts	学时分配 Including					建议 修读 学期 Suggested Term	先修课程 Prerequisite Course
			总学时 Tot hrs.	实验 Exp.	上机 Ope- ration	实践 Prac- tice	课外 Extra- cur		
4050619170	结构力学 A Structural Mechanics	4	64		10			4	理论力学 材料力学
4050620170	计算力学 Computational Mechanics	3.5	56					5	数值分析 弹性力学
4050621170	振动力学 A Vibration Mechanics	3	48					5	理论力学 结构力学
4050135110	流体力学 B Fluid Mechanics	3.5	56	6				6	高等数学 理论力学
4050162110	实验力学 A Experimental Mechanics	2.5	40	8				7	材料力学 弹性力学
小 计 Subtotal		61.5	1016	86	10	0	0		
(四) 专业教育选修课程 Specialized Elective Courses									
4050622170	分析力学 Analysis Mechanics	2	32					3	高等数学 理论力学
4050185110	数值分析 B Numerical Analysis	2.5	40		8			4	高等数学 线性代数
4050623170	混凝土结构设计原理 D Principle of Concrete Structures Design	5	80			16		4	结构力学 材料力学
4050069110	工程结构构造与设计 Engineering Structural Construction and Design	4	64			4		5	建筑制图
4050006110	板壳力学 Mechanics of Plates and Shells	2	32					5	材料力学 弹性力学
4050186110	塑性力学 Mechanics of Plasticity	2	32					5	材料力学 弹性力学
4050624170	钢结构力学分析 C Mechanical Analysis of Steel Structures	4	64			16		5	结构力学 弹性力学
4050625170	混凝土结构力学分析 C Mechanical Analysis of Concrete Structures	3.5	56			8		5	结构力学 混凝土结构设计原理
4050626170	复合材料力学与结构设计 C Mechanics of Composite Materials and Structural Design	3	48					5	材料力学 弹性力学
4050034110	断裂力学 Fracture Mechanics	2	32					6	弹性力学 塑性力学
4050115110	计算力学程序设计语言 Program Design Language for Computational Mechanics	3.5	56		20			6	数值分析 计算力学
4050627170	有限元分析与应用 C FEM Analysis & Application	3	48		16			6	弹性力学 计算力学
4050628170	土力学与基础工程 B Soil Mechanics and Fundamental Engineering	4	64			16		6	材料力学

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
			总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur		
4050070110	工程结构抗震 Engineering Structural Seismic	2.5	40			8		6	混凝土结构力学 振动力学
4050629170	工程岩土学 B Soil and Rock Engineering	1.5	24	6				6	
4050630170	计算机辅助结构设计 A Computer Aided Structural Design	2.5	40		20	4		6	混凝土结构力学分析 钢结构力学分析
4050350110	工程材料力学性能 Mechanical Properties of Engineering Materials	2	32					7	材料力学 断裂力学
4050351110	计算流体力学 B Computational Fluid Mechanics	2	32					7	流体力学 计算力学
4050631170	路桥设计与施工 Road and Bridge Design and Construction	4	64					7	土力学与基础工程 工程岩土学
小 计 Subtotal		55	880	6	64	72	0		
修读说明：要求至少选修 25 学分。 NOTE: Minimum subtotal credits:25.									
(五) 个性课程 Personalized Elective Courses									
4050052110	复变函数与积分变换 B Complex Variable Function and Integral Transformation	3	48					4	高等数学
4050632170	基础力学理论设计与操作 Basic Mechanics Theory Design and Operation	4	64					6	理论力学 材料力学
4050633170	基础力学理论设计与操作实验 Basic Mechanics Theory Design and Operation	1.5	48	48				6	理论力学 材料力学
小 计 Subtotal		8.5	160	48	0	0	0		
修读说明：学生从以上个性课程和学校发布的其它个性课程目录中选课，要求至少选修 6 学分。 NOTE: Students can select courses from above and the other personalized courses in catalog, and are required to obtain at least 6 credits.									

五、集中性实践教学环节

V Practice Schedule

课程编号 Course Number	实践环节名称 Practice Courses Name	学分 Crs	周数 Weeks	建议修读学期 Suggested Term
1060002110	军事训练 Military Training	1.5	3	1
4050299110	认识实习 Practice of Understanding	1	1	2

课程编号 Course Number	实践环节名称 Practice Courses Name	学分 Crs	周数 Weeks	建议修读学期 Suggested Term
4080151110	机械制造工程实训 C Practice of Mechanical Manufacturing Engineering	2	2	4
4100069110	电工电子实习 B Practice of Electrical Engineering & Electronics	1	1	4
4050303110	生产实习 Production Practice	2	2	5
4050539140	力学专业实验 Mechanics Specialized Experiments	2	2	6
4050274110	毕业实习 Practice for Graduation	2	2	7
4050634170	结构综合训练 Comprehensive Training on Structure	4	4	7
4050635170	力学综合实验 Comprehensive Experiments on Mechanics	2	2	7（分散）
4050636170	毕业设计 Graduation Design (Thesis)	12	17	8
小 计 Subtotal		29.5	36	

六、其它要求

VI Recommendations on Course Studies

- 1、《形势与政策》和《心理健康教育》课程为课外必修课程，分别计 2 个和 1 个课外学分。
 - 2、学生选修的通识选修课程和从学校发布的个性课程目录中选修的个性课程，要求与本专业培养方案内设置的课程内容不重复。
- 1.Situation & Policy (2 credits) and Mental Health Education (1 credit) are the required extracurricular courses.
 - 2.The selected General Education Elective Courses and Personalized Elective Courses from the courses program by university must be different from the major undergraduate education plan in content.

学院教学责任人：何 朗
专业培养方案责任人：张 梅

信息与计算科学专业（应用数学实验班）

2017 版本本科培养方案

Undergraduate Education Plan for Specialty in Information and Computing Science (Applied Mathematics Experimental Class) (2017)

专业名称	信息与计算科学	主干学科	数学
Major	Information and Computing Science	Major Disciplines	Science
计划学制	四年	授予学位	理学学士
Duration	4 Years	Degree Granted	Bachelor of Science

最低毕业学分规定

Graduation Credit Criteria

课程分类 Course Classification 课程性质 Course Nature	通识教育课程 Public Basic Courses	专业教育课程 Specialized Courses	个性课程 Personalized Course	集中性实践 教学环节 Practice Courses	课外学分 Study Credit after Class	总学分 Total Credits
必修课 Required Courses	29	74	\	21.5	\	170
选修课 Elective Courses	9	20.5	6	\	10	

一、培养目标与毕业要求

I Educational Objectives & Requirement

(一) 培养目标

本专业培养具有良好的道德、科学与文化素养，具有扎实的数学基础，掌握信息科学和计算科学的基本理论、方法和技能，受到科学研究的初步训练，具有一定国际视野，能运用数学知识和熟练的计算机技能解决实际问题，能够适应数学与计算科学发展需求进行知识更新，能够在数学和计算科学等相关领域从事科学研究或在科技、教育、信息产业、经济金融、行政管理等部门从事研究、教学、应用开发和管理等工作的人才。

毕业 5 年左右能够达到：

- (1) 具备良好的敬业精神、社会责任感，关注当代全球和社会问题，有意愿并有能力服务于社会；
- (2) 能够独立从事数学相关领域的研究，或能够独立从事与信息计算科学相关领域的教育、科研、系统开发与应用等工作；
- (3) 能够在一个科研团队或技术团队中担任技术骨干或管理工作；
- (4) 能够通过继续教育或其它学习渠道更新知识，实现综合能力和技术的提升。

Educational Objectives:

This line is for applicants who have decided to take mathematics seriously, build a solid foundation in theoretical mathematics, with a strong inclination to graduate. The graduates who

have the moral, scientific and cultural qualities of professional training, master the basic theory, information science and computer science methods and skills. With the rudimentary training of scientific research and some international perspective, the graduates are capable to use mathematical knowledge and computer skills to solve practical problems, and adapt the needs of knowledge renewal of the development of mathematics and computational science, and other related fields, such as information industry, financial industry, administration, teaching and so on.

In five years after their graduation, they might

1. Good professionalism, social responsibility, focusing on contemporary global and social problems, willing and capable of serving the society;
2. Be able to work independently in mathematical related fields, or independently engaged in information and computing science and related fields;
3. Be able to serve as a technical backbone or manager in a scientific team or a technical team;
4. Be able to update knowledge through continuing education or other learning channels to improve the comprehensive ability and technology.

(二) 毕业要求

- (1) 思想及职业规范：具有良好的思想道德素质和身体心理素质；具有良好的社会公德，自觉遵守社会行为规范；具有较强的法律意识，在法律法规规定的范畴内，按确定的相关标准和程序要求开展工作；具有良好的职业道德规范，自觉遵守职业行为准则。
- (2) 数学基础及科学素质：具有扎实的数学基础，接受过良好的科学研究的训练，能够理解信息与计算科学专业知识，具有将自然科学、社会科学与信息技术三者结合在一起的思想与能力；掌握基本的科学方法，树立科学思想，崇尚科学精神。
- (3) 学习能力：具有较强的获取知识、终身学习的能力，能够紧跟信息与计算科学领域最新技术发展趋势，了解和学习本领域的最新技术知识和技术成果，不断提升自己的专业水平；具备收集、分析、判断、归纳和选择国内外相关技术信息的能力，不断补充自己的专业知识。
- (4) 研究能力：能够运用自然科学及所学信息与计算科学的专业知识，采用科学方法对复杂实际问题或工程问题进行分析、推理、证明和计算；能够建立模型、解释数据、设计实验并编程实现，并通过信息综合得到有效的结论。
- (5) 计算机能力：能够运用计算机进行科学计算和研究，能够使用数学软件并具有算法分析与设计能力和较强的编程能力，具有一定的软件开发的能力，能够对复杂问题进行建模、算法设计、数值计算和分析。
- (6) 沟通能力：能够对复杂问题与同行及社会公众进行有效沟通和交流，包括撰写报告和设计文稿、陈述发言、清晰表达并能够回应反馈，具备一定的国际视野，能够在跨文化背景下进行沟通和交流。
- (7) 英语能力：熟练掌握英语，能够阅读本专业的外文资料，能够运用英语进行表达、沟通和交流。
- (8) 交叉科学研究能力：掌握自然科学知识和控制理论等相关的工程技术知识。
- (9) 创新能力：具有较强的创新意识和应用数学进行创新建模的初步能力；具有创新的理念和创新欲望；具有扎实的专业基础知识，良好科学的学习习惯和独立思考习惯。

- (10) 综合素养：具有适应国家建设所需要的各种文化素质，包括文化素养、文学艺术修养、了解历史学、哲学、思想道德、艺术、法学、社会学、心理学等方面的知识。
- (11) 社会责任感：具有较强的社会责任感，在环境保护、节约资源、公共安全、社会服务、社会福利、公共卫生、社会秩序等方面体现对社会的责任。
- (12) 个人与团队：具备团队合作精神，能够在多学科背景下承担个体、团队成员以及负责人的角色，并具备一定的协调、管理、竞争与合作的初步能力。

Graduation Requirement: Have a good moral quality, physical and psychological quality; good social ethics, abide by social norm; with a strong awareness of laws, work in accordance with the relevant standards and procedures to determine the occupation requirements within the provisions of laws and regulations; with good moral standards, consciously abide by the occupation behavior criterion.

Have a solid foundation of mathematics, received good training in scientific research, understand the knowledge of information and computing science, with the natural science, the social science, the information technology; master the basic scientific method, scientific thoughts and scientific spirit.

1. Has strong ability to acquire knowledge and lifelong learning, to keep up with the development of information and Computing Science in the field of new technology trends, understand and learn the latest technology in the field of knowledge and technology, and constantly improve their professional level; have the ability of collection, analysis, judgment, induction to select relevant technical information.
2. Capable to use the professional knowledge of natural science, information science and computation science, using scientific methods to complex problems or engineering problem, reasoning, proof and calculation; to establish models, interpretation of data, experimental designs and programming, obtain the conclusion through effective information.
3. To carry out scientific calculation and research on the use of computer, able to use mathematical software, grasp algorithm analysis, have strong programming ability, certain ability of software development.
4. Able to effectively communicate with the peers and the public on complex issues, including writing reports, presenting project, clearly expressing viewpoints.
5. Proficient in English, can read the foreign language information of the major, and use English for expression and communication.
6. Master the related engineering knowledge of natural science and control theory.
7. With strong creativity and the ability of using applied mathematics to innovate modeling; have innovative ideas and desire, have solid professional knowledge, good scientific learning habits and independent thinking habits.
8. Have all kinds of cultural qualities which are suitable for national construction, including cultural accomplishment, literature and art accomplishment, knowledge of history, philosophy, ideology and morality, art, law, sociology, psychology and so on.
9. Have strong sense of social responsibility and embodies social responsibility in environmental protection, resource conservation, public safety, social services, social welfare,

public health and social order.

10. With team spirit, able to act as individual, team member or leaders in a multidisciplinary background team, have a certain ability of cooperation, management and competition.

附：培养目标实现矩阵

	培养目标 1	培养目标 2	培养目标 3	培养目标 4
毕业要求 1	√			
毕业要求 2		√		
毕业要求 3		√		√
毕业要求 4		√	√	√
毕业要求 5		√		
毕业要求 6			√	
毕业要求 7			√	√
毕业要求 8		√	√	
毕业要求 9				
毕业要求 10	√		√	√
毕业要求 11	√		√	
毕业要求 12			√	

二、专业核心课程与专业特色课程

II Core Courses and Characteristic Courses

(一) 专业核心课程：

数学分析，高等代数，常微分方程，数据结构与算法，概率论与数理统计，实变函数，泛函分析，微分几何。

Core Courses: Mathematical Analysis, Advanced Algebra, Ordinary Differential Equations, Data Structure and Algorithms, Probability and Statistics, Functions of Real Variable, Functional Analysis, Differential Geometry.

(二) 专业特色课程：

数学模型，智能计算，计算机图形学，模式识别。

Characteristic Courses: Mathematical Model, Artificial Computation, Computer Graphics, Pattern Recognition.

附：毕业要求实现矩阵：

专业 核心 课程	专业 特色 课程	课程名称	信息与计算科学专业（应用数学实验班）毕业要求											
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
		思想道德修养与法律基础	√									√	√	
		中国近现代史纲要	√									√	√	
		毛泽东思想和中国特色社会主义理论体系概论	√									√	√	
		马克思主义基本原理	√									√	√	
		军事理论	√									√	√	

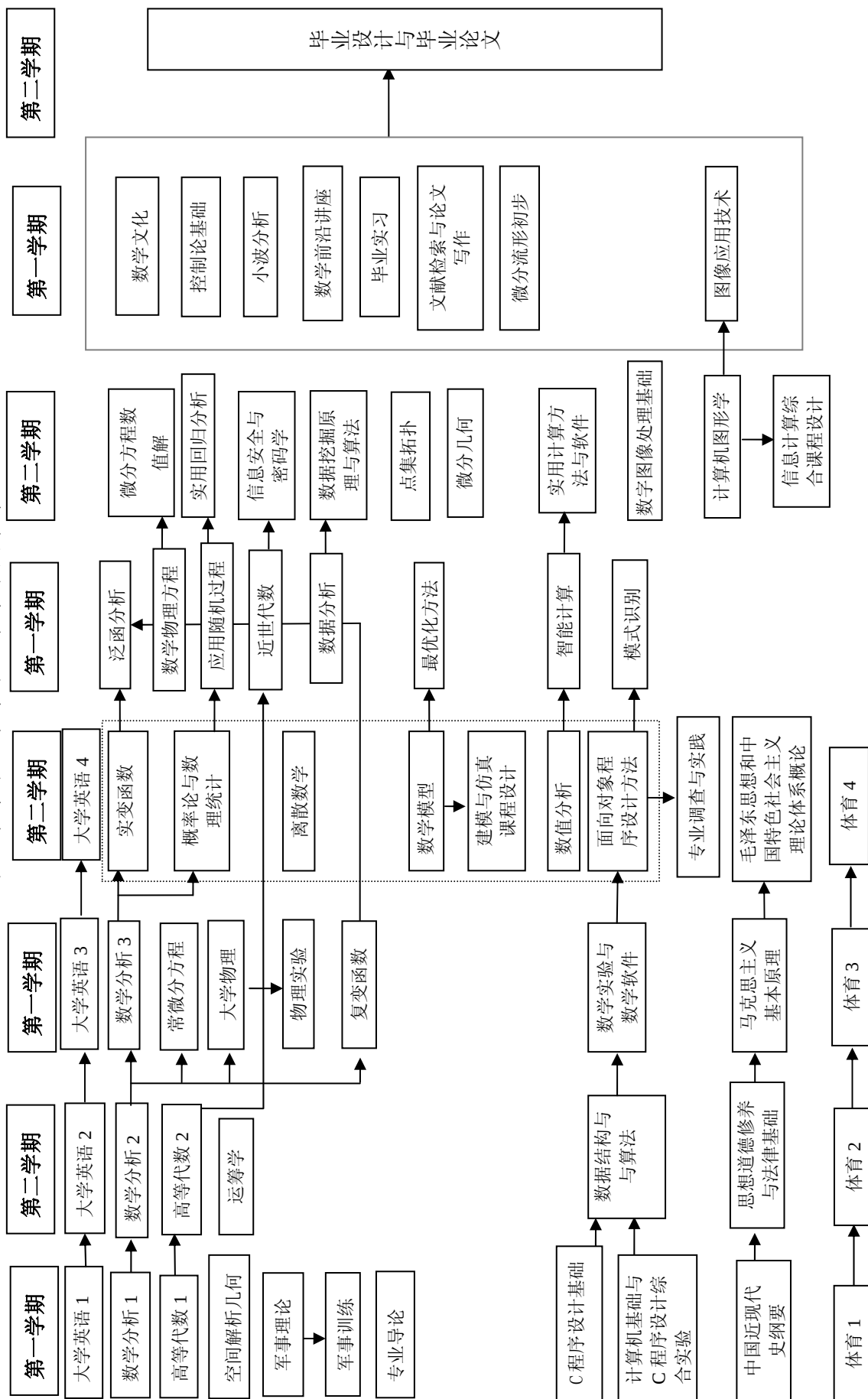
专业 核心 课程	专业 特色 课程	课程名称	信息与计算科学专业（应用数学实验班）毕业要求											
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
		体育 1-4	√									√	√	
		大学英语 1-4	√									√	√	
		C 程序设计基础	√									√	√	
		计算机基础与 C 程序设计综合实验	√											
		专业导论	√											
√		数学分析 1-3							√					
√		高等代数 1-2		√	√									
		空间解析几何		√	√									
√		常微分方程		√	√									
		数据结构与算法			√	√	√							
		大学物理								√				
		物理实验								√				
√		实变函数		√	√									
		数学实验与数学软件				√	√							
		运筹学		√	√	√					√			
		数值分析		√	√	√					√			
		面向对象程序设计方法				√	√							
		离散数学			√	√	√				√			
√		概率论与数理统计		√	√									
		复变函数与积分变换		√	√									
√		微分几何		√	√									
		近世代数		√	√									
√		泛函分析		√	√									
		数学物理方程		√	√									
		最优化方法		√	√	√	√			√	√			
		点集拓扑		√	√									
	√	数学模型			√	√	√	√		√	√			√
		数据分析			√	√	√							
		应用随机过程		√	√									
		数据建模基础			√		√	√						
	√	智能计算		√	√	√	√							
	√	模式识别			√	√	√	√		√	√			√

专业 核心 课程	专业 特色 课程	课程名称	信息与计算科学专业（应用数学实验班）毕业要求											
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
		数据挖掘原理与算法			√	√	√			√	√			√
		实用计算方法与软件			√		√							
		实用回归分析			√	√	√							
	√	计算机图形学			√	√	√				√			
		数字图像处理基础			√	√	√				√			
		信息安全技术与密码学		√	√									
		微分方程数值解			√		√							
		图像应用技术			√	√	√				√			
		控制论基础		√	√									
		小波分析		√	√									
		微分流形初步		√	√									
		数学文化			√							√		
		数学前沿讲座			√	√								
		论文检索与写作	√			√		√						
		军事训练	√											
		专业调查与实践	√					√						√
		建模与数值仿真课程设计				√	√				√			
		信息计算综合课程设计				√	√				√			
		毕业实习	√					√					√	√
		毕业设计						√				√		√

三、课程教学进程图

III Teaching Process Map

第一学年第二学期第三学年第四学年



四、 理论教学建议进程表

IV Theory Course Schedule

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
			总学时 Tot hrs.	实验 Exp.	上机 Ope- ration	实践 Prac- tice	课外 Extra- cur		
(一) 通识教育必修课程 General Education Required Courses									
4220001110	思想道德修养与法律基础 Morals, Ethics and Fundamentals of Law	3	48			8		2	
4220002110	中国近现代史纲要 Outline of Contemporary and Modern Chinese History	2	32					1	
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		4	
4220005110	马克思主义基本原理 Marxism Philosophy	3	48			8		3	
1060003130	军事理论 Military Theory	1	32				16	1	
4210001170	体育 1 Physical Education I	1	26					1	
4210002170	体育 2 Physical Education II	1	34					2	
4210003170	体育 3 Physical Education III	1	34					3	
4210004170	体育 4 Physical Education IV	1	34					4	
4030002180	大学英语 1 College English I	3	60				12	1	
4030003180	大学英语 2 College English II	2	44				12	2	大学英语 1
4030004180	大学英语 3 College English III	2	44				12	3	大学英语 2
4030004180	大学英语 4 College English IV	2	44				12	4	大学英语 3
4120335170	C 程序设计基础 Fundamentals of Computer Program Design(C)	2	32					1	
4120336170	计算机基础与 C 程序设计综合实验 Fundamentals of Computer and Comprehensive Experiment of C Programming	1	32	32				1	
小 计 Subtotal		29	640	32	0	48	64		

课程编号 Course Number	课 程 名 称 Course Title	学分 Crts	学时分配 Including					建议 修读 学期 Suggested Term	先修课程 Prerequisite Course
			总学时 Tot hrs.	实验 Exp.	上机 Ope- ration	实践 Prac- tice	课外 Extra- cur		
(二) 通识教育选修课程 General Education Elective Courses									
创新创业类 Innovation and Entrepreneurship Courses		要求至少取得 9 个学分, 且必须选修艺术体育类课程中的艺术类 相关课程并取得至少 2 个学分, 在创新创业类课程中至少选修一 门课程, 在人文社科类或经济管理类课程中至少选修一门。 Students are required to abtain at least 9 credits, which must cotain art courses of 2 credits from the category of Art and Physical Education Courses,at least one course from the category of Innovation and Entrepreneurship Courses, and at least one course from the category of Arts and Social Science Courses or the category of Economy and Management Courses.							
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									
(三) 专业教育必修课程 Basic Disciplinary RequiredCourses									
4050597170	应用数学专业导论 Introduction to Specialty	1	16					1	
4050175110	数学分析 1 Mathematical Analysis I	5	80					1	
4050176110	数学分析 2 Mathematical Analysis II	6	96					2	数学分析 1
4050177110	数学分析 3 Mathematical Analysis III	5	80					3	数学分析 2
4050647170	高等代数 A1 Advanced Algebra I	4	64					1	
4050680170	高等代数 A2 Advanced Algebra II	4	64					2	高等代数 1
4050359120	空间解析几何 Geometry in Space	2.5	40					1	
4050654170	数据结构与算法 B Data Structure & Algorithms	3	48		8			2	C 程序设 计基础
4050019110	常微分方程 Ordinary Differential Equations	3	48					3	数学分析 2
4050649170	复变函数 A Complex Analysis	3	48					3	数学分析 2
4050463130	大学物理 B Physics	5	80					3	数学分析 2
4050224110	物理实验 B Physics Lab.	1	32	32				4	大 学 物 理 B

课程编号 Course Number	课 程 名 称 Course Title	学分 Crts	学时分配 Including					建议 修读 学期 Suggested Term	先修课程 Prerequisite Course
			总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Prac-tice	课外 Extra-cur		
4050465130	实变函数 A Real Variable Functions	3.5	56					4	数学分析 3
4050650170	数值分析 D Numerical Analysis	3.5	56		8			4	
4050651170	面向对象程序设计方法 B Object-oriented programming method	3.5	56		24			4	
4050652170	离散数学 B Discrete Mathematics	3	48					4	
4050057110	概率论与数理统计 A Probability and Statistics	4.5	72					4	数学分析 3
4050571130	近世代数 A Modern Algebra	3	48					5	
4050375120	泛函分析 Functional Analysis	3	48					5	实变函数
4050408120	数学物理方程 Equations of Mathematical Physics	2.5	40					5	数学分析 3
4050578130	点集拓扑 Point Set Topology	2.5	40					6	
4050653170	微分几何 B Differential Geometry	2.5	40					6	
小 计 Subtotal		74	1200	32	40	0	0		
(四) 专业教育选修课程 Specialized Elective Courses									
4050254110	运筹学 A Operation Research	3	48					2	高等代数 1
4050180110	数学实验与数学软件 A Mathematical experiments & Softwares	2	32		12			3	C 程序设计基础
4050655170	数学模型 B Mathematical Model	3	48		8			4	运筹学
4050244110	应用随机过程 B Applied Stochastic Processes	3	48					5	
4050165110	数据分析 Data Analysis	3	48					5	概率论与数理统计
4050262110	最优化方法 Optimization Method	2.5	40		8			5	

课程编号 Course Number	课 程 名 称 Course Title	学分 Crts	学时分配 Including					建议 修读 学期 Suggested Term	先修课程 Prerequisite Course
			总学时 Tot hrs.	实验 Exp.	上机 Ope- ration	实践 Prac- tice	课外 Extra- cur		
4050258110	智能计算 A Artificial Computation	2	32					5	数值分析
4050572130	模式识别 C Pattern Recognition	3	48		8			5	
4050579130	微分方程数值解 Numerical Solution of Differential Equations	2.5	40					6	
4050656170	信息安全与密码学 Information Safety and Cryptography	3	48					6	
4050657170	数据挖掘原理与算法 C Data mining principles and algorithms	3	48		8			6	
4050479130	实用计算方法与软件 Practical Calculation Method and Software	3	48		16			6	
4050407120	实用回归分析 B Applied Regression Analysis	3	48		8			6	概率论与数理统计
4050487130	数字图像处理基础 Digital Image Processing	3	48		8			6	
4050474130	计算机图形学 A Computer Graphics	3	48		8			6	
4050658170	小波分析 B Wavelet Analysis	2	32					7	
4050127110	控制论基础 The Foundation of Control Theory	2	32					7	
4050659170	数学文化 Mathematics Culture	2	32					7	
4050491130	图像应用技术 Image Application Technology	2	32					7	
4050674170	文献检索与论文写作 Image Application Technology	1	16					7	
4050675170	微分流形初步 Calculus on the Manifold	1	16					7	
小 计 Subtotal		52	832	0	84	0	0		
修读说明：要求至少选修 20.5 学分。 NOTE: Minimum subtotal credits:20.5.									
(五) 个性课程 Personalized Elective Courses									
修读说明：学生从学校发布的个性课程目录中选课，要求至少选修 6 学分。 NOTE: Students can select courses from the personalized courses in catalog, and are required to obtain at least 6 credits.									

五、集中性实践教学环节

V Practice Schedule

课程编号 Course Number	实践环节名称 Practice Courses Name	学分 Crs	周数 Weeks	建议修读学期 Suggested Term
1060002110	军事训练 Military Training	1.5	3	1
4050321110	专业调查与实践 Understanding of Specialty	2	2	4（暑期）
4050441120	建模与数值仿真课程设计 B Design of Modeling and Numeric Simulation	2	2	4
4050499130	信息计算综合课程设计 Course Design for Information and Computation	2	2	6
4050307110	数学前沿讲座 Lecture of Mathematics Frontier	1	1	7
4050275110	毕业实习 Graduation Practice	2	2	7
4050684170	毕业论文 Graduation Thesis	11	17	8
小 计 Subtotal		21.5	29	

六、其它要求

VI Recommendations on Course Studies

1、数据信息计算方向建议选修：运筹学、智能计算、应用随机过程、数据挖掘原理与算法、现代数据分析导论及应用、实用计算方法与软件、实用回归分析。

2、图像信息计算方向建议选修：应用随机过程、模式识别、智能计算、计算机图形学、数字图像处理基础、小波分析、偏微分方程数值解。

3、《形势与政策》和《心理健康教育》课程为课外必修课程，分别计 2 个和 1 个课外学分。

4、学生选修的通识选修课程和从学校发布的个性课程目录中选修的个性课程，要求与本专业培养方案内设置的课程内容不重复。

1.Recommendation courses for data and information calculation are operations research, intelligent computing, stochastic processes, data mining principles and algorithms, introduction and application of modern data analysis, practical computing methods and software, practical regression analysis.

2.Recommendation courses for Image Information are: stochastic process, pattern recognition, intelligent computation, computer graphics, digital image processing foundation, wavelet analysis and partial differential equation numerical solution.

3.Situation & Policy (2 credits) and Mental Health Education (1 credit) are the required extracurricular courses.

4.The selected General Education Elective Courses and Personalized Elective Courses from the courses program by university must be different from the major undergraduate education plan in content.

学院教学责任人：何 朗
专业培养方案责任人：刘 扬

工程力学专业（卓越工程师班）2017 版本本科培养方案

Undergraduate Education Plan for Engineering Mechanics (Excellent Engineer Class) (2017)

专业名称	工程力学	主干学科	工程力学
Major	Engineering Mechanics	Major Disciplines	Engineering Mechanics
计划学制	四年	授予学位	工学学士
Duration	4 Years	Degree Granted	Bachelor of Engineering

最低毕业学分规定

Graduation Credit Criteria

课程分类 Course Classification 课程性质 Course Nature	通识教育课程 Public Basic Courses	专业教育课程 Specialized Courses	个性课程 Personalized Course	集中性实践教学环节 Practice Courses	课外学分 Study Credit after Class	总学分 Total Credits
必修课 Required Courses	29	62	\	30.5	\	170
选修课 Elective Courses	9	23.5	6	\	10	

一、培养目标与毕业要求

I Educational Objectives & Requirement

（一）培养目标

工程力学卓越工程师班培养具有高度的社会责任感，良好的科学、文化素养，系统掌握力学基础知识、基本理论和基本技能，富有创新意识和实践能力，身心健康，能够从事汽车科学研究和汽车整车及零部件设计开发、试验、制造等领域工作的应用创新型工程技术人才。本方案培养学生达到以下目标：

- （1） 具有良好的人文素养和工程职业道德，具备严谨求实和吃苦耐劳的工程师品质，能主动承担社会责任并积极服务于社会。
- （2） 具有较系统的工程力学专业基础知识，具备扎实的有限元分析模拟和力学实验测试能力，能从事车辆工程领域的科学研究、技术开发、力学测试和管理工作的。
- （3） 能利用多重技术手段和方法综合分析和解决复杂工程问题，能够在工作团队中作为技术骨干或管理者发挥作用。
- （4） 能适应社会发展及变革，了解学科前沿与发展趋势，具备创新精神和国际化视野，能够通过继续教育或其它学习渠道更新知识，实现能力和技术水平的提升。

Educational objectives

Engineering Mechanics Excellence Engineer Class trains innovative and technical talents with a high sense of social responsibility, good scientific and cultural literacy, systematic mastery of mechanics basic knowledge, basic theory and basic skills, innovative and practical ability, physical and mental health, able to engage in automotive science research and automotive vehicles and spare parts design and development, testing, manufacturing and other fields of application. The program is to develop students to achieve the

following goals:

1. Have a good humanistic accomplishment and professional ethics, have rigorous and realistic hard-working engineer quality, take the initiative to shoulder social responsibility and actively serve the society.
2. Having basic knowledge of mechanical engineering systematically, having strong ability of finite element calculation and analysis, being capable of doing test, scientific research, technology development and management work in vehicle engineering field
3. Be able to comprehensively analyze and solve complex engineering problems by means of multiple technical means and methods, and can play a role as technical backbone or manager in the work team.
4. Be able to adapt to social development and change, understand the cutting edge and development trend of disciplines, possess the innovative spirit and international vision, and be able to update their knowledge through continuous education or other learning channels to achieve the improvement of their abilities and skills.

(二) 毕业要求

- (1) **工程知识:** 能够将数学、自然科学、工程基础和力学专业知识用于解决复杂工程问题。
- (2) **问题分析:** 能够应用数学、自然科学和力学的基本原理, 结合对科技文献的研究结果, 识别、表达、并通过文献研究分析复杂工程问题, 以获得有效结论。
- (3) **设计(开发) 解决方案:** 能够设计针对复杂工程问题的解决方案, 设计满足特定需求的系统、单元(部件)或工艺流程, 并能够在设计环节中体现创新意识, 考虑社会、健康、安全、法律、文化以及环境等因素。
- (4) **研究:** 能够基于科学原理并采用科学方法对复杂工程问题进行研究, 包括设计实验、分析与解释数据、并通过信息综合得到合理有效的结论。
- (5) **使用现代工具:** 能够针对复杂工程问题, 开发、选择与使用恰当的技术、资源、现代工程工具和信息技术工具, 包括对复杂工程问题的预测与模拟, 并能够理解其局限性。
- (6) **工程与社会:** 能够基于工程相关背景知识进行合理分析, 评价专业工程实践和复杂工程问题解决方案对社会、健康、安全、法律以及文化的影响, 并理解应承担的责任。
- (7) **环境和可持续发展:** 能够理解和评价针对复杂工程问题的专业工程实践对环境、社会可持续发展的影响。
- (8) **职业规范:** 具有人文社会科学素养、社会责任感, 能够在工程实践中理解并遵守工程职业道德和规范, 履行责任。
- (9) **个人和团队:** 能够在多学科背景下的团队中承担个体、团队成员以及负责人的角色。
- (10) **沟通:** 能够就复杂工程问题与业界同行及社会公众进行有效沟通和交流, 包括撰写报告和设计文稿、陈述发言、清晰表达或回应指令。并具备一定的国际视野, 能够在跨文化背景下进行沟通和交流。
- (11) **项目管理:** 理解并掌握工程管理原理与经济决策方法, 并能在多学科环境中应用。
- (12) **终身学习:** 具有自主学习和终身学习的意识, 有不断学习和适应发展的能力。

Graduate requirements

1. **Engineering knowledge:** apply mathematics, natural science, engineering mechanics foundation and professional knowledge to solve complex engineering problems.
2. **Problem analysis:** the basic principle can be applied using mathematics, natural science and mechanics, combined with the research results of scientific literature, identification, expression, and through literature research and analysis of complex engineering problems, in order to obtain the effective conclusion.

3. **Design (development) solution:** to design solutions to complex engineering problems, designed to meet the specific needs of the system, the unit (or components) process, and can reflect the sense of innovation in the design process, considering the social, health and safety, legal, cultural and environmental factors.
4. **Research:** to study based on the principle of science and research on complex engineering problems by using scientific methods, including experimental design, analysis and interpretation of data, and get the rational conclusion through comprehensive information.
5. **The use of modern tools:** for complex engineering problems, development, selection and use of appropriate technology, resources, modern engineering tools and information technology tools, including the prediction and simulation of complex engineering problems, and to understand its limitations.
6. **Engineering and society:** be able to reasonably analyze related background knowledge based on the evaluation of professional engineering practice and complex engineering solutions to social, health, safety, law and culture, and understand the responsibilities.
7. **Environmental and sustainable development:** can affect the understanding and evaluation of professional engineering practice for complex engineering problems on the sustainable development of environment and society.
8. **Specification:** with the humanities and social science literacy, social responsibility, to comply with the occupation morals and norms of Engineering in engineering practice and understanding, and take responsibility.
9. **Individual and team:** assume individual, team members and responsible role in a multidisciplinary context to the team.
10. **Communication:** to communicate and exchange for complex engineering problems with industry peers and the public, including report writing and presentation, design statement and clear expression or respond to instructions. And have a certain international vision, able to communicate and exchange in the cross cultural background.
11. **Project management:** to understand and grasp the decision making method of project management and economic principle, and can be used in a multidisciplinary environment.
12. **Lifelong learning:** has the consciousness of independent learning and lifelong learning, be able to learn continuously and to adapt to the development.

附：培养目标实现矩阵

	培养目标 1	培养目标 2	培养目标 3	培养目标 4
毕业要求 1		√		
毕业要求 2		√	√	
毕业要求 3		√	√	
毕业要求 4		√	√	
毕业要求 5		√	√	
毕业要求 6	√		√	
毕业要求 7			√	√
毕业要求 8	√			
毕业要求 9	√		√	

	培养目标 1	培养目标 2	培养目标 3	培养目标 4
毕业要求 10	√		√	√
毕业要求 11		√		√
毕业要求 12				√

二、专业核心课程与专业特色课程

II Core Courses and Characteristic Courses

(一) 专业核心课程:

理论力学、材料力学、弹性力学、计算力学、振动力学、流体力学、实验力学

Core Courses:

Theoretical Mechanics, Mechanics of Materials, Elastic Mechanics, Computational Mechanics, Vibration Mechanics, Fluid Mechanics, Experimental mechanics.

(二) 专业特色课程:

汽车构造、汽车理论、机械设计力学基础、复合材料力学与结构设计、有限元分析与应用

Characteristic Courses:

Automobile Structure A, Theory of Automobile B, Fundamentals of Mechanical Design, Mechanics of Composite Materials and Structural Design, FEM Analysis and Application

附: 毕业要求实现矩阵:

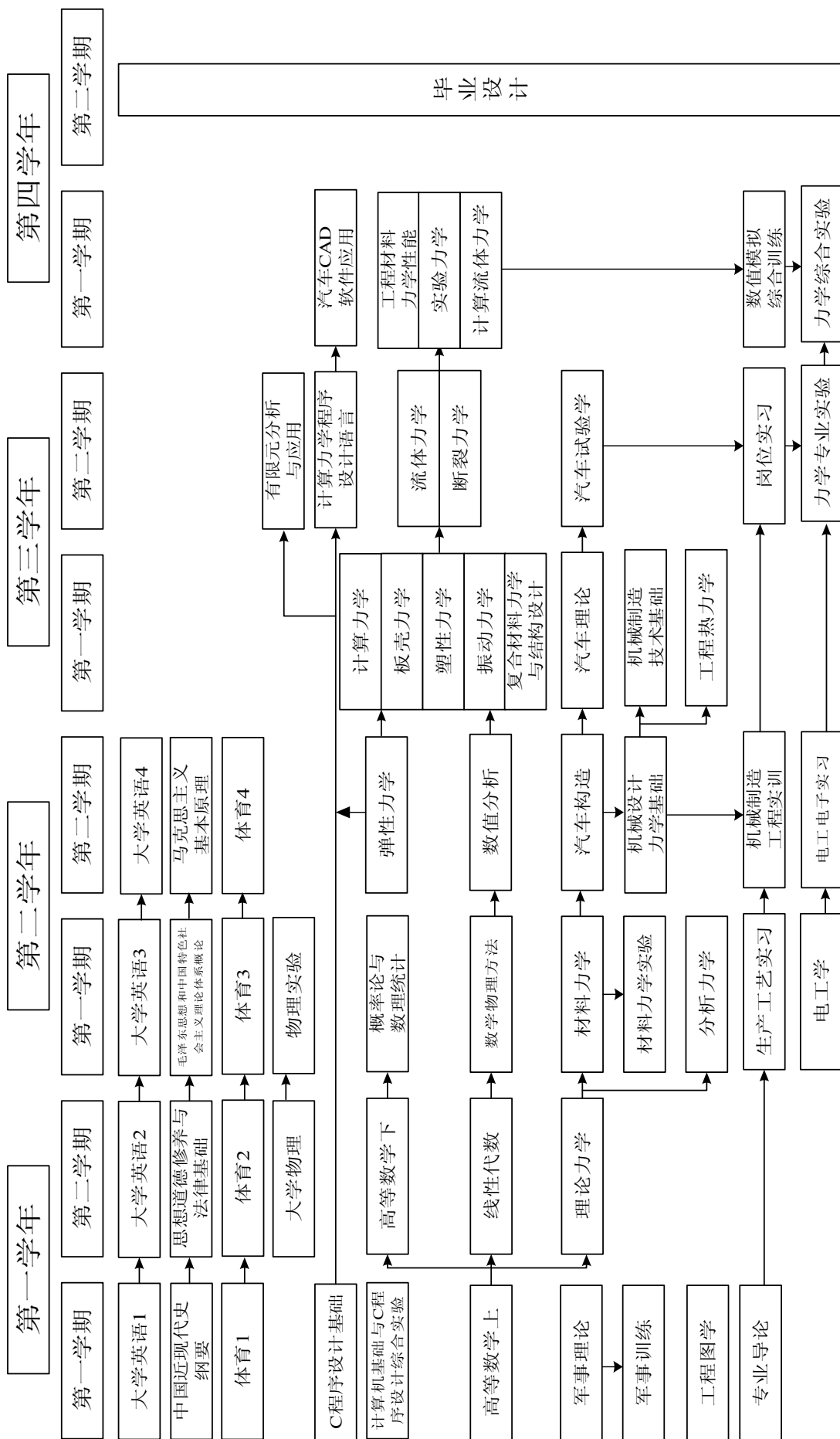
专业 核心 课程	专业 特色 课程	课程名称	工程力学专业(卓越工程师班)毕业要求											
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
		中国近现代史纲要			√			√	√					
		思想道德修养与法律基础			√			√		√			√	
		马克思主义基本原理			√			√	√			√		
		毛泽东思想和中国特色社会主义理论体系概论			√			√	√					
		军事理论									√			
		体育									√			
		大学英语				√						√		√
		C 程序设计基础					√							√
		计算机基础与 C 程序设计综合实验					√							√
		专业导论	√	√		√	√	√						
		工程图学	√				√							
		高等数学	√			√								
		线性代数	√											
		概率论与数理统计	√											
		电工学	√											

专业 核心 课程	专业 特色 课程	课程名称	工程力学专业(卓越工程师班)毕业要求											
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
		大学物理	√											
		物理实验	√											
√		理论力学	√	√	√	√								
√		材料力学	√	√	√	√								
		材料力学实验				√	√							
		数学物理方法	√											
√		弹性力学	√	√	√	√								
	√	汽车构造	√	√	√	√								
√		计算力学	√	√	√	√								
√		振动力学	√	√	√	√								
√		流体力学	√	√	√	√								
√		实验力学	√	√	√	√	√							
		分析力学	√	√	√	√								
		数值分析	√	√	√	√								
	√	机械设计力学基础	√	√	√	√								
		机械制造技术基础	√	√	√	√								
		板壳力学	√	√	√	√								
		塑性力学	√	√	√	√								
		工程热力学	√	√	√	√								
	√	复合材料力学与结构设计	√	√	√	√								
	√	汽车理论	√	√	√	√								
		断裂力学	√	√	√	√								
		计算力学程序设计语言	√		√		√							
	√	有限元分析与应用	√	√	√	√								
		汽车实验学		√	√		√							
		试验设计		√	√		√							
		计算流体力学	√	√	√	√								
		工程材料力学性能	√	√	√	√								
		汽车 CAD 软件应用	√	√	√	√								

专业 核心 课程	专业 特色 课程	课程名称	工程力学专业(卓越工程师班)毕业要求											
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
		军事训练									√	√		
		生产工艺实习			√		√							
		机械制造工程实训	√		√									
		电工电子实习	√		√									
		力学专业实验		√	√		√							
		岗位实习			√					√	√	√		
		数值模拟综合训练		√	√	√	√							
		力学综合实验		√	√		√							
		毕业设计		√	√	√	√	√	√	√		√		√

三、课程教学进程图

III Teaching Process Map



四、 理论教学建议进程表

IV Theory Course Schedule

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
			总学时 Tot hrs.	实验 Exp.	上机 Ope- ration	实践 Prac- tice	课外 Extra- cur		
(一) 通识教育必修课程 General Education Required Courses									
4220002110	中国近现代史纲要 Outline of Contemporary and Modern Chinese History	2	32					1	
4220001110	思想道德修养与法律基础 Morals, Ethics and Fundamentals of Law	3	48			8		2	
4220005110	马克思主义基本原理 Marxism Philosophy	3	48			8		3	
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		4	
1060003130	军事理论 Military Theory	1	32			16		1	
4210001170	体育 1 Physical Education I	1	26					1	
4210002170	体育 2 Physical Education II	1	34					2	
4210003170	体育 3 Physical Education III	1	34					3	
4210004170	体育 4 Physical Education IV	1	34					4	
4030002180	大学英语 1 College English I	3	60				12	1	
4030003180	大学英语 2 College English II	2	44				12	2	大学英语 1
4030004180	大学英语 3 College English III	2	44				12	3	大学英语 2
4030004180	大学英语 4 College English IV	2	44				12	4	大学英语 3
4120335170	C 程序设计基础 Foundation of C Program Design	2	32					1	
4120336170	计算机基础与 C 程序设计综合实验 Computer Basis and Comprehensive	1	32	32				1	
小 计 Subtotal		29	640	32	0	64	48		

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
			总学时 Tot hrs.	实验 Exp.	上机 Ope- ration	实践 Prac- tice	课外 Extra- cur		
(二) 通识教育选修课程 General Education Elective Courses									
创新创业类 Innovation and Entrepreneurship Courses		要求至少取得 9 个学分，且必须选修艺术体育类课程中的艺术类相关课程并取得至少 2 个学分，在创新创业类课程中至少选修一门课程，在人文社科类或经济管理类课程中至少选修一门。 Students are required to obtain at least 9 credits, which must cotain art courses of 2 credits from the category of Art and Physical Education Courses,at least one course from the category of Innovation and Entrepreneurship Courses, and at least one course from the category of Arts and Social Science Courses or the category of Economy and Management Courses.							
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									
(三) 专业教育必修课程 Basic Disciplinary RequiredCourses									
4050259110	专业导论 Introduction to Engineering Mechanics	1	16					1	
4080373170	工程图学 B Engineering Graphics	3.5	72				16	1	
4050063110	高等数学 A 上 Advanced Mathematics I	5	80					1	
4050064110	高等数学 A 下 Advanced Mathematics II	5	80					2	高等数学上
4050229110	线性代数 Linear Algebra	2.5	40					2	
4050129110	理论力学 A Theoretical Mechanics	4.5	72					2	
4050463130	大学物理 B Physics	5	80					2	
4050224110	物理实验 B Physics Lab.	1	32	32				3	大学物理
4050058110	概率论与数理统计 B Probability and Mathematics Statistic	3	48					3	
4100008110	电工学 Electronic Technology	3	48	8				3	
4050016110	材料力学 B Mechanics of Materials	4.5	72					3	理论力学
4050017110	材料力学 B 实验 Experiments of Materials Mechanics	1	32	32				3	
4050618170	数学物理方法 C Mathematical Physics Methods	2.5	40					3	高等数学 线性代数
4050025110	弹性力学 A Mechanics of Elasticity	4	64					4	理论力学 材料力学

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
			总学时 Tot hrs.	实验 Exp.	上机 Ope- ration	实践 Prac- tice	课外 Extra- cur		
4090037110	汽车构造 A Automobile Structure	4	64			4		4	
4050620170	计算力学 Computational Mechanics	3.5	56					5	数值分析 弹性力学
4050621170	振动力学 A Vibration Mechanics	3	48					5	理论力学 结构力学
4050135110	流体力学 B Fluid Mechanics	3.5	56	6				6	高等数学 理论力学
4050162110	实验力学 A Experimental Mechanics	2.5	40	8				7	材料力学 弹性力学
小 计 Subtotal		62	1040	86	0	4	16		
(四) 专业教育选修课程 Specialized Elective Courses									
4050622170	分析力学 Analysis Mechanics	2	32					3	高等数学 理论力学
4050185110	数值分析 B Numerical Analysis	2.5	40		8			4	高等数学 线性代数
4050098110	机械设计力学基础 Fundamentals of Mechanical Design	3.5	56	6				4	理论力学 材料力学
4080393170	机械制造技术基础 D Fundamentals of Mechanical Manufacturing Technology	2.5	40	6				5	机 械 设 计 力学基础
4050006110	板壳力学 Mechanics of Plates and Shells	2	32					5	材料力学 弹性力学
4050186110	塑性力学 Mechanics of Plasticity	2	32					5	材料力学 弹性力学
4090272170	工程热力学 C Engineering Thermodynamics	2	32	4				5	
4050626170	复合材料力学与结构设计 C Mechanics of Composite Materials and Structural Design	3	48					5	材料力学 弹性力学
4090043110	汽车理论 B Theory of Automobile	2	32					5	汽车构造
4050034110	断裂力学 Fracture Mechanics	2	32					6	弹性力学 塑性力学
4050115110	计算力学程序设计语言 Program Design Language for Computational Mechanics	3.5	56		20			6	数值分析 计算力学
4050627170	有限元分析与应用 C FEM Analysis & Application	3	48		16			6	弹性力学 计算力学
4090115120	汽车试验学 B Automobile Test	2	32					6	汽车构造

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
			总学时 Tot hrs.	实验 Exp.	上机 Ope- ration	实践 Prac- tice	课外 Extra- cur		
4050637170	试验设计 Experimental Design	2	32	4				6	概率论与数理统计
4050351110	计算流体力学 B Computational Fluid Mechanics	2	32					7	流体力学 计算力学
4050350110	工程材料力学性能 Mechanical Properties of Engineering Materials	2	32					7	材料力学 断裂力学
4090199150	汽车 CAD 软件应用 Automobile CAD Software Application	3	48		20			7	工程图学
小 计 Subtotal		41	656	20	64	0	0		
修读说明：要求至少选修 23.5 学分。 NOTE: Minimum subtotal credits:23.5.									
(五) 个性课程 Personalized Elective Courses									
4050052110	复变函数与积分变换 B Complex Variable Function and Integral Transformation	3	48					4	高等数学
4050632170	基础力学理论设计与操作 Basic Mechanics Theory Design and Operation	4	64					6	理论力学 材料力学
4050633170	基础力学理论设计与操作实验 Basic Mechanics Theory Design and Operation	1.5	48	48				6	理论力学 材料力学
小 计 Subtotal		8.5	160	48	0	0	0		
修读说明：学生从以上个性课程和学校发布的其它个性课程目录中选课，要求至少选修 6 学分。 NOTE: Students can select courses from above and the other personalized courses in catalog, and are required to obtain at least 6 credits.									

五、集中性实践教学环节

V Practice Schedule

课程编号 Course Number	实践环节名称 Practice Courses Name	学分 Crs	周数 Weeks	建议修读学期 Suggested Term
1060002110	军事训练 Military Training	1.5	3	1
4050353110	生产工艺实习 Production Craft Internship	1	1	3 (企业)
4080151110	机械制造工程实训 C Practice of Mechanical Manufacturing Engineering	2	2	4
4100069110	电工电子实习 B Practice of Electrical Engineering & Electronics	1	1	4

课程编号 Course Number	实践环节名称 Practice Courses Name	学分 Crs	周数 Weeks	建议修读学期 Suggested Term
4050539140	力学专业实验 Mechanics Specialized Experiments	2	2	6（企业）
4050540140	岗位实习 C Job Internship	5	5	6（假期）（企业）
4050638170	数值模拟综合训练 Comprehensive Training on Numerical Simulations	4	4	7（企业）
4050635170	力学综合实验 Comprehensive Experiments on Mechanics	2	2	7（分散）（企业）
4050636170	毕业设计 Graduation Design (Thesis)	12	17	8（企业）
小 计 Subtotal		30.5	37	

六、其它要求

VI Recommendations on Course Studies

- 1、《形势与政策》和《心理健康教育》课程为课外必修课程，分别计 2 个和 1 个课外学分。
- 2、学生选修的通识选修课程和从学校发布的个性课程目录中选修的个性课程，要求与本专业培养方案内设置的课程内容不重复。

1.Situation & Policy (2 credits) and Mental Health Education (1 credit) are the required extracurricular courses.

2.The selected General Education Elective Courses and Personalized Elective Courses from the courses program by university must be different from the major undergraduate education plan in content.

学院教学责任人：何 朗
专业培养方案责任人：张 梅

光电信息科学与工程专业（应用物理基地班）

2017 版本本科培养方案

Undergraduate Education Plan for Specialty in Photoelectric Information Science and Engineering (Applied Physics Experimental Class) (2017)

专业名称	光电信息科学与工程	主干学科	物理学
Major	Photoelectric Information Science and Engineering	Major Disciplines	Physics
计划学制	四年	授予学位	理学学士
Duration	4 Years	Degree Granted	Bachelor of Science

最低毕业学分规定

Graduation Credit Criteria

课程分类 Course Classification 课程性质 Course Nature	通识教育课程 Public Basic Courses	专业教育课程 Specialized Courses	个性课程 Personalized Course	集中性实践教学环节 Practice Courses	课外学分 Study Credit after Class	总学分 Total Credits
必修课 Required Courses	29.0	74.5	\	21.5	\	170.0
选修课 Elective Courses	9.0	20	6.0	\	10.0	

一、培养目标与毕业要求

I Educational Objectives & Requirement

（一）培养目标

本专业通过人文素养、职业规范、专业知识、实践技能和职业发展能力的专业教育和综合训练，培养具有现代科学意识和国际视野、理论基础扎实、专业口径宽、具备较强实践能力和创新精神，能适应社会经济发展需要，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工作的人才。也可以在本专业或其它相关专业继续深造，攻读硕士、博士学位。

学生毕业 5 年左右能达到以下目标：

- (1) 有良好的职业素养和社会责任感，有意愿并有能力服务社会；
- (2) 具有深厚的数学基础，掌握物理学的基本知识与原理、基本实验技能与技术，具备系统化的专业技能和实践能力，能够独立在应用物理学科、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工作的人才；
- (3) 具有科学思维和物理学研究方法的训练，具有科学精神、科学素养、科学作风和创新意识；
- (4) 能够通过继续教育或其它学习渠道更新知识，实现能力和技术水平的提升。

This undergraduate program is designed to train individuals who will have solid background in fundamentals of physics and special knowledge in related applications, who will have strong practical ability and innovative talent, and who will pursue careers in research, teaching, development and application of new technologies, and management in the fields of applied physics, interdisciplines and relevant science and technologies. The students can also continue to pursue their master or doctor degrees in this physics major or

other related majors.

The objectives are to train the individuals:

1. With good professionalism and sense of social responsibility, willing and able to serve the society.
2. To have good foundation of mathematics, to master the fundamentals and principles of physics, and to have basic experimental skills;
3. To have the way of scientific thinking and studying, to have scientific attitude and attainments, and to be innovative;
4. To have self-taught ability, hands-on skills, practical ability and ability to develop new technologies.

(二) 毕业要求

1. 具备扎实数学推演及计算能力，掌握宽厚的物理基础和一般性工程技术知识，了解应用物理重要研究方向的发展现状和发展趋势。

- 1.1 掌握数学和相关自然科学知识，具备较强的数学推导和计算能力。
- 1.2 掌握扎实的普通物理学知识，具备运用力、热、电、光等相关知识描述基本物理现象及建立模型的初步能力。
- 1.3 具备将物理模型归纳为数学模型，并通过计算机模拟、数值计算解决实际问题的初步能力。
- 1.4 了解应用物理专业有关特色研究方向重要领域的前沿动态和发展方向。

2. 系统掌握近现代物理科学的基础理论、应用物理专业知识，具有抽象思维能力和对基本物理问题的分析、解决能力。

- 2.1 掌握经典机械运动现象与规律的研究方法，培养处理物理问题的抽象思维能力。
- 2.2 掌握与电磁现象有关的基本规律，理解物质和时空概念，了解激光的应用领域、应用技术和发展动态。
- 2.3 掌握与热现象有关的基本原理及其处理方法，初步具备处理现代物理学中相变、凝聚相关基本问题的能力。
- 2.4 掌握利用量子理论描述微观世界基本规律的方法及原理，揭示原子、分子层次的物质微观结构、运动规律，了解凝聚态物质性质的基本理论和典型模型。
- 2.5 掌握应用物理相关专业知识，具备运用物理学的原理知识，建立物理模型，解释自然现象、规律的初步能力。
- 2.6 了解、掌握近代物理学发展过程、脉络体系，培养物理学抽象思维能力，和能够将近代物理知识体系融会贯通解决实际问题能力。
- 2.7 不断获取新的科学技术知识，培养自我更新知识体系和知识结构、适应科学发展的能力。
- 2.8 具备能够阅读专业领域的主要学术专著和研究前沿文献、专业评论、了解专业发展方向的能力。

3. 具备基本实验技能、实践动手能力、观察分析能力和创新能力。

- 3.1 掌握基础物理、近代物理实验方法与技能，熟悉常用实验仪器和设备的工作原理和使用方法，具备一定实验思维能力。
- 3.2 熟悉电工学、电子工艺和技术等当代实用技术，具备初步的电子元器件认识、设计能力。
- 3.3 掌握前沿物理实验研究领域及方法，培养学生较高的科学素养和科技研发能力。
- 3.4 能够综合运用所学知识开展实验研究，搭建自有探索、自由发展兴趣的实验平台，培养研究型自主创新能力。

4. 具有科技工作者所必须的责任担当，以及贡献社会、服务社会的意识。

- 4.1 具有良好的思想素质、文化修养、社会道德等人文素养。
- 4.2 具备技术伦理学知识，能够认识技术发展可能带来的社会问题，并加以判断和自我约束。
- 4.3 具备良好军事技能、心理承受能力以及应对突发事件和危机的能力。

4.4 熟悉国家的基本法律、法规，遵守职业行为准则，并在法律和制度的框架下开展工作。

5. 具有良好的沟通 and 交流能力。

5.1 掌握文献检索、资料查询及运用现代信息技术跟踪并获取信息的方法。

5.2 至少熟练掌握一门外国语，并能进行有效的技术沟通 and 交流。

5.3 能够使用物理学专业术语，进行有效沟通 and 交流。

5.4 具有团队合作和协作能力，并在团队中发挥骨干作用；具有一定的组织管理能力、较强的自我控制能力和人际交往能力；具有较强的适应能力，自信、灵活地处理新的人际环境和职场环境。

5.5 具有国际视野和跨文化的交流、竞争与合作能力。

6. 具有自主学习和终身学习的意识，具有提高自主学习和适应光电信息工程新发展的能力。

6.1 理解和主动关注社会发展方向和应用物理前沿的发展趋势。

6.2 具有强健的体魄、良好的自我管理能力和自主学习能力，进行自我能力提升。

II. Graduation requirements

1. Having solid mathematical deduction and calculation ability, master the broad physical foundation and general engineering technology knowledge, understand the development status and development trend of the important research direction of Applied Physics.

1.1 Mastering mathematics and related natural science knowledge, and have strong ability of mathematical deduction and computation.

1.2 Mastering solid knowledge of general physics, having the basic knowledge of power, heat, electricity and light to describe basic physical phenomena and the ability to build models.

1.3 Having the ability to induce physical models into mathematical models and solve practical problems through computer simulation and numerical computation.

1.4 Understand the frontiers and trends of Applied Physics in the important field of characteristic research.

2. With basic theories of modern physical science and the professional knowledge of Applied Physics. Having the ability of abstract thinking and the ability to analyze and solve the basic physical problems.

2.1 Master the research methods of classical mechanical movement phenomena and rules, and cultivate the abstract thinking ability of dealing with physical problems.

2.2 Grasp the basic laws related to electromagnetic phenomena, understand the concept of matter and space-time, and understand the application field, application technology and development trend of lasers.

2.3 Grasp the basic principles and processing methods related to thermal phenomena, and initially have the ability to deal with the basic problems of phase transformation and cohesion in modern physics.

2.4 Master the method and principle of using quantum theory to describe the basic law of the microcosmic world, reveal the microscopic structure of the material at the atomic and molecular level, the law of motion, and understand the basic theory and typical model of the properties of the condensed matter.

2.5 Master relevant knowledge of Applied Physics, have the ability to apply physical knowledge, establish physical models, explain natural phenomena and laws.

2.6 Understand and master the development process of modern physics, the system of context, the ability to cultivate abstract thinking in physics, and the ability to integrate the modern physical knowledge system to solve practical problems.

2.7 Constantly acquire new knowledge of science and technology, cultivate self-renewal knowledge system and knowledge structure, and adapt to the ability of scientific development.

2.8 Having the ability to read major academic monograph and research frontiers, professional reviews

and understand the direction of professional development.

3. With basic experimental skills, practical operation ability, observation and analysis ability and innovative ability.

3.1 Mastering basic physics, modern physics experiment methods and skills, familiar with the working principles and methods of common experimental instruments and equipment, and have certain experimental thinking ability.

3.2 Be familiar with modern practical technology such as electrotechnics, electronic technology and technology. I have the preliminary understanding and design ability of electronic components.

3.3 Grasp the frontier physics experiment research field and method, cultivate students' high scientific literacy and R & D capability.

3.4 Make full use of our knowledge to carry out experimental research, build our own exploration and free development interest platform, and cultivate research independent innovation ability.

4. Responsibility of scientists and technicians, and the consciousness of contributing to the society and serving the society.

4.1 Good humanistic quality, such as ideological quality, cultural accomplishment and social morality.

4.2 Having the knowledge of technological ethics, can recognize the social problems that may bring about technological development, and make judgement and self-restraint.

4.3 Having good military skills, psychological endurance and coping with unexpected events and crises.

4.4 Be familiar with the basic laws and regulations of the state, abide by the code of professional conduct, and work under the framework of law and system.

5. Good communication ability.

5.1 Mastering the methods of literature search, data inquiry and tracking and obtaining information by modern information technology.

5.2 At least proficient in a foreign language, and can effectively communicate with technology.

5.3 Be able to use physical terminology for effective communication and communication.

5.4 Ability of teamwork and collaboration, and play a key role in the team; have a certain organizational and management ability, strong self-control ability and interpersonal skills; have strong adaptability, confidence and flexible handling of the new interpersonal environment and workplace environment.

5.5 Ability of international vision and cross-cultural communication, competition and cooperation.

6. With the consciousness of self-learning and lifelong learning, and have the ability to improve self-learning and adapt to the new development of Optoelectronic Information Engineering.

6.1 Understand and take the initiative to pay attention to the trend of social development and Applied Physics frontiers.

6.2 Solid physique knowledge, good self-management and self learning ability, and improvement of self ability.

附：培养目标实现矩阵

	目标 1	目标 2	目标 3	目标 4		目标 1	目标 2	目标 3	目标 4
毕业要求 1.1		√	√		毕业要求 3.3		√	√	
毕业要求 1.2		√	√		毕业要求 3.4		√	√	√

	目标 1	目标 2	目标 3	目标 4		目标 1	目标 2	目标 3	目标 4
毕业要求 1.3		√	√		毕业要求 4.1	√			
毕业要求 1.4		√		√	毕业要求 4.2	√			
毕业要求 2.1		√	√		毕业要求 4.3	√			
毕业要求 2.2		√	√		毕业要求 4.4	√		√	
毕业要求 2.3		√	√		毕业要求 5.1			√	√
毕业要求 2.4		√	√		毕业要求 5.2			√	√
毕业要求 2.5		√	√		毕业要求 5.3			√	√
毕业要求 2.6		√	√	√	毕业要求 5.4			√	√
毕业要求 2.7		√	√	√	毕业要求 5.5			√	√
毕业要求 2.8		√	√	√	毕业要求 6.1		√		√
毕业要求 3.1		√	√	√	毕业要求 6.2		√		√
毕业要求 3.2		√	√						

二、专业核心课程与专业特色课程

II Core Courses and Characteristic Courses

(一) 专业核心课程:

专业核心课程: 数学物理方法、理论力学、热力学与统计物理、电动力学、量子力学、近代物理实验等。

Core Courses: Method of Mathematical Physics, Theoretical Mechanics, Thermodynamics and Statistical Physics, Electrodynamics, Quantum Mechanics, Modern Physical Experiments, etc.

(二) 专业特色课程:

专业特色课程: 半导体物理、固体物理、计算物理、材料物理、理论物理综合、凝聚态物理综合等。

Characteristic Courses: Semiconductor Physics, Solid State Physics, Computational Physics, Materials Physics, Integrated Theoretical Physics, Integrated Condensed Matter Physics etc.

附: 毕业要求实现矩阵

光电信息科学与工程专业（应用物理基地班）毕业要求																														
专业 核心 课程	专业 特色 课程	课程名称	1.1	1.2	1.3	1.4	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	4.5	5.1	5.2	5.3	5.4	5.5	6.1	6.2
		思想道德修养与法律基础																	√	√		√								
		中国近现代史纲要																	√	√		√								
		毛泽东思想和中国特色社会主义理论体系概论																	√	√		√								
		马克思主义基本原理																	√	√		√								
		军事理论																			√									
		体育 1-4																												
		通识类课程																	√	√		√								√
		心理健康教育																			√									
		大学英语 1-4																							√					
		C 程序设计基础			√								√																	
		高等数学上、下	√																											
		计算机基础与 C 程序设计综合实验		√									√																	
		专业导论				√								√																
		线性代数	√																											
		概率论与数理统计	√																											
		物理实验 1、2													√		√	√												
		模拟电子技术基础													√		√	√												
		模拟电子技术基础实验													√		√	√												

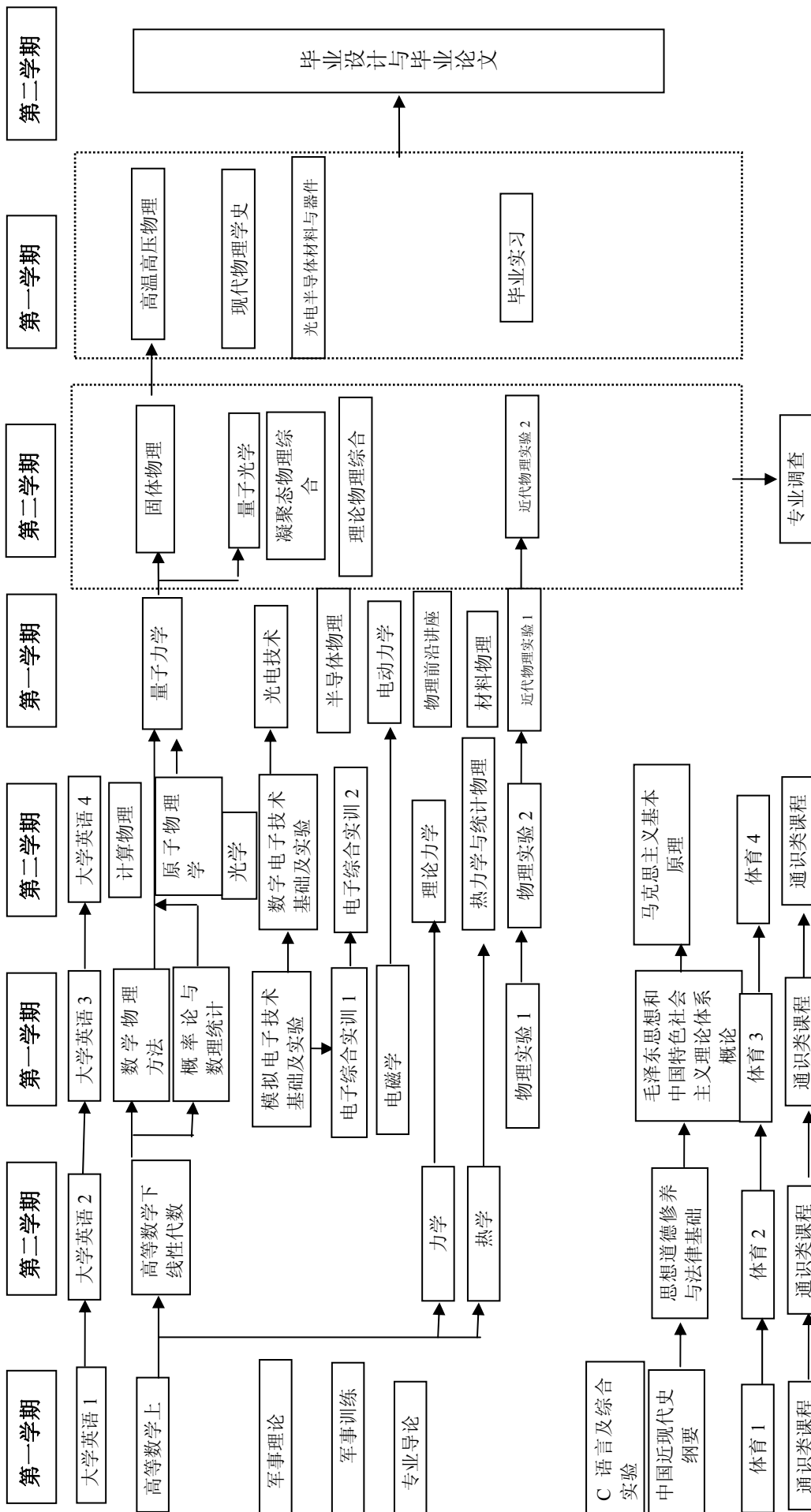
光电信息科学与工程专业（应用物理基地班）毕业要求																															
专业 核心 课程	专业 特色 课程	课程名称	1.1	1.2	1.3	1.4	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	4.5	5.1	5.2	5.3	5.4	5.5	6.1	6.2	
√		数学物理方法	√	√																											
		数字电子技术基础													√	√	√	√													
		数字电子技术基础实验													√	√	√	√													
		力学		√			√				√	√																			
		热学		√					√		√	√																			
		电磁学		√				√			√	√																			
		光学		√						√	√	√																			
		原子物理学		√						√	√																				
	√	半导体物理		√						√	√	√	√	√																	
√		理论力学		√			√				√	√	√	√																	
√		电动力学		√				√			√	√	√	√																	
√		热力学与统计物理		√					√		√	√	√	√																	
		量子力学		√						√	√	√	√	√																	
	√	固体物理		√						√	√	√	√	√																	
	√	计算物理		√						√	√	√	√	√																	
√		近代物理实验 1、2													√	√	√	√													
		光电技术		√							√	√	√	√																	
		高温高压物理专题		√							√	√	√	√																	
√		量子光学		√							√	√	√	√																	

			光电信息科学与工程专业（应用物理基地班）毕业要求																												
			1.1	1.2	1.3	1.4	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	4.5	5.1	5.2	5.3	5.4	5.5	6.1	6.2	
专业 核心 课程	专业 特色 课程	课程名称																													
		物理前沿讲座										√	√																	√	
	√	材料物理		√							√	√	√																	√	
	√	理论物理综合		√							√	√	√																	√	
	√	凝聚态物理综合		√							√	√	√																	√	
		光电半导体材料与器件		√							√	√	√																	√	
		现代物理学史		√							√	√	√																	√	
		军事训练																													
		电工电子实习																													
		电子综合实训																													
		光电综合实训																													
		专业调查																													
		毕业实习																													
		毕业论文																													

三、课程教学进程图

III Teaching Process Map

第 一 学 年 第 二 学 年 第 三 学 年 第 四 学 年



四、 理论教学建议进程表

IV Theory Course Schedule

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
			总学时 Tot hrs.	实验 Exp.	上机 Ope- ration	实践 Prac- tice	课外 Extra- cur		
(一) 通识教育必修课程 General Education Required Courses									
4220001110	思想道德修养与法律基础 Morals, Ethics and Fundamentals of Law	3	48			8		2	
4220002110	中国近现代史纲要 Outline of Contemporary and Modern Chinese History	2	32					1	
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		4	
4220005110	马克思主义基本原理 Marxism Philosophy	3	48			8		3	
1060003130	军事理论 Military Theory	1	32				16	1	
4210001170	体育 1 Physical Education I	1	26					1	
4210002170	体育 2 Physical Education II	1	34					2	
4210003170	体育 3 Physical Education III	1	34					3	
4210004170	体育 4 Physical Education IV	1	34					4	
4030002180	大学英语 1 College English I	3	60				12	1	
4030003180	大学英语 2 College English II	2	44				12	2	大学英语 1
4030004180	大学英语 3 College English III	2	44				12	3	大学英语 2
4030004180	大学英语 4 College English IV	2	44				12	4	大学英语 3
4120335170	C 程序设计基础 Fundamentals of Computer Program Design(C)	2	32					1	
4120336170	计算机基础与 C 程序设计综合实验 Comprehensive Experiment on Fundamentals of Computer and Program Design (C)	1	32	32				1	
小 计 Subtotal		29	640	32	0	48	64		

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
			总学时 Tot hrs.	实验 Exp.	上机 Ope- ration	实践 Prac- tice	课外 Extra- cur		
(二) 通识教育选修课程 General Education Elective Courses									
创新创业类 Innovation and Entrepreneurship Courses		要求至少取得 9 个学分，且必须选修艺术体育类课程中的艺术类相关课程并取得至少 2 个学分，在创新创业类课程中至少选修一门课程，在人文社科类或经济管理类课程中至少选修一门。 Students are required to obtain at least 9 credits, which must cotain art courses of 2 credits from the category of Art and Physical Education Courses,at least one course from the category of Innovation and Entrepreneurship Courses, and at least one course from the category of Arts and Social Science Courses or the category of Economy and Management Courses.							
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									
(三) 专业教育必修课程 Basic Disciplinary RequiredCourses									
4050337110	专业导论 Introduction to Materials Physics	1	16					1	
4050063110	高等数学 A 上 Advanced Mathematics I	5	80					1	
4050064110	高等数学 A 下 Advanced Mathematics II	5	80					2	高等数学上
4050229110	线性代数 Linear Algebra	2.5	40					2	
4050533140	力学 C Mechanics	4	64					2	
4050534140	热学 A Thermology	3	48					2	
4050546140	电磁学 A Electromagnetics	4	64					3	
4050058110	概率论与数理统计 B Probability and Mathematical Statistics	3	48					3	
4050182110	数学物理方法 A Method of Mathematical Physics	4.5	72					3	高等数学上、下
4110049110	模拟电子技术基础 B Fundamentals of Analog Electronic Circuit	3.5	56					3	
4110051110	模拟电子技术基础实验 Experiments of Analog Electronic Circuit	0.5	16	16				3	
4050466130	物理实验 A 上 Physics Lab. I	1	32	32				3	
4050467130	物理实验 A 下 Physics Lab. II	1	32	32				4	物理实验上
4110067110	数字电子技术基础 B Fundamentals of Digital Electronic Circuit	3.5	56					4	

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
			总学时 Tot hrs.	实验 Exp.	上机 Ope- ration	实践 Prac- tice	课外 Extra- cur		
4110068110	数字电子技术基础实验 Experiments of Digital Electronic Circuit	0.5	16	16				4	
4050547140	光学 A Optics	4	64					4	
4050587150	原子物理学 B Atomic Physics	3	48					4	
4050549140	理论力学 C Theoretical Mechanics	4	64					4	力学
4050554140	计算物理 Computational Physics	3	48					4	
4050551140	热力学与统计物理 A Thermodynamics and Statistical Physics	4	64					4	热学
4050550140	电动力学 A Electrodynamics	4	64					5	电磁学
4050586140	量子力学 D Quantum Mechanics	4.5	72					5	数学物理方法
4050555140	近代物理实验 A1 Lab of Modern Physic I	1	32	32				5	物 理 实 验 上、下
4050556140	近代物理实验 A2 Lab of Modern Physics II	1	32	32				6	物 理 实 验 上、下
4050553140	固体物理 A Solid State Physics	4	64					6	量子力学
小 计 Subtotal		74.5	1272	160	0	0	0		
(四) 专业教育选修课程 Specialized Elective Courses									
4050079110	光电技术 B Optoelectronic Technology	2.5	40					5	光学
4050008110	半导体物理 A Semiconductor Physics	3	48					5	量子力学
4050562140	物理前沿讲座 Advanced Special Topics of Physics	2	32					5	
4050535140	材料物理 Materials Physics	3	48					5	固体物理
4050561140	量子光学 Quantum Optics	3	48					6	量子力学、 光学
4050668170	理论物理综合 Integrated Theoretical Physics	5	80					6	量子力学
4050564140	凝聚态物理综合 Integrated Condensed Matter Physics	4	64					6	量子力学

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
			总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur		
4050669170	现代物理学史 History of Modern Physics	1	16					7	
4050560140	高温高压物理专题 Topics of High-Temperature and High-Pressure Physics	3	48					7	
4050565140	光电半导体材料与器件 Photoelectric Semiconductor Materials and Devices	3	48					7	半导体物理
小 计 Subtotal		29.5	472	0	0	0	0		
修读说明：要求至少选修 20 学分。 NOTE: Minimum subtotal credits:20.									
(五) 个性课程 Personalized Elective Courses									
4050594150	同步辐射应用基础 Basic Theory and Application of Synchrotron Radiation	3	48					6	
4050103110	激光原理与技术 A Technology and Application of lasing cooling	3	48					7	
修读说明：学生从学校发布的个性课程目录中选课，要求至少选修 6 学分。 NOTE: Students can select courses from the personalized courses in catalog, and are required to obtain at least 6 credits.									

五、集中性实践教学环节

V Practice Schedule

课程编号 Course Number	实践环节名称 Practice Courses Name	学分 CrS	周数 Weeks	建议修读学期 Suggested Term
1060002110	军事训练 Military Training	1.5	3	1
4100068110	电工电子实习 A Practice of Electrical Engineering & Electronics	2	2	3
4050616170	电子综合实训 C Comprehensive Training of Electronics	1	1	4
4050646170	光电综合实训 Photoelectric Comprehensive Training	2	2	5
4050320110	专业调查 Professional Investigation	2	2	6
4050277110	毕业实习 Internship	2	2	7
4050430120	毕业设计 Graduation Thesis	11	17	8
小 计 Subtotal		21.5	29	

六、其它要求

VI Recommendations on Course Studies

- 1、《形势与政策》和《心理健康教育》课程为课外必修课程，分别计 2 个和 1 个课外学分。
 - 2、学生选修的通识选修课程和从学校发布的个性课程目录中选修的个性课程，要求与本专业培养方案内设置的课程内容不重复。
 - 3、在专业选修课程中，侧重于理论物理方向的学生建议系统修读量子光学和理论物理综合等课程；侧重于材料与应用物理方向的学生建议修读高温高压物理专题、半导体物理、凝聚态物理综合、材料物理和激光原理与技术等课程。
- 1.Situation & Policy (2 credits) and Mental Health Education (1 credit) are the required extracurricular courses.
 - 2.The selected General Education Elective Courses and Personalized Elective Courses from the courses program by university must be different from the major undergraduate education plan in content.
 - 3.When taking specialized courses, students oriented in Theoretical Physics are suggested to choose Quantum Optics, and Comprehensive Theoretical Physics, etc. While students oriented in Material and Applied Physics are suggested to choose High Temperature and High Pressure Physics, Introduction of Plasma Physics, Semiconductor Physics, Condensed Matter Physics and Principles and Techniques of Laser, etc.

学院教学责任人：何 朗
专业培养方案责任人：郭 斌