

武汉理工大学理学院  
School of Science of  
Wuhan University of Technology

# 2015 版本本科培养方案

## Undergraduate Education Plan (2015)

武汉理工大学教务处  
Academic Affairs Office of Wuhan University of Technology

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# 【光电信息科学与工程专业】2015 版本本科培养方案

## Undergraduate Education Plan for Specialty in Photoelectric Information Science and Engineering (2015)

专业名称	光电信息科学与工程	主干学科	光学与光电子学, 电子与信息科学
Major	Photoelectric Information Science and Engineering	Major Disciplines	Optics and Optoelectronics, Electronic and Information 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	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

课程类 Course Classification 课程性质 Course Nature	通识课程 Public Basic Courses	学科大类课程 Basic Disciplinary Courses	专业课程 Specialized Courses	个性课程 Personalized Course	集中性实践 Practice Courses	课外学分 Study Credit after Class	总学分 Total Credits
必修课 Required Courses	35	46	43.5	\	21.5	\	190
选修课 Elective Courses	9	\	15	10	\	10	

### 一、培养目标与毕业要求

#### I Educational Objectives & Requirement

##### (一) 培养目标

本专业的培养目标为:

- 1) 以光学和信息科学为核心, 着重培养学生的基础理论、基础知识、基本技能、科研与工程创新以及管理能力。
- 2) 培养具有较高思想道德和文化修养、敬业精神和责任感, 具有健康的体魄和良好的心理素质的高级专业人才。
- 3) 培养具备光电信息科学与工程方面知识和能力的厚基础、高素质、有创新意识和实践能力的高级专业人才。

学生主要学习光电信息科学与工程的基本理论和基本知识, 接受光电信息系统分析、设计和研究方法等方面的基本训练, 具有研究、设计、开发、集成及应用光电信息系统的基本能力。学生毕业后能在光学、光电子学及电子信息、计算机科学等领域(特别是光机电算一体化产业)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等工作。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。

Educational objectives for Specialty in photoelectric information science and engineering are:

- 1) Based on optics and information science, focusing on students' basic theories, basic knowledge and basic skills, researching and engineering innovation, and management capabilities;

- 2) graduates should have higher moral and cultural enrichment, professionalism and social responsibility, with good health and good mental qualities;
- 3) Cultivating thick foundation with photoelectric information science and engineering knowledge and ability, high-quality, innovation and practical ability of senior professionals.

Students of this program are mainly required to acquire basic theories and knowledge of photoelectric information science and engineering, who will receive the basic training of the analysis, training design and research method, and have competency for science research, designing, developing, the integration and application of photoelectric information system. They can do research, product design, production technology or management in the field of optics, optoelectronics, electronic information and computer science, also can continue to study in this major or other related majors.

## (二) 毕业要求

本专业学生主要学习光电信息科学与工程的基础理论和技术,熟悉光学、电子技术和计算机技术,接受科学实验与科学思维的训练,具备本学科及相关领域的科学研究与技术开发的能力。

1、掌握光电信息科学与工程的基础知识、操作技能和工程方法,了解光电信息工程领域的新产品、新技术、新工艺以及技术发展趋势。

① 以数学、物理学和相关自然科学为基础,掌握从事光电信息科学与工程工作所需的自然科学知识。

② 掌握电路原理、电子技术、光电技术、光纤技术、光学仪器原理与技术、激光原理与技术、微处理器与微控制器理论、计算机技术等与光电信息科学与工程相关的工程技术知识,侧重于应用工程技术知识解决实际工程问题。熟练掌握一门计算机语言的编程和一种光学系统设计软件,具有在工程实践中应用的能力。

③ 熟悉电气工程相关标准,熟练掌握基本工程制图。

④ 具备较丰富的工程经济、管理、社会学、情报交流、法律、环境等人文与社会学的知识。

⑤ 通过学习电工电子类基础课程,掌握电路原理、模拟电子技术、数字电子技术等课程知识,熟悉其实验方法和技术。

⑥ 通过学习微机类课程,掌握微机原理与接口技术、微处理器与微控制器技术等课程知识,熟悉微机应用系统、计算机控制系统的设计与开发技术。

⑦ 通过学习光学和光电类基础课程,掌握应用光学、物理光学、信息光学、光电技术、光纤光学、激光原理等课程知识,熟悉其基本原理及实验方法。

⑧ 通过课程实验、综合实验与实训、专业调查、专业实习、实用技术讲座、毕业设计、科研实践等环节,熟练掌握光电信息工程应用的场合、过程、方法、结论等相关技术。

⑨ 熟悉光电信息工程领域的技术标准;了解光电信息科学与工程的发展现状和趋势动态,了解新技术、新产品、新方法;了解光信息科学与工程领域的技术标准、质量管理和质量保证体系以及法律法规。

2、具备运用理论和实践方法解决光电信息科学与工程实际问题的能力,在光电信息系统分析、设计、开发等方面的实践能力得到系统化训练。

① 了解市场、用户的需求变化以及技术发展,具备初步的光电子产品和光电系统开发的策划能力。

② 能参与光电系统产品开发的工程解决方案的制定,能考虑成本、质量、环保性、安

全性、可靠性、外形、适应性等因素，寻找、选择和评估完成光电系统产品开发任务所需的技术、工艺和方法，具备初步的制定光电系统产品设计的工程解决方案的能力。

③ 具有较强的光电产品设计能力，具有较强的创新意识和进行光学系统和光电产品创新设计的初步能力。

### 3、参与项目及工程管理。

① 具有较强的质量意识，能在项目的实施中自觉地贯彻质量标准，保证工作质量；具有较强的环境意识，能在项目的实施中自觉执行环保标准，具有使用环保材料、环保技术、节能技术进行光电子产品设计的初步能力；具有较强的职业健康安全意识，能在项目实施中严格执行安全规范，养成保证职业健康和安全的的工作习惯，具有应用人机工程和安全工程进行光电子产品设计的初步能力；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。

② 能运用经济管理知识，具有项目预算和光电信息系统成本核算的初步能力；能运用生产管理知识，具有制定光电子产品生产计划和进行生产管理的初步能力。

③ 具有一定的组织管理能力和进行项目任务分解、人力和资源调度的初步能力；具有团队协作精神，参与团队管理、协调团队工作，确保工作进度。

④ 具备应对危机与突发事件的初步能力，能根据用户或市场需求变化提出变更光电信息系统产品设计任务书、项目实施计划等方面的建议；能根据光电信息系统质量标准变化提出修改项目技术指标和质量标准的建议；能根据市场价格和项目预算的变化变化提出调整预算、节省开支方面的建议。

⑤ 能够发现国家产业政策、经济政策、行政条例、法规等方面的变化，并能根据变化提出项目变更、项目申报审批等方面的建议；参与评估项目，提出改进建议。

### 4、有效的沟通与交流能力和较强的获取知识、终身学习的能力。

① 能够使用技术语言，在跨文化环境下进行沟通与表达；能够进行工程文件的编纂，如：可行性分析报告、项目任务书、投标书等，并可进行说明、阐释。

② 能够运用英语进行与光电信息工程技术方面的表达、沟通和交流。

③ 具备团队合作精神，并具备一定的协调、管理、竞争与合作的初步能力；具备较强的人际交往能力，能够控制自我并了解、理解他人需求和意愿；具备较强的适应能力，自信、灵活地处理新的和不断变化的人际环境和工作环境；

④ 能够跟踪光电信息工程领域最新技术发展趋势，了解和学习光电信息工程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。

⑤ 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。

### 5、具备良好道德和较强的责任感。

① 具有良好的社会道德，自觉遵守社会行为规范和法律法规，为人正直、诚实守信。

② 具有良好的职业道德规范，自觉遵守所属职业体系的职业行为准则。

③ 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。

④ 具有较强的工作责任感，在工作质量、工作效率、工作纪律、职业健康安全、维护企业形象、关注企业发展等方面体现对工作、对企业的责任。

Students of this program are mainly required to acquire basic theories and technology of photoelectric information science and engineering, they will be familiar with optics, electronics and computer technology, receive science basic trainings on scientific experiment and thinking, and have competency for science research and technological development.

1. Mastering basic knowledge, experimental skill and engineering methods of photoelectric

information science and engineering, acquiring its new product, new technology, new process and technology development trend.

① Based on mathematics, physics and related science, acquiring the science knowledge of photoelectric information science and engineering.

② Mastering circuit principle, electronic circuit, optoelectronic technology, fiber technology, principles and technology of optical instrument, principles and techniques of laser, theory of microprocessor and microcontroller, techniques of computer and knowledge of engineering technique related to photoelectric information science and engineering.

③ Familiar with electrical engineering related standards, mastering the basic engineering drawing.

④ With the rich knowledge of humanistic and social, such as engineering economics, management, sociology, information exchange, law, environment etc.

⑤ Mastering basic principles and professional knowledge of circuit principle, analog electronic circuit and digital electronic circuit by studying the basic course of electrical engineering and electronics.

⑥ Familiar with microcomputer application system, the design and development of the technology of computer control system through the study of computer courses.

⑦ Through the study of optics and electro-optical foundation course, master the curriculum knowledge such as applied optics, physics optics, informational optics, optoelectronic technology, fiber optics and principle of laser etc, familiar with the experimental method.

⑧ Through the study of the experiment, comprehensive experiment and training course, professional research and practice, practice technical seminars, graduation thesis, research practice etc., mastering application occasion, process, method conclusion and related technology of photoelectric information science and engineering.

⑨ Familiar with the technical standard of photoelectric information science and engineering, understanding the current situation and development trend of dynamic, new technology, new product, technical standard of engineering field etc.

2. Have the ability to use the theory and practice of the method of solving problem, get systematic training in the analysis, designing and developing of photoelectric information system practice ability.

① To understand the change of the market, the needs of the users and the development of technology, with photoelectron product preliminary and photoelectric system development planning ability.

② With the ability participate in the photoelectric system product development of engineering solutions, make a photoelectric system product design and engineering solutions of the initial preparation.

③ Obtaining the ability of designing photoelectric product, with a strong sense of innovation and the basic ability of innovation designing optical system and photoelectric product.

3. Take part in project and engineering administration

① Students should have a better quality sense and automatically adhere to the quality standard in the project implementation to ensure working quality. They should have better environmental sense and automatically carry out environmental standard. They should have basic ability of using environmental material, environmental technology and conservation technology to proceed the optoelectronic products design. They should have better safe sense about professional

health and strictly carry out safety norms in the project implementation to form a working habit of ensuring professional health and safety. They should have basic ability to apply man-machine engineering and safety engineering to electronic products design. They should have better law sense and work with certain related criteria and process in the category of law and rule.

② Students should have the ability to utilize economic administration knowledge and have basic ability of project budget and optoelectronic products cost calculation. They should have the ability to utilize producing administration knowledge and have the basic ability to make optoelectronic products producing plan and process producing administration.

③ Students should have certain organizing and administration ability and have basic ability to proceed project task decomposition, human power and resource adjustment. They should have team cooperation spirit to take part in team management and coordinate team work to ensure working schedule.

④ Students should have basic ability to deal with crisis and accidents. They should be able to find out the change of user or market demands and propose a suggestion about changing optoelectronic information system products design task book and project implementation plan according to the changes. They should be able to find out the changes of optoelectronic information system products quality standard and propose a suggestion about changing project technology standard and quality standard. They should be able to find out the changes of market price and project budget and propose a suggestion about adjusting budget and saving cost according to the changes.

⑤ Students should be able to find out the changes in national industrial strategy, economic policy, executive practices and law rules and propose a suggestion about project changes and project declaration for approval according to the changes. They should take part in the assessment of projects and propose an improving suggestion.

4. Have efficient communication ability and better knowledge acquiring and lifelong learning ability.

① Students should be able to use technological language for communicating and expressing in cross cultural environment. They should be able to edit the engineering documents, such as, practicable analysis report, project task book, bidding documents etc. and explain them.

② Students should be able to use English for expression and communication concerned with photoelectric information science and engineering.

③ Students should have better interpersonal communication ability, control themselves and understand others' demands and willing. They should have better adapted ability and confidently, neatly deal with new, variable interpersonal and working environment. They should have team cooperation spirit and certain basic ability of coordination, management, competition and cooperation.

④ Students should be able to track the newest technology developing trend of photoelectric information engineering region, understand and learn the newest technology knowledge and achievements in photoelectric information engineering region to continuously improve their own professional level.

⑤ Students should have the ability to collect, analysis, judge, conclude and choose related home and abroad technology information and continuously replenish their own professional knowledge.

5. Have well virtue sense and better responsibility

① Students should have better social virtue and automatically adhere to the social action norms and law rules, being honest and sincere.

② Students should have better professional virtue norms and automatically adhere to the professional action norms of their own professional system.

③ Students should have better social responsibility and embody their social duty in environmental protection, source saving, public safety, social service, social welfare, public sanitation and social orders.

④ Students should have better working responsibility and embody their working and enterprise's duty in working quality, working efficiency, working principles, professional health and safety, protection of corporate's image and concerns of corporate's development.

附：培养目标实现矩阵

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

## 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：模拟电子技术基础、数字电子技术基础、通信原理 B、光学（应用光学、物理光学）、量子力学 B、电动力学、激光原理与技术、光纤通信原理与技术、光电技术等。



Core Courses: Electronic Technology (Analogy Electronic Technology, Digital Electronic Technology), Principles of Communication B, Optics (Applied Optics, Physical Optics), Quantum Mechanics B, Electrodynamics, Principles and Techniques of Laser, Fiber Communication Theory and Technology, Optoelectronics Technology etc.

**(二) 专业特色课程:**

专业特色课程: 光电技术、光电信息技术实验、光纤技术与传感测试、光纤通信原理与技术、光纤技术实验、激光原理与技术、激光原理与技术实验、太阳能电池原理、技术及应用

Characteristic Courses: Optoelectronic Technology, Experiment on Optoelectronic Information, Fiber Optical Sensing Technology, Fiber Communication Theory and Technology, Experiment on Fiber Technology, Principles and Techniques of Laser, Experiment on Principles and Techniques of Laser, Principles, Technology and Application of Solar cells.

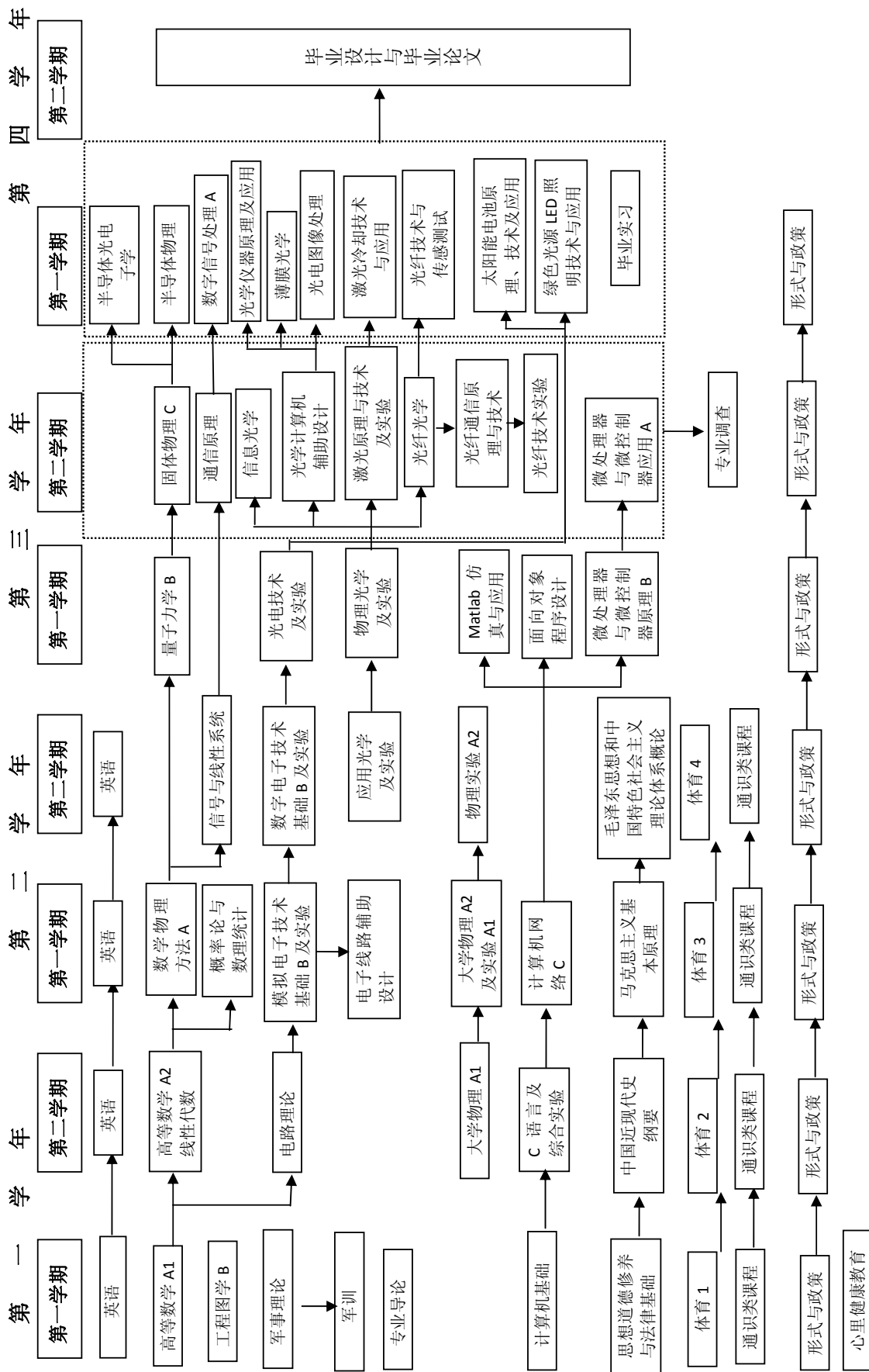
附: 毕业要求实现矩阵:

		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	1- 1- ②	1- 1- ③	1- 1- ④	1- 1- ⑤	1- 1- ⑥	1- 1- ⑦	1- 1- ⑧	1- 1- ⑨	2- 2- ①	2- 2- ②	2- 2- ③	3- 3- ①	3- 3- ②	3- 3- ③	3- 3- ④	3- 3- ⑤	4- 4- ①	4- 4- ②	4- 4- ③	4- 4- ④	4- 4- ⑤	5- 5- ①	5- 5- ②	5- 5- ③	5- 5- ④	
		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 A1-A4																				√							
		大学计算机基础			√																								
		计算机程序设计基础(C 语 言)			√																								
		高等数学 A1、A2	√																										
		专业导论									√														√	√			
		工程图学			√																								
		线性代数	√																										
		概率论与数理统计 B	√																										
		大学物理 A1、A2	√																										
		电路理论			√																								
		物理实验 A1、A2	√																										
√		模拟电子技术基础 B						√																					
√		模拟电子技术基础实验						√		√																			
		数学物理方法 A	√																										

		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-	1-	1-	1-	1-	1-	2-	2-	2-	2-	2-	2-	3-	3-	3-	3-	3-	3-	3-	3-	4-	4-	4-	4-	4-	4-	5-	5-	5-	5-	5-		
			①	②	③	④	⑤	⑥	⑦	⑧	⑨	①	②	③	④	⑤	⑥	⑦	⑧	⑨	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④			
√		数字电子技术基础B		√																																	
√		数字电子技术基础实验		√					√																												
√		C语言综合实验	√																																		
√		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B	√																																		
√	√	光电技术					√					√													√												
	√	光电信息技术实验					√		√																	√											
		面向对象程序设计B		√																					√												
√		通信原理B					√																														
		光纤光学							√																	√											
√	√	光纤通信原理与技术		√						√																√											
	√	光纤技术实验					√		√																	√											
√	√	激光原理与技术		√																						√											
	√	激光原理与技术实验					√		√																	√											
√	√	光纤技术与传感测试		√																						√											
		计算机网络C		√																																	
		电子线路辅助设计					√																														
		Matlab 仿真与应用		√					√																												

		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-	1-	1-	1-	1-	1-	2-	2-	2-	3-	3-	3-	3-	3-	3-	3-	4-	4-	4-	4-	4-	4-	5-	5-	5-	5-	5-	
			①	②	③	④	⑤	⑥	⑦	⑧	⑨	①	②	③	①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	①	②	③	④
		微处理器与微控制器原理 B	√																													
		光学计算机辅助设计	√					√																								
		信息光学																														
		固体物理 C																														
		微处理器与微控制器应用 A	√																													
		半导体物理	√																													
		数字信号处理 A	√																													
		光电图像处理	√																													
		半导体光电子学	√																													
		薄膜光学	√																													
	√	太阳能电池原理、技术及应 用																														
		激光冷却技术与应用																														
		绿色光源 LED 照明技术及应用																														
		光学仪器原理及应用	√																													
		军事训练																														
		电工电子实习 A																														
		电子综合实训 I、II																														
		专业调查																														
		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

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Number	课程名称 Course Title	学分 Crs	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major		
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur					
通 识 课 程  Public Basic Courses	必 修 课  Required Courses	4220001110	思想道德修养与法律基础 Morals, Ethics and Fundamentals of Law	3	48			8		1-6				
		4220002110	中国近现代史纲要 Outline of Contemporary and Modern Chinese History	2	32					1-6				
		4220003110	毛泽东思想和中国特色社会主义理论体系概论 Introduction to Mao Zedong Thought and Socialism with Chinese Characteristics	4	96			32		1-6				
		4220005110	马克思主义基本原理 Marxism Philosophy	3	48			8		1-6				
		1060001110	军事理论 Military Theory	1	32			16		1-4				
		4210001110	体育 1 Physical Education I	1	32					1				
		4210002110	体育 2 Physical Education II	1	32					2	体育 1			
		4210003110	体育 3 Physical Education III	1	32					3	体育 2			
		4210004110	体育 4 Physical Education IV	1	32					4	体育 3			
		1050001110	心理健康教育 Mental Health Education	1	16					1-2				
		4030002110	大学英语 A1 College English A I	3	64				16	1				
		4030003110	大学英语 A2 College English A II	3	64				16	2	大学英语 A1			
		4030004110	大学英语 A3 College English A III	3	64				16	3	大学英语 A2			
		4030005110	大学英语 A4 College English A IV	3	64				16	4	大学英语 A3			
		4120017110	大学计算机基础 Foundation of Computer	2	32		12			1				
		4120023110	计算机程序设计基础(C语言) Fundamentals of Computer Program Design(C)	3	48		12			2				
					小 计 Subtotal	35	736	24	64	64				
			选 修 课  Elective Courses	创新创业类 Innovation and Entrepreneurship Courses	全校学生要求至少取得 9 个学分，且必须选修艺术体育类课程中的艺术类相关课程，取得至少 2 个学分。理工科专业学生至少选修一门人文社科类或经济管理类课程，其他专业学生至少选修一门科学技术类课程。									
				人文社科类 Arts and Social Science Courses	All students are required to obtain at least 9 credits, and must select art courses from Art and Physical Education Courses to obtain at least 2 credits. Science and engineering students should select at least one course from Arts and Social Science Courses or Economy and Management Courses, and other students should select at least one course from Science and Technology 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												

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Number	课程名称 Course Title	学分 CrS	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major	
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extracur				
学 科 大 类 课 程 Basic Disciplinary Courses	必 修 课 程 Required Courses	4050337110	专业导论 Introduction of Specialty	1	16					1			
		4050063110	高等数学 A1 Advanced Mathematics A I	5	80					1			
		4050064110	高等数学 A2 Advanced Mathematics A II	5	80					2	高等数学 A1		
		4080041110	工程图学 B Engineering Graphics B	4	64		4			1			
		4050229110	线性代数 Linear Algebra	2.5	40					2			
		4050058110	概率论与数理统计 B Probability and Mathematics Statistic B	3	48					3			
		4050021110	大学物理 A1 Physics. A I	3.5	56					2			
		4050022110	大学物理 A2 Physics. A II	3.5	56					3	大学物理 A1		
		4110018110	电路理论 Circuit Principle	4	64	8				2			
		4050466130	物理实验 A1 Physics Lab. A I	1	32	32				3			
		4050467130	物理实验 A2 Physics Lab. A II	1	32	32				4	物理实验 A1		
		4110049110	模拟电子技术基础 B Fundamentals of Analog Electronic Circuit B	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			
		4050182110	数学物理方法 A Method Of Mathematical Physics A	4.5	72					3			
		4110067110	数字电子技术基础 B Fundamentals of Digital Electronic Circuit B	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			
		小 计 Subtotal				46	784	104	4				

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Number	课程名称 Course Title	学分 Cr	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur			
专 业 课 程 Specialized Courses	必 修 课 Required Courses	4050361120	C 语言综合实验 Comprehensive Experiment on C Language	1	32		32			2	计算机程序设计基础(C 语言)	
		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 A	
		4050030110	电动力学 Electrodynamics	3	48					4		
		4050415120	物理光学 Physical Optics	3.5	56					5		
		4050416120	物理光学实验 Experiment on Physical Optics	0.5	16	16				5	物理光学	
		4050133110	量子力学 B Quantum Mechanics B	3	48					5	数学物理方法 A	
		4050079110	光电技术 Optoelectronic Technology	3.5	56			16		5	模拟电子技术基础 B	
		4050081110	光电信息技术实验 Experiment on Optoelectronic Information	1	32	32				5	光电技术	
		4050139110	面向对象程序设计 B Object Oriented Programming B	4.5	72		8	16		5	计算机程序设计基础(C 语言)	
		4050190110	通信原理 B Principles of Communication B	4.5	72	8		16		6	信号与线性系统	
		4050084110	光纤光学 Fiber Optics	2	32					6		
		4050087110	光纤通信原理与技术 Fiber Communication Theory and	3.5	56			16		6	光纤光学	
		4050085110	光纤技术实验 Experiment on Fiber Technology	1	32	32				6	光纤光学	
		4050103110	激光原理与技术 Principles and Techniques of Laser	3	48					6		
		4050104110	激光原理与技术实验 Experiment on Principles and Techniques of Laser	0.5	16	16				6	激光原理与技术	
		4050086110	光纤技术与传感测试 Fiber Optic Sensing Technology	2	32	16				7	光纤光学	
小 计 Subtotal				43.5	768	144	40	64				



课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Number	课程名称 Course Title	学分 Crs	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major	
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur				
选修课 Elective Courses		4050111110	计算机网络 C Computer Network C	2.5	40					3			
		4050032110	电子线路辅助设计 Computer Aided Design of Electronic	1	32		32			3			
		4050003110	Matlab 仿真与应用 Matlab Simulation and Application	1	32		32			5			
		4050199110	微处理器与微控制器原理 B Theory of Microprocessor and Microcontroller B	4	64	8				5			
		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 Informational Optics	3	48	16				6			
		4050077110	固体物理 C Solid State Physics C	3	48					6	量子力学 B		
		4050196110	微处理器与微控制器应用 A Application of Microprocessor and Microcontroller A	3.5	56	24				6	微处理器与微控制器原理 B		
		4050008110	半导体物理 Semiconductor Physics	3	48					7	固体物理 C		
		4110071110	数字信号处理 A Digital Signal Processing A	4	64	10				7	信号与线性系统		
		4050080110	光电图像处理 Photoelectric Image Processing	2	32					7			
		4050007110	半导体光电子学 Semiconductor Optoelectronics	2.5	40					7			
		4050013110	薄膜光学 Thin Film Optics	2	32					7			
		4050188110	太阳能电池原理、技术及应用 Principles, Technology and Application of Solar cells	2	32					7			
		4050137110	绿色光源 LED 照明技术及应用 Green light LED Lighting Technology and Applications	2	32					7			
		4050392120	激光冷却技术及应用 Technology and Application of lasing cooling	2	32					7			
		4050386120	光学仪器原理及应用 Principles and Application of Optical Instrument	2	32					7			
			小 计 Subtotal		40.5	696	58	96					
	修读说明：要求至少选修 15 学分。 NOTE: Minimum subtotal credits: 15.												
个性化课程 Personalized Course	选修课 Elective Courses	修读说明：学生可跨专业自主选择修读全校其他专业的课程。要求至少选修 10 学分。 NOTE: Students can choose any courses from the other specialties. Minimum subtotal credits: 10.											

## 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	周数 Weeks	学分 Crts	建议修读学期 Suggested Term	第二专业 Second Major
1060002110	军事训练 Military Training	3	1.5	1	
4100068110	电工电子实习 A Practice of Electrical Engineering and Electronics	2	2	3	
4050438120	电子综合实训 I Comprehensive training of electronics I	2	2	3	
4050439120	电子综合实训 II Comprehensive training of electronics II	1	1	4	
4050320110	专业调查 Professional Investigation	2	2	6	
4050277110	毕业实习 Internship	2	2	7	
4050269110	毕业设计 Graduate Design	17	11	8	
	小 计 Subtotal	29	21.5		

## 六、修读指导

### VI Recommendations on Course Studies

在专业选修课程中，建议将电子线路辅助设计、微处理器与微控制器原理 B、微处理器与微控制器应用 A 课程作为共选课程；侧重于光电系统与信息处理方向的同学建议系统修读光学仪器原理及应用、激光冷却技术及应用、数字信号处理 A 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 C、半导体物理、信息光学、半导体光电子学、薄膜光学、太阳能电池原理、技术及应用和绿色光源 LED 照明技术及应用等课程。

Theory of Microprocessor and Microcontroller B, Application of Microprocessor and Microcontroller A are recommended as shared elective courses. Therefore, students oriented in Optoelectronic System and Information Processing are suggested to take Laser Testing Technology, Fiber Optical Sensing Technology, Digital Signal Processing A 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 C, Semiconductor Physics, Informational Optics, Semiconductor Optoelectronics, Thin Film Optics, Principles, Technology and Application of Solar cells, Green Light LED Lighting Technology and Applications, etc.

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

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

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】2015 版本本科培养方案

## Undergraduate Education Plan for Specialty in Electronic Information Science and Technology (2015)

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

课程类别 课程性质	通识课程 Public Basic Courses	学科大类课程 Basic Disciplinary Courses	专业课程 Specialized Courses	个性课程 Personalized Course	集中性实践 Practice Courses	课外学分 Study Credit after Class	总学分 Total Credits
必修课 Required Courses	35	46	43.5	\	21.5	\	190
选修课 Elective Courses	9	\	15	10	\	10	

### 一、培养目标与毕业要求

#### I Educational Objectives & Requirement

##### (一) 培养目标

学生主要学习电子信息科学与技术的基本理论和基本知识，接受电子信息系统分析、设计和研究方法等方面的基本训练，具有研究、设计、开发、集成及应用电子信息系统的基本能力。学生毕业后能在电子、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等工作；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。

专业的培养目标为：

- 1) 以电子学和信息科学为核心，着重培养学生的基础理论、基础知识、基本技能、科研与工程创新以及管理能力；
- 2) 使毕业生具有较高思想道德和文化修养、敬业精神和责任感，具有健康的体魄和良好的心理素质；
- 3) 培养具备电子信息科学与技术方面的知识和能力的厚基础、高素质、有创新意识和实践能力的高级专业人才。

Students are mainly required to acquire basic theories and knowledge of electronic information science and technology, who will receive the basic training of the analysis, training design and research method, and have competency for science research, designing, developing, the integration and application of electronic information system. They can do research, product design, production technology or management in the field of electronic, information, computer science, also can continue to study in this major or other related majors.

Educational objectives for specialty in electronic information science and technology are:

- 1) Based on electronics and information science , focusing on students' basic theories, basic knowledge

and basic skills, researching and engineering innovation, and management capabilities;

- 2) graduates should have higher moral and cultural enrichment, professionalism and social responsibility, with good health and good mental qualities;
- 3) Cultivating people with thick foundation with electronic information science and technology knowledge and ability, high-quality, innovation and practical ability of senior professionals.

## (二) 毕业要求

本专业学生主要学习电子信息科学的基础理论和技术,接受科学实验与科学思维的训练,具备本学科及相关领域的应用研究与技术开发的能力。

毕业生应具备以下几方面的知识和能力:

1. 掌握电子信息科学与技术基础技术知识、操作技能和工程方法,了解电子信息工程领域的新产品、新技术、新工艺以及技术发展趋势。

① 以数学、物理和相关自然科学为基础,掌握电气技术的工程数学,如线性代数、复变函数与积分变换、概率论与数理统计,具有熟练的应用和计算能力。

② 掌握电路原理、信息技术、微处理器与微控制器理论、计算机技术等专业基础知识,侧重于应用工程技术知识解决实际工程问题。熟练掌握一门计算机语言的编程和一种电子线路设计软件,具有在工程实践中应用的能力。

③ 熟悉电气工程相关标准,熟练掌握基本工程制图。

④ 具备较丰富的工程经济、管理、社会学、情报交流、法律、环境等人文与社会学的知识。

⑤ 通过学习电工电子类基础课程,掌握电路原理、模拟电子技术、数字电子技术等课程知识,熟悉其实验方法和技术。

⑥ 通过学习电子信息类课程,掌握信号与系统、通信原理、数字信号处理、高频电子线路、图像处理等课程知识,熟悉其基本原理及实验方法。

⑦ 通过学习微机类课程,掌握微机原理与接口技术、微处理器与微控制器技术、DSP 原理与应用等课程知识,熟悉微机应用系统、计算机控制系统、DSP 系统的设计与开发技术。

⑧ 通过课程实验、综合实验与实训、专业调查、专业实习、实用技术讲座、毕业设计、科研实践等环节,熟练掌握电子信息科学与技术应用的场合、过程、方法、结论等相关技术。

⑨ 熟悉电子信息科学与技术领域的技术标准,了解电子、通信、计算机行业的相关政策、法律和法规及电子信息科学发展现状和趋势动态;了解新技术、新产品、新方法、实用技术和现代设计方法,了解电子信息领域的技术标准、质量管理和质量保证体系以及法律法规。

2. 具备运用适当的理论和实践方法解决电子信息科学实际问题的能力,在电子信息系统分析、设计、开发等方面的实践能力得到系统化训练。

① 了解市场、用户的需求变化以及技术发展,具备初步的电子产品开发的策划能力。

② 能参与电子信息系统产品开发的工程解决方案的制定,能考虑成本、质量、环保性、安全性、可靠性、外形、适应性等因素,寻找、选择和评估完成电子信息系统产品开发任务所需的技术、工艺和方法,具备初步的制定电子信息系统产品设计的工程解决方案的能力。具有较强的电子产品设计能力,具有较强的创新意识和进行电子产品创新设计的初步能力。

3. 参与项目及工程管理。

① 具有较强的质量意识,能在项目的实施中自觉地贯彻质量标准,保证工作质量;具有较强的环境意识,能在项目的实施中自觉执行环保标准,具有使用环保材料、环保技术、节能技术进行电子产品设计的初步能力;具有较强的职业健康安全意识,能在项目实施中严格执行安全规范,养成保证职业健康和安全的工作习惯,具有应用人机工程和安全工程进行电子产品设计的初步能力;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。

② 能运用经济管理知识,具有项目预算和电子产品成本核算的初步能力;能运用生产管理知识,

具有制定电子产品生产计划和进行生产管理的初步能力；

- ③ 具有一定的组织管理能力和进行项目任务分解、人力和资源调度的初步能力；具有团队协作精神，参与团队管理、协调团队工作，确保工作进度。
  - ④ 具备应对危机与突发事件的初步能力。能够发现用户或市场需求的变化，并能根据变化提出变更电子产品设计任务书、项目实施计划等方面的建议；能够发现电子产品质量标准的变化，并能根据变化提出修改项目技术指标和质量标准的建议；能够发现市场价格和项目预算的变化，并能根据变化提出调整预算、节省开支方面的建议。
  - ⑤ 能够发现国家产业政策、经济政策、行政条例、法规等方面的变化，并能根据变化提出项目变更、项目申报审批等方面的建议；参与评估项目，提出改进建议。
4. 有效的沟通与交流能力和较强的获取知识、终身学习的能力。
- ① 能够使用技术语言，在跨文化环境下进行沟通与表达；能够进行工程文件的编纂，如：可行性分析报告、项目任务书、投标书等，并可进行说明、阐释。
  - ② 能够运用英语进行与电子信息工程技术方面的表达、沟通和交流。
  - ③ 具备较强的人际交往能力，能够控制自我并了解、理解他人需求和意愿；具备较强的适应能力，自信、灵活地处理新的和不断变化的人际环境和工作环境；具备团队合作精神，并具备一定的协调、管理、竞争与合作的初步能力。
  - ④ 能够跟踪电子信息科学领域最新技术发展趋势，了解和学习电子信息科学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。
  - ⑤ 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。
5. 具备良好道德和较强的责任感。
- ① 具有良好的社会公德，自觉遵守社会行为规范和法律法规，为人正直、诚实守信。
  - ② 具有良好的职业道德规范，自觉遵守所属职业体系的职业行为准则。
  - ③ 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。
  - ④ 具有较强的工作责任感，在工作质量、工作效率、工作纪律、职业健康安全、维护企业形象、关注企业发展等方面体现对工作、对企业的责任。

Students in this major are mainly required to acquire basic theory and technology of electronic information, receive basic trainings on scientific experiment and thinking and have competency for scientific research and technological development.

1. Mastering basic knowledge, experimental skill and engineering methods of electronic information science and technology, acquiring its new product, new technology, new process and technology development trend.

- ① Based on mathematics, physics, science and related, acquiring the science knowledge of electronic and information science and technology.
- ② Mastering circuit principle, electronic circuit, information technology, theory of microprocessor and microcontroller, techniques of computer and an electronic circuit design software, armed with application in the engineering practice.
- ③ Familiar with electrical engineering related standards, mastering the basic engineering drawing.
- ④ Armed with the rich knowledge of humanistic and social, such as engineering economy, management, sociology, information exchange, law, environment etc.
- ⑤ Mastering basic principles and professional knowledge of circuit principle, analog electronic circuit and digital electronic circuit by studying the basic course of electrical engineering and electronics.
- ⑥ Through the study of electrical engineering courses, master power electronics, integrated circuits, control theory, curriculum knowledge of motion control technology, signal analysis and processing technology, familiar with the power electronic devices ,integrated electronic design and operation

methods.

- ⑦ Familiar with microcomputer application system, the principle and application of DSP, the design and development of the technology of computer control system through the study of computer courses.
- ⑧ Through the study of the experiment, comprehensive experiment and training course, professional research and practice, practice technical seminars, graduation thesis, research practice etc., mastering application occasion, process, method conclusion and related technology of electronic information science and technology.
- ⑨ Familiar with the technical standard of electronic information science and technology, understanding the current situation and developing trend of electronic information science, new technology, new product, technical standard of electronic and information engineering field, technology standards, quality management and quality assurance system, and laws and regulations of electronic information field.

2. Have the ability of using certain theory and practical methods to solve practical problems in electronic information engineering and acquire system training, receiving systematic training of the practical ability in the electronic information system analysis, design, development etc.

- ① Understand the change of the market, the needs of the users and the development of technology, having the planning preliminary ability in electronic product development design.
- ② Able to participate in the electronic information system solutions to product development engineering, consider the factors such as cost, quality, environmental protection, security, reliability, appearance, adaptability and so on, search, select and evaluate the technology, process and methods needed to complete the electronic information system product development tasks. Having the preliminary ability to design electronic information system solutions to product development engineering. Having the strong ability of electronic product design, having strong innovation consciousness and the preliminary ability of electronic product innovation design.
- ③ Obtaining the ability of designing electronic product, with a strong sense of innovation and the basic ability of innovation designing electronic system and electronic product.

3. Take part in project and engineering administration

- ① Students should have a better quality sense and automatically adhere to the quality standard in the project implementation to ensure working quality. They should have better environmental sense and automatically carry out environmental standard. They should have basic ability of using environmental material, environmental technology and conservation technology to proceed the electronic products design. They should have better safe sense about professional health and strictly carry out safety norms in the project implementation to form a working habit of ensuring professional health and safety. They should basic ability to apply man-machine engineering and safety engineering to electronic products design. They should have better law sense and work with certain related criteria and process in the category of law and rule.
- ② Students should have the ability to utilize economic administration knowledge and have basic ability of project budget and electronic products cost calculation. They should have the ability to utilize producing administration knowledge and have the basic ability to make electronic products producing plan and process producing administration.
- ③ Students should have certain organizing and administration ability and have basic ability to proceed project task decomposition, human power and resource adjustment . They should have team cooperation spirit to take part in team management and coordinate team work to ensure working schedule.

- ④ Students should have basic ability to deal with crisis and accidents. They should be able to find out the change of user or market demands and propose a suggestion about changing electronic products design task book and project implementation plan according to the changes. They should be able to find out the changes of electronic products quality standard and propose a suggestion about changing project technology standard and quality standard .They should be able to find out the changes of market price and project budget and propose a suggestion about adjusting budget and saving cost according to the changes.
  - ⑤ Students should be able to find out the changes in national industrial strategy, economic policy, executive practices and law rules ad propose a suggestion about project changes and project declaration for approval according to the changes. They should take part in the assessment of projects and propose an improving suggestion.
4. Have efficient communication ability and better knowledge acquiring and lifelong learning ability.
- ① Students should be able to use technological language for communicating and expressing in cross cultural environment. They should be able to edit the engineering documents, such as, practicable analysis report, project task book, bidding documents etc. and explain them.
  - ② Students should be able to use English for expression and communication concerned with electronic information engineering technology.
  - ③ Students should have better interpersonal communication ability, control themselves and understand others' demands and willing. They should have better adapted ability and confidently, neatly deal with new, variable interpersonal and working environment. They should have team cooperation spirit and certain basic ability of coordination, management, competition and cooperation.
  - ④ Students should be able to track the newest technology developing trend of electronic information science field, understand and learn the newest technology knowledge and achievements in electronic information science field to continuously improve their own professional level.
  - ⑤ Students should have the ability to collect, analysis, judge, conclude and choose related home and abroad technology information and continuously replenish their own professional knowledge.
5. Have well virtue sense and better responsibility
- ① Students should have better social virtue and automatically adhere to the social action norms and law rules, being honest and sincere.
  - ② Students should have better professional virtue norms and automatically adhere to the professional action norms of their own professional system.
  - ③ Students should have better social responsibility and embody their social duty in environmental protection, source saving, public safety, social service, social welfare, public sanitation and social orders.
  - ④ Students should have better working responsibility and embody their working and enterprise's duty in working quality, working efficiency, working principles, professional health and safety, protection of corporate's image and concerns of corporate's development.

附：培养目标实现矩阵

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

## 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：电子技术(模电，数电)、通信原理 B、电动力学、量子力学 B、微波技术与天线 A、微处理器与微控制器原理 A、面向对象程序设计 B

Core Courses: Electronic Technology (Analog Electronic and Digital Electronic), Communication Principles B, Electrodynamics, Quantum Mechanics B, Microwave Technology and Antenna A, Theory of Microcontroller and Microprocessor A, Object-Oriented Programming B

#### (二) 专业特色课程

专业特色课程：量子力学 B、微波技术与天线 A、电磁兼容原理与应用、半导体物理、射频识别技术与应用

Characteristic Courses: Quantum Mechanics B, Microwave Technology and Antenna A, Principle and Application of EMC, Semiconductor Physics, RFID technology and Application



附：毕业要求实现矩阵：

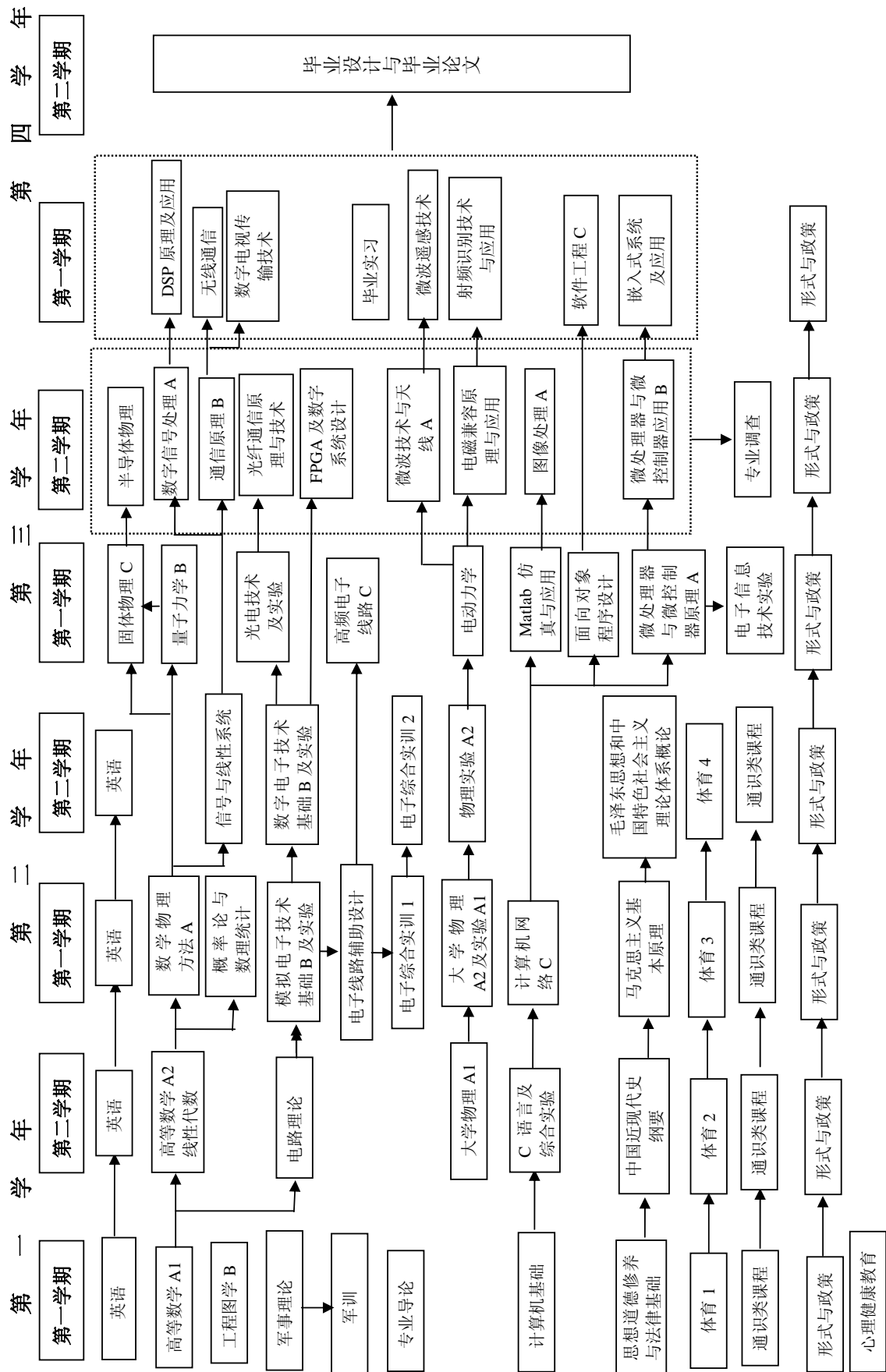
		电子信息科学与技术专业毕业要求																										
专业核心课程	专业特色课程	课程名称	1-①	1-②	1-③	1-④	1-⑤	1-⑥	1-⑦	1-⑧	1-⑨	2-①	2-②	2-③	3-①	3-②	3-③	3-④	3-⑤	4-①	4-②	4-③	4-④	4-⑤	5-①	5-②	5-③	5-④
		思想道德修养与法律基础																							√	√	√	√
		中国近现代史纲要																							√	√	√	√
		毛泽东思想和中国特色社会主义理论体系概论																							√	√	√	√
		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A1-A4																			√							
		大学计算机基础																										
		高等数学A1、A2	√																									
		计算机程序设计基础(C语言)	√																									
		专业导论									√													√				
		工程图学												√														
		线性代数	√																									
		概率论与数理统计B	√																									
		大学物理A1、A2	√																									
		电路理论												√														
		物理实验A1、A2	√																									
√		模拟电子技术基础B																										





### 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

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Number	课程名称 Course Title	学分 Crs	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major	
					总学时 Tot hrs.	实验 Exp.	上机 Ope-ration	实践 Prac-tice	课外 Extra-cur				
通 识 课 程  Public Basic Courses	必 修 课  Required Courses	4220001110	思想道德修养与法律基础 Morals, Ethics and Fundamentals of Law	3	48			8		1-6			
		4220002110	中国近现代史纲要 Outline of Contemporary and Modern Chinese History	2	32					1-6			
		4220003110	毛泽东思想和中国特色社会主义理论体系概论 Introduction to Mao Zedong Thought and Socialism with Chinese Characteristics	4	96			32		1-6			
		4220005110	马克思主义基本原理 Marxism Philosophy	3	48			8		1-6			
		1060001110	军事理论 Military Theory	1	32			16		1-4			
		4210001110	体育 1 Physical Education I	1	32					1			
		4210002110	体育 2 Physical Education II	1	32					2	体育 1		
		4210003110	体育 3 Physical Education III	1	32					3	体育 2		
		4210004110	体育 4 Physical Education IV	1	32					4	体育 3		
		1050001110	心理健康教育 Mental Health Education	1	16					1-2			
		4030002110	大学英语 A1 College English A I	3	64				16	1			
		4030003110	大学英语 A2 College English A II	3	64				16	2	大学英语 A1		
		4030004110	大学英语 A3 College English A III	3	64				16	3	大学英语 A2		
		4030005110	大学英语 A4 College English A IV	3	64				16	4	大学英语 A3		
		4120017110	大学计算机基础 Foundation of Computer	2	32		12			1			
		4120023110	计算机程序设计基础(C语言) Fundamentals of Computer Program Design(C)	3	48		12			2			
					小 计 Subtotal	35	736		24	64	64		
	创新创业类 Innovation and Entrepreneurship Courses	全校学生要求至少取得 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，取得至少 2 个学分。理工科专业学生至少选修一门人文社科类或经济管理类课程，其他专业学生至少选修一门科学技术类课程。 All students are required to obtain at least 9 credits, and must select art courses from <i>Art and Physical Education Courses</i> to obtain at least 2 credits. Science and engineering students should select at least one course from <i>Arts and Social Science Courses</i> or <i>Economy and Management Courses</i> , and other students should select at least one course from <i>Science and Technology Courses</i> .											
	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												

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Number	课程名称 Course Title	学分 Crs	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur			
学 科 大 类 课 程 Basic Disciplinary Courses	必 修 课 Required Courses	4050337110	专业导论 Introduction of Specialty	1	16					1		
		4050063110	高等数学 A1 Advanced Mathematics A I	5	80					1		
		4050064110	高等数学 A2 Advanced Mathematics A II	5	80					2	高等数学 A1	
		4080041110	工程图学 B Engineering Graphics B	4	64		4			1		
		4050229110	线性代数 Linear Algebra	2.5	40					2		
		4050058110	概率论与数理统计 B Probability and Mathematics Statistic B	3	48					3		
		4050021110	大学物理 A1 Physics. A I	3.5	56					2		
		4050022111	大学物理 A2 Physics. A II	3.5	56					3	大学物理 A1	
		4110018110	电路理论 Circuit Principle	4	64	8				2		
		4050222110	物理实验 A1 Physics Lab. A I	1	32	32				3		
		4050223110	物理实验 A2 Physics Lab. A II	1	32	32				4	物理实验 A1	
		4110049110	模拟电子技术基础 B Fundamentals of Analog Electronic Circuit B	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		
		4050182110	数学物理方法 A Method Of Mathematical Physics A	4.5	72					3		
		4110067110	数字电子技术基础 B Fundamentals of Digital Electronic Circuit B	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		
		小 计 Subtotal		46	784	104	4					
专 业 课 程 Specialized Courses	必 修 课 Required Courses	4050361120	C 语言综合实验 Integrated Experiments of C language	1	32		32			2	计算机程序设计基础(C语言)	
		4050231110	信号与线性系统 Signal and Liner System	4	64	8				4	数学物理方法 A	
		4050167110	数据结构与算法 B Data Structures and Algorithms B	2.5	40		6			4	计算机程序设计基础(C语言)	
		4050030110	电动力学 Electrodynamics	3	48					5		
		4050139110	面向对象程序设计 B Object Oriented Programming B	4.5	72		8	16		5	计算机程序设计基础(C语言)	
		4050133110	量子力学 B Quantum Mechanics B	3	48					5	数学物理方法 A	
		4050198110	微处理器与微控制器原理 A Theory of Microcontroller and Microprocessor A	4	64					5	数字电子技术基础 B	

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Number	课程名称 Course Title	学分 Crs	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major	
					总学时 Tot hrs.	实验 Exp.	上机 Ope-ration	实践 Prac-tice	课外 Extra-cur				
		4050079110	光电技术 Optoelectronic Technology	3.5	56			16		5	数字电子技术基础 B		
		4050083110	光电技术实验 Optoelectronic Technology Experiment	0.5	16	16				5			
		4050281110	电子信息技术实验 Experiment on Electronic Information Technology	1	32	32				5	微处理器与微控制器原理 A		
		4050195110	微波技术与天线 A Microwave Technology and Antenna A	3	48					6	电动力学		
		4050190110	通信原理 B Communication Principles B	4.5	72	8		16		6	信号与线性系统		
		4110071110	数字信号处理 A Digital Signal Processing A	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 B	3	48			16		6	微处理器与微控制器原理 A		
		4050264110	射频识别技术与应用 RFID technology and Application	2	32					7			
		小 计 Subtotal		43.5	736	74	46	64					
	选修课 Elective Courses	4050111110	计算机网络 C Computer Network C	2.5	40					3			
		4050032110	电子线路辅助设计 Computer Aided Design of Electronic Circuit	1	32		32				3		
		4050003110	Matlab 仿真与应用 Matlab Simulation and Application	1	32		32				5		
		4050077110	固体物理 C Solid State Physics C	3	48						5	数学物理方法 A	
		4110031110	高频电子线路 C High-Frequency Electronic Circuits C	3	48	8					5	模拟电子技术基础 B	
		4050078110	关系数据库与 SQL Principles of Relational Database and SQL	2.5	40						6		
		4050008110	半导体物理 Semiconductor Physics	3	48						6	量子力学 B	
		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 B	
		4050087110	光纤通信原理与技术 Fiber Communication Theory and	2.5	40						6	光电技术	
		4050192110	图像处理 A Image Process A	2.5	40						6	信号与线性系统	
		4050028110	电磁兼容原理与应用 The Principle and Application of EMC	3	48						6	电动力学	
		4050149110	软件工程 C Software Project C	2	32						7	面向对象程序设计 B	
		4050146110	嵌入式系统及其应用 Embedded System and Application	2	32						7	微处理器与微控制器应用 B	
		4050239110	无线通信 Wireless Communication	2.5	40	8					7	通信原理 B	
	4050105110	DSP 原理及应用 DSP Theory and Application	2	32						7	数字信号处理 A		

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Number	课程名称 Course Title	学分 Crs	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major
					总学时 Tot hrs.	实验 Exp.	上机 Ope-ration	实践 Prac-tice	课外 Extra-cur			
		4050263110	数字电视传输技术 Digital TV transmission technology	2	32					7	通信原理 B	
		4050265110	微波遥感技术 Microwave remote sensing technology	2	32					7	微波技术与天线 A	
		小 计 Subtotal		37.5	648	48	64					
修读说明：要求至少选修 15 学分。 NOTE: Minimum subtotal credits: 15.												
个性化课程 Personalized Course	选修课 Elective Courses	修读说明：学生可跨专业自主选择修读全校其他专业的课程，建议修读以上课程。要求至少选修 10 学分。 NOTE: Students can choose any courses from the other specialties, and are especially suggested to choose the courses above. Minimum subtotal credits: 10.										

## 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	周数 Weeks	学分 Crs	建议修读学期 Suggested Term	第二专业 Second Major
1060002110	军事训练 Military Training	3	1.5	1	
4050438120	电子综合实训 I Comprehensive training of electronics I	2	2	3	
4050439120	电子综合实训 II Comprehensive training of electronics II	1	1	4	
4100068110	电工电子实习 A Practice in Electrical Engineering & Electronics	2	2	3	
4050319110	专业调查 Specialty Investigation	2	2	6	
4050276110	毕业实习 Practice for Graduation	2	2	7	
4050268110	毕业设计 Graduation Design	17	11	8	
小 计 Subtotal		29	21.5		

## 六、修读指导

### VI Recommendations on Course Studies

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电磁兼容原理与应用、射频识别技术与应用、无线通信和微波遥感技术等课程；侧重于通信与信息处理方向的学生建议修读光纤通信原理与技术、图像处理 A、关系数据库与 SQL、无线通信 A、DSP 原理与应用和数字电视传输技术等课程。

When taking specialized courses, students oriented in radio Physics are suggested to choose Principle and Application of EMC Electromagnetic, RFID technology and Application, Wireless Communication A, etc. While students oriented in communication and information processing are suggested to choose Fiber Communication Theory and Technology, Image Processing A, Principles of Relational Database and SQL, Wireless



Communication A, DSP Theory and Application, Digital TV transmission technology, Microwave remote sensing technology, etc.

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

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

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】2015 版本本科培养方案

## Undergraduate Education Plan for Specialty in Information and Computing Science (2015)

专业名称	信息与计算科学	主干学科	理学
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

课程类 Course Classification 课程性质 Course Nature	通识课程 Public Basic Courses	学科大类课程 Basic Disciplinary Courses	专业课程 Specialized Courses	个性课程 Personalized Course	集中性实践 Practice Courses	课外学分 Study Credit after Class	总学分 Total Credits
必修课 Required Courses	35	43	31.5	\	22.5	\	190
选修课 Elective Courses	9	5	24	10	\	10	

### 一、培养目标与毕业要求

#### I Educational Objectives & Requirement

##### (一) 培养目标

- (1) 身心健康，具备良好的敬业精神、社会责任感和工程职业道德，关注当代全球和社会问题，具有质量意识、环境意识和安全意识；
- (2) 具有扎实的数学基础，掌握信息科学或计算科学的基本理论和方法；
- (3) 具有综合运用科学理论、方法和技能解决某些科研或生产中的实际问题的能力；
- (4) 能熟练使用计算机(包括常用语言、工具以及一些专用软件)，具有基本的算法分析、设计能力和较强的编程能力，具有一定的科学研究和软件开发的能力；
- (5) 具有良好的口头和书面表达和交流沟通能力、良好的团队意识和合作精神，具有终身学习的能力。

##### Educational Objectives:

- (1) physically and mentally healthy, has a good working spirit, sense of social responsibility and engineering professional ethics, concerned about the contemporary and social issues around the world, with consciousness of quality, environment and safety;
- (2) Solid grounding in mathematics, fundamental theories and knowledge in information and computing science;
- (3) Has ability of the integrated use of scientific theory, method and skill to solve some practical problems in scientific research or production;
- (4) Mastery of common computer language tools and necessary specialized software, skills in algorithm analysis, design and programming, having a practical ability to carry out science research and software development;

- (5) Efficient in both oral and written expression, good at communication, has good team consciousness and cooperation spirit and enjoys lifelong learning.

## (二) 毕业要求

- (1) 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；为人正直、诚实守信；具有良好的职业道德规范，自觉遵守所属职业体系的职业行为准则；具备团队合作精神，并具备一定的协调、管理、竞争与合作的初步能力。
- (2) 具有适应 21 世纪社会主义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、现代意识等。
- (3) 具有良好的科学素质，能够理解专业科学知识，了解科学研究过程和方法；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，并具有一定的应用它们处理实际问题、参与公共事务的能力。
- (4) 具备较强的适应能力，自信、灵活地处理新的和不断变化的人际环境和工作环境；具备较强的人际交往能力和团结合作精神。
- (5) 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。
- (6) 具有较强的工作责任感，在工作质量、工作效率、工作纪律、职业健康安全、维护企业形象、关注企业发展等方面体现对工作、对企业的责任。
- (7) 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数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。
- (8) 具有应用数学进行分析、推理、证明和计算的能力；针对具体的实际问题，具有能够应用所学的数学知识建模并计算解决问题的综合能力。
- (9) 具有应用计算机及相应数学软件的能力。
- (10) 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；具有创新的观念和创新欲望；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。
- (11) 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。
- (12) 熟练掌握计算机方面的知识，能过运用计算机进行科学计算和研究；掌握信息查询及文件检索方法。
- (13) 了解人文社会科学知识，包括文学、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。
- (14) 掌握物理学等自然科学知识和控制理论等相关的工程技术知识。
- (15) 具有扎实的数学基础，掌握信息科学与计算科学的基本理论和方法。

### Requirement:

- (1) Has good qualities in morality, body constitution and psychological disposition; With good social morality, consciously abide by social norms; With strong sense of law, to carry out work in accordance with the requirements of the standards and procedures; Be honest and trustworthy; Has good professional ethics, consciously abide by the professional code; Has team work spirit with ability of coordination, management, competition and cooperation.

- (2) Adapting to Chinese socialist state's construction in the 21st century, has cultural characters including literacy, literary and artistic appreciation and modern consciousness.
- (3) Has the good scientific quality to comprehend the professional scientific knowledge, understand the scientific research process and methods; Be capable of combining natural science, social science and information technology; Master the basic scientific method with the scientific thought to solve problems and participate in public affairs.
- (4) Have strong ability to adapt the work and to handle affairs in new and changing environment; obtains abilities of interpersonal communication the spirit of cooperation.
- (5) With strong sense of social responsibility, contributing to environmental protection, resource conservation, public security, social service, social welfare and public health, and social order.
- (6) Has strong sense of work responsibility, pursuing work quality, work efficiency, work discipline, occupational health and safety, maintaining the corporate image, concern about enterprise development.
- (7) Has strong learning ability and enjoys lifelong learning; to learn the knowledge and latest technology in the field and constantly improve professional level, flowing the technology trend of information and computation mathematics development; has ability of Collection, analysis, judgment, induction and selection of domestic and foreign relevant technical information, updating professional knowledge.
- (8) Applies mathematics to analysis, reasoning, prove and computing; In view of the specific practical problems, has comprehensive ability to apply mathematics knowledge to solve the problem with modeling and computing.
- (9) Has the ability of application of computer and the corresponding mathematical software.
- (10) With strong sense of innovation, initially acquires the ability to produce innovation in mathematics modeling; With innovative ideas and desire, has solid professional knowledge, good study habits and independent scientific thinking habit.
- (11) Has a good grasp of English, able to read the professional foreign language material, be capable of expressing and communicating in English.
- (12) Good command of the computer knowledge, has ability of computer operating for scientific computing and research; Master information query and document retrieval method.
- (13) Learn about humanities and social science knowledge, including literature, history, philosophy, ideological and moral, art, law, sociology, and psychology.
- (14) Obtains knowledge of not only natural science such as physics, also engineering and technology such as control theory and the correlative.
- (15) Has a solid mathematical foundation and master the basic theory and method of information and computation science.

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	培养目标 5
毕业要求 1	√				
毕业要求 2					√
毕业要求 3		√	√		
毕业要求 4					√

	培养目标 1	培养目标 2	培养目标 3	培养目标 4	培养目标 5
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				√	
毕业要求 13					√
毕业要求 14			√		
毕业要求 15		√			

## 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, 空间解析几何, 常微分方程, 数值分析, 概率论与数理统计, 微分方程数值解, 实变函数。

Core Courses: Mathematical Analysis, Higher Algebra, Ordinary Differential Equations, Space analytic geometry, Ordinary Differential Equations, Numerical Analysis, Probability and Statistics, Numerical Solution of Differential Equations, Functions of Real Variable.

#### (二) 专业特色课程:

数学模型, 数据分析, 计算机图形学, 信息安全与密码学、并行计算。

Characteristic Courses: Mathematical model, Data Analysis, Computer graphics, Information safety and Cryptology, Parallel computing.

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)	(13)	(14)	(15)	
		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	√	√		√										√		
		大学英语 A1-A4		√	√				√				√					

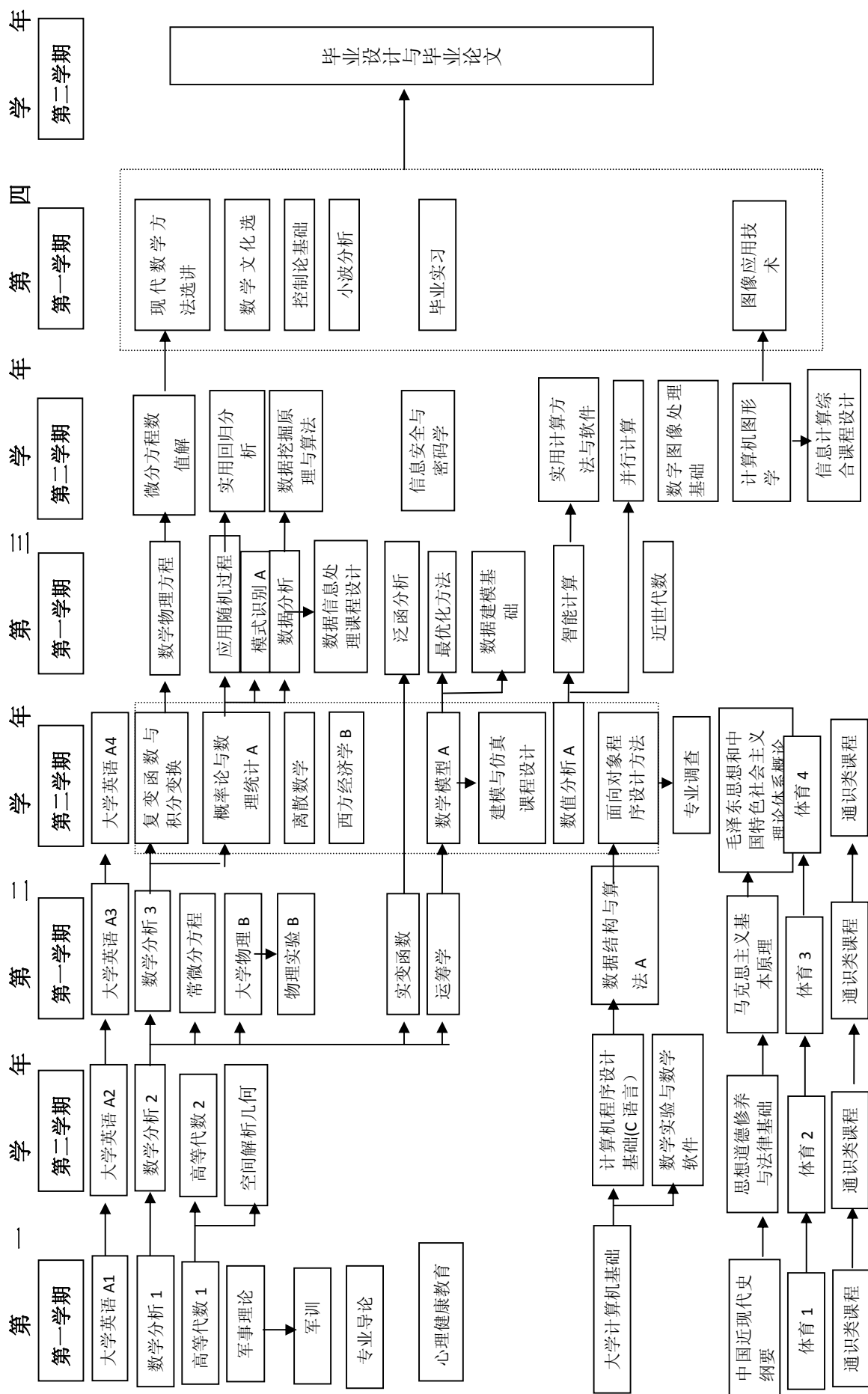
专业 核心 课程	专业 特色 课程	课程名称	信息与计算科学专业毕业要求														
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
		大学计算机基础			√					√		√					
		计算机程序设计基础(C语言)			√			√		√		√					
		专业导论			√	√		√									
		心理健康教育	√			√	√	√									
√		数学分析 1-3			√			√			√					√	
√		高等代数 1-2			√			√			√					√	
√		空间解析几何			√			√			√					√	
√		常微分方程			√			√			√					√	
		数据结构与算法 A			√					√							
		大学物理 B			√										√		
		物理实验 B			√										√		
√		实变函数			√			√			√					√	
		数学实验与数学软件			√			√	√	√			√				
		运筹学			√						√						
		西方经济学 B		√	√												
√		数值分析 A			√			√			√						
		面向对象程序设计方法			√								√				
		离散数学			√												
√		概率论与数理统计 A			√			√			√					√	
		复变函数与积分变换 A			√			√			√					√	
	√	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 A			√				√		√					√	
		近世代数			√											√	

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)	(13)	(14)	(15)
		应用随机过程			√				√	√							
		数据建模基础			√					√							
		智能计算			√				√			√		√			
		模式识别 A			√				√			√					
		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			√												
√		并行计算			√				√			√					
		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			√												
		现代数学方法选讲			√				√			√					
		数学文化选讲		√	√											√	
		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

信息与计算科学专业课程进程图





#### 四、理论教学建议进程表

#### IV Theory Course Schedule

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Number	课程名称 Course Title	学分 Crs	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major	
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur				
通识课程 Public Basic Courses	必修课 Required Courses	4220001110	思想道德修养与法律基础 Morals, Ethics and Fundamentals of Law	3	48			8		1-6			
		4220002110	中国近现代史纲要 Outline of Contemporary and Modern Chinese History	2	32					1-6			
		4220003110	毛泽东思想和中国特色社会主义理论体系概论 Introduction to Mao Zedong Thought and Socialism with Chinese Characteristics	4	96			32		1-6			
		4220005110	马克思主义基本原理 Marxism Philosophy	3	48			8		1-6			
		1060003130	军事理论 Military Theory	1	32			16		1-4			
		1050001130	心理健康教育 Mental Health Education	1	16					1-2			
		4210001110	体育 1 Physical Education I	1	32					1			
		4210002110	体育 2 Physical Education II	1	32					2	体育 1		
		4210003110	体育 3 Physical Education III	1	32					3	体育 2		
		4210004110	体育 4 Physical Education IV	1	32					4	体育 3		
		4030002110	大学英语 A1 College English A I	3	64				16	1			
		4030003110	大学英语 A2 College English A II	3	64				16	2	大学英语 A1		
		4030004110	大学英语 A3 College English A III	3	64				16	3	大学英语 A2		
		4030005110	大学英语 A4 College English A IV	3	64				16	4	大学英语 A3		
		4120017110	大学计算机基础 Foundation of Computer	2	32			12		1			
		4120023110	计算机程序设计基础(C语言) Fundamentals of Computer Program Design(C)	3	48			12		2			
					小计 Subtotal	35	736		24	64	64		
选修课 Elective Courses	创新创业类 Innovation and Entrepreneurship Courses	全校学生要求至少取得 9 个学分,且必须选修艺术体育类课程中的艺术类相关课程,取得至少 2 个学分。理工科专业学生至少选修一门人文社科类或经济管理类课程,其他专业学生至少选修一门科学技术类课程。 All students are required to obtain at least 9 credits, and must select art courses from <i>Art and Physical Education Courses</i> to obtain at least 2 credits. Science and engineering students should select at least one course from <i>Arts and Social Science Courses</i> or <i>Economy and Management Courses</i> , and other students should select at least one course from <i>Science and Technology Courses</i> .											
	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												

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Number	课程名称 Course Title	学分 Crs	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major	
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur				
学 科 大 类 课 程  Basic Disciplinary Courses	必 修 课  Required Courses	4050335110	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		
		4050355120	高等代数 1 Higher Algebra I	5	80					1	高等代数 1		
		4050358120	高等代数 2 Higher Algebra II	2.5	40					2	高等代数 1		
		4050359120	空间解析几何 Space analytic geometry	2.5	40					2			
		4050019110	常微分方程 Ordinary Differential Equations	3	48					3	数学分析 2		
		4050166110	数据结构与算法 A Data Structure & Algorithms	3.5	56		16			3	计算机程序设计基础		
		4050021110	大学物理 B Physics B	5	80					3	数学分析 2		
		4050222110	物理实验 B Physics Lab. B	1	32	32				4	大学物理 B		
		4050406120	实变函数 Functions of Real Variable	3.5	56					3	数学分析 2		
		小计 Subtotal				43	704	32	16				
	选 修 课  Elective Courses	4050180110	数学实验与数学软件 Mathematical experiments & Soft	2.0	32		12			2	大学计算机基础		
		4050254110	运筹学 Operation Research	3.0	48					3	数学分析 2		
		4010097110	西方经济学 B West Economics B	3.0	48					4			
		小计 Subtotal				8	128	12					
	修读说明：要求至少选修 5 学分。 NOTE: Minimum subtotal credits:5												
	专 业 课 程  Specialized Courses	必 修 课  Required Courses	4050184110	数值分析 A Numerical Analysis A	4	64		8			4		
			4050477130	面向对象程序设计方法 Object-oriented programming method	4	64		24			4		
			4050128110	离散数学 Discrete Mathematics	4	64					4		
			4050057110	概率论与数理统计 A Probability and Statistics A	4.5	72					4	数学分析 3	
4050051110			复变函数与积分变换 A Complex Analysis & Transformation A	4	64					4	数学分析 3		
4050165110			数据分析 Data Analysis	3	48					5	概率论与数理统计 A		
4050408120			数学物理方程 Equations of Mathematical Physics	2.5	40					5	数学分析 3		

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Number	课程名称 Course Title	学分 Crs	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur			
		4050399120	微分方程数值解 Numerical Solution of Differential Equations	2.5	40					6		
		4050232110	信息安全与密码学 Information Safety and Cryptography	3	48		8			6		
		小计 Subtotal		31.5	504		40					
	选修课 Elective Courses	4050178110	数学模型 A Mathematical Model A	3.5	56		8			4	运筹学	
		4050394120	近世代数 Modern Algebra	3	48					5		
		4050244110	应用随机过程 Applied Stochastic Processes	3	48					5		
		4050480130	数据建模基础 Data Modeling Foundation	3	48					5		
		4050258110	智能计算 Artificial Computation	2	32					5	数值分析	
		4050140110	模式识别 A Pattern Recognition A	3	48		8			5	概率论与数理统计 A	
		4050262110	最优化方法 Optimization Method	2.5	40		8			5	数学模型 A	
		4050375120	泛函分析 Functional Analysis	3	48					5	实变函数	
		4050170110	数据挖掘原理与算法 Data mining principles and algorithms	3.5	56		16			6	数据分析	
		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 Applied Regression Analysis	3	48		8			6		
		4050368120	并行计算 Parallel computing	4	64		16			6	数值分析 A	
		4050487130	数字图像处理基础 Digital Image Processing	3	48		8			6		
		4050474130	计算机图形学 Computer Graphics	3	48		8			6		
		4050491130	图像应用技术 Image Application Technology	2	32					7		
		4050127110	控制论基础 The Foundation of Control Theory	2	32					7		
		4050497130	小波分析 Wavelet Analysis	3	48					7		
		4050495130	现代数学方法选讲 Selective modern mathematical methods	3	48					7		
		4050485130	数学文化选讲 Selective mathematics culture	3	48					7		
			小计 Subtotal		55.5	888		96				
		修读说明：要求至少选修 24 学分。 NOTE: Minimum subtotal credits: 24										

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Number	课程名称 Course Title	学分 Crs	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur			
个性化课程 Personalized Course	选修课 Elective Courses	修读说明：学生可跨专业自主选择修读全校其他专业的课程，建议修读以上课程。要求至少选修 10 学分。 NOTE: Students can choose any courses from the other specialties, and are especially suggested to choose the courses above. Minimum subtotal credits: 10.										

## 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	周数 Weeks	学分 Crs	建议修读学期 Suggested Term
1060002110	军事训练 Military Training	3	1.5	1
4050321110	专业调查与实践 Understanding of Specialty	2	2	4
4050440120	建模与数值仿真课程设计 Design of Modeling and Numeric Simulation	2	2	4
4050445120	数据信息处理课程设计 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
4050275110	毕业实习 Graduation Practice	2	2	7
4070432120	毕业设计 Graduation Design	17	11	8
小计 Subtotal		30	22.5	

## 六、修读指导

### VI Recommendations on Course Studies

专业选修课程选修建议：

Suggestion of specialized elective courses:

(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、数据建模基础、数据挖掘原理与算法、实用计算方法与软件、实用回归分析、最优化方法、并行计算。

Suggestion of data information computing: Operation Research、Artificial Computation、Applied Stochastic Processes、Data Modeling Foundation、Data mining principles and algorithms、Practical Calculation Method and Software、Applied Regression Analysis 、Optimization Method、Parallel computing.

(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、图像应用技术、并行计算、小波分析、泛函分析。

Suggestion of mage information science: Applied Stochastic Processes、Pattern Recognition、Artificial Computation、Computer Graphics、Digital Image Processing、Image Application Technology、Parallel computing、Wavelet Analysis、Functional Analysis.

(3) 《形势与政策》课程，平均每学期 16 学时，一般按专题进行，在第七学期考核，

计 2 个课外学分，具体由学校学生发展指导中心负责组织落实。

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

学院教学责任人：何 朗  
专业培养方案责任人：刘 扬

# 【统计学专业】2015 版本本科培养方案

## Undergraduate Education Plan for Specialty in Statistics (2015)

专业名称	统计学	主干学科	统计学
Major	Statistics	Major Disciplines	Statistics
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	Mathematics Duration	1.5years

### 最低毕业学分规定

#### Graduation Credit Criteria

课程类 Course Classification 课程性质 Course Nature	通识课程 Public Basic Courses	学科大类课程 Basic Disciplinary Courses	专业课程 Specialized Courses	个性课程 Personalized Course	集中性实践 Practice Courses	课外学分 Study Credit after Class	总学分 Total Credits
必修课 Required Courses	35	43	36	\	24.5	\	190
选修课 Elective Courses	9	5	17.5	10	\	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科学素养和扎实的概率论与数理统计基础，掌握统计学的基本理论和方法，具有一定的使用计算机的能力和解决实际的问题的能力。能熟练地运用所学知识与计算机技能采集信息、分析数据、综合处理。并在企业、事业单位和经济、管理部门从事统计调查、统计信息管理、数量分析等开发、应用和管理工作，或在科研、教育部门从事研究和教学工作的高级专门人才。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。

专业的培养目标为：

- 1) 以数学和统计学为核心，着重培养学生的基础理论、基础知识、基本技能、科研创新以及应用能力；
- 2) 使毕业生具有较高思想道德和文化修养、敬业精神和责任感，具有健康的体魄和良好的心理素质；
- 3) 培养具备数学与统计学的知识和能力的坚实基础，良好的科学思维和科学方法，德、智、体全面发展，能适应科学技术发展和现代化建设的需要的复合型创新人才。

The program is designed to build a solid background for students in mathematics, probability and statistics. Through studying a variety of courses, the students improve their ability in mathematics, statistics, computer data progressing and analysis, and statistical progressing. The program is aimed to prepare students for careers in business, industry, management science, economy, finance, science research, education, etc.

Professional training objectives consist of:

- 1) Taking mathematics and statistics as the core, with emphasis on cultivating students' basic

theory, basic knowledge and basic skills, research innovation and application abilities.

- 2) Making graduates have high moral and cultural enrichment, professionalism and social responsibility, good health and mental qualities.
- 3) Training compound talents who have solid foundation about mathematical and statistical knowledge and abilities, good scientific thinking and the scientific method, with comprehensive development on moral, intellectual and physical aspects in order to adapt to the needs of complex scientific and technological innovation.

## (二) 毕业要求

本专业学生主要学习统计学的基本理论和方法, 打好数学基础, 具有较好的科学素养, 受到理论研究、应用技能和使用计算机的基本训练, 具有数据处理和统计分析的基本能力。

毕业生应获得以下几方面的知识和能力:

1. 具有扎实的数学基础, 受到比较严格的科学思维训练;
2. 掌握统计学的基本理论、基本知识、基本方法和计算机操作技能; 具有采集数据、设计调查问卷和处理调查数据的基本能力;
3. 了解社会经济统计、工业统计以及技术工程中的模拟与仿真等有关的自然科学、社会科学、工程技术某一领域的基本知识, 具有应用统计学理论分析、解决该领域实际问题的初步能力;
4. 了解统计与概率专业学科的理论与方法的发展动态及其应用前景;
5. 能熟练使用各种统计软件包, 有较强的统计计算能力; 应具有经济学基础, 熟悉国家经济发展的方针、政策和统计法律、法规, 具有利用信息资料进行综合分析和管理的的能力;
6. 能较熟练掌握一门外国语, 顺利地阅读本专业对口的外文书刊; 掌握资料查询、文献检索及运用现代信息技术获得相关信息的基本方法; 具有一定的科学研究和实际工作能力;
7. 具有较强的英语综合应用能力, 特别是听说能力。在今后工作和社会交往中, 能用英语进行口头和书面的信息交流, 能熟练地进行外文阅读, 有一定的科技外语能力。
8. 学生具有良好的思想素质、身体素质、心理素质、文化修养、社会道德和责任担当等人文素养, 具有良好的口头和书面表达和交流能力, 具有良好的团队意识和合作精神。
9. 学生能够胜任本专业入门级的职业岗位, 具备研究生课程学习所需的认知和基础能力, 具有进行终身学习的愿望和能力。

This program aims to nurture talents in statistics with its theory and methodology. The graduates can use specialized knowledge and statistics software to solve practical problems.

As a student of this course, you are supposed to have:

1. Solid grounding and well training in mathematics;
2. The knowledge in fundamental theories and methods of statistics, and the ability to program and process data with computer;
3. The basic knowledge related to one of the social statistics, hygienic statistics, biological statistics and industrial statistics;
4. Comprehension of development in theory and applications of probability and statistics;
5. The ability of science research and solving actual problems and the ability of statistical calculation with software package for the Bachelor of Science.
6. Mastery of a foreign language and the ability to employ technical resources documents in foreign language.

7. The ability of communication (oral and written) in science.

8. The student has good qualities of physical, psychological, cultural enrichment, social ethics and responsibility and other humanities, good oral and written expression and communication skills, good team spirit and cooperation.

9. Student are competent in professional entry-level professional positions, with postgraduate study cognitive and basic skills needed to lifelong learning has the desire and ability.

附：培养目标实现矩阵

	培养目标 1	培养目标 2	培养目标 3
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		√	

## 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

Mathematical Analysis, Higher Algebra, Probability, Mathematical Statistics

#### (二) 专业特色课程：

应用随机过程、实用回归分析、时间序列分析、多元统计分析、抽样调查、非参数统计、统计预测与决策

Stochastic Processes, Applied Regression analysis, Time Series Analysis, Multivariate Statistical Analysis, Sampling Survey, Non-parameter Statistics, Statistical Forecasting and Decision

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)	
		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									√	



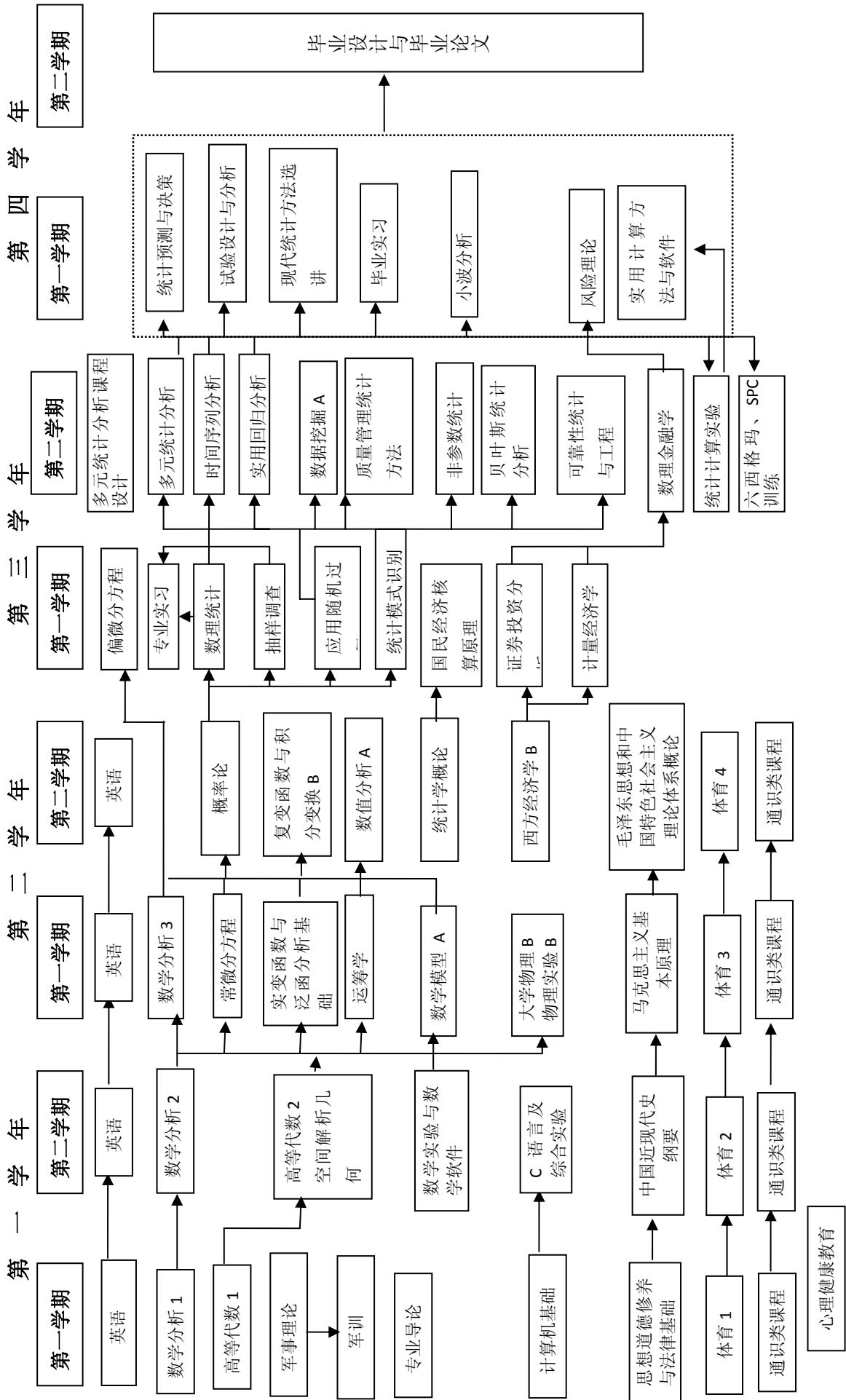
专业 核心 课程	专业 特色 课程	课程名称	统计学专业毕业要求									
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	
		心理健康教育									√	
		大学英语 A1-A4						√	√			
		大学计算机基础		√								
		计算机程序设计基础(C 语言)		√			√					
		专业导论				√						
√		数学分析	√									
√		高等代数	√									
		空间解析几何	√									
		常微分方程	√									
		数据结构与算法 A		√								
		大学物理 B	√									
		物理实验 B	√									
		实变函数	√									
		数学实验与数学软件					√					
		运筹学	√									
		西方经济学 B				√		√				
		计量经济学				√		√				
		数学模型 A				√		√				
		统计学概论		√								
		复变函数与积分变换 B	√									
√		概率论		√		√						
√		数理统计		√		√						
	√	抽样调查		√		√						
	√	应用随机过程		√		√						
	√	多元统计分析		√		√						
	√	时间序列分析		√		√						
	√	实用回归分析		√		√						

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)		
	√	统计预测与决策		√		√							
		试验设计与分析		√		√							
		数值分析 A	√				√						
		偏微分方程	√										
		国民经济核算原理			√		√						
		证券投资分析			√		√						
		统计模式识别		√		√							
		数理金融学			√		√						
		数据挖掘 A		√		√							
		质量管理统计方法		√		√							
	√	非参数统计		√		√							
		贝叶斯统计分析		√		√							
		可靠性统计与工程		√		√							
		实用计算方法与软件					√						
		风险理论			√		√						
		小波分析	√										
		现代统计方法选讲			√	√							
		军事训练									√		
		专业实习		√								√	
		统计计算实验			√		√						
		多元统计分析课程设计			√		√						
		六西格玛、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

统计学专业课程进程图



#### 四、理论教学建议进程表

#### IV Theory Course Schedule

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Number	课程名称 Course Title	学分 Crs	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major	
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur				
通识课程 Public Basic Courses	必修课 Required Courses	4220001110	思想道德修养与法律基础 Morals, Ethics and Fundamentals of Law	3	48			8		1-6			
		4220002110	中国近现代史纲要 Outline of Contemporary and Modern Chinese History	2	32					1			
		4220003110	毛泽东思想和中国特色社会主义理论体系概论 Introduction to Mao Zedong Thought and Socialism with Chinese Characteristics	4	96			32			1-6		
		4220005110	马克思主义基本原理 Marxism Philosophy	3	48			8			1-6		
		1060003130	军事理论 Military Theory	1	32			16			2-4		
		1050001130	心理健康教育 Mental Health Education	1	16						1-2		
		4210001110	体育 1 Physical Education I	1	32						1		
		4210002110	体育 2 Physical Education II	1	32						2	体育 1	
		4210003110	体育 3 Physical Education III	1	32						3	体育 2	
		4210004110	体育 4 Physical Education IV	1	32						4	体育 3	
		4030002110	大学英语 A1 College English A I	3	64					16	1		
		4030003110	大学英语 A2 College English A II	3	64					16	2	大学英语 A1	
		4030004110	大学英语 A3 College English A III	3	64					16	3	大学英语 A2	
		4030005110	大学英语 A4 College English A IV	3	64					16	4	大学英语 A3	
		4120017110	大学计算机基础 Foundation of Computer	2	32			12			1		
		4120023110	计算机程序设计基础(C语言) Fundamentals of Computer Program Design (C Language)	3	48			12			2		
		小 计 Subtotal				35	704		24	64	64		
选修课 Elective Courses	创新创业类 Innovation and Entrepreneurship Courses			<p>全校学生要求至少取得 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,取得至少 2 个学分。理工科专业学生至少选修一门人文社科类或经济管理类课程,其他专业学生至少选修一门科学技术类课程。</p> <p>All students are required to obtain at least 9 credits, and must select art courses from <i>Art and Physical Education Courses</i> to obtain at least 2 credits. Science and engineering students should select at least one course from <i>Arts and Social Science Courses</i> or <i>Economy and Management Courses</i>, and other students should select at least one course from <i>Science and Technology Courses</i>.</p>									
	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												

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Number	课程名称 Course Title	学分 Crts	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur			
学 科 大 类 课 程  Basic Disciplinary Courses	必 修 课  Required Courses	4050335110	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	
		4050355120	高等代数 1 Higher Algebra I	5	80					1		
		4050358120	高等代数 2 Higher Algebra II	2.5	40					2		
		4050359120	空间解析几何 Space analytic geometry	2.5	40					2		
		4050019110	常微分方程 Ordinary Differential Equations	3	48					3	数学分析 2	
		4050166110	数据结构与算法 A Data Structure & Algorithms	3.5	56		16			3		
		4050463130	大学物理 B Physics B	5	80					3	数学分析 1	
		4050224110	物理实验 B Physics Lab. B	1	32	32				4	大学物理 B	
		4050406120	实变函数 Functions of A Real Variable	3.5	56					3	数学分析 3	
		小 计 Subtotal				43	704	32	16			
	选 修 课  Elective Courses	4050180110	数学实验与数学软件 Mathematical experiments & Soft	2	32		12			2	数学分析 1	
		4050254110	运筹学 Operation Research	3	48					3		
		4010097110	西方经济学 B West Economics B	3	48					4		
		小 计 Subtotal				8	128		12			
	修读说明：要求至少选修 5 分。 NOTE: Minimum subtotal credits: 5.											
	专 业 课 程  Specialized Courses	必 修 课  Required Courses	4050449130	统计学概论 An introduction to statistics	2	32					4	
4050052110			复变函数与积分变换 B Complex Function and Integral Transform B	3	48					4	数学分析 2	
4050473130			概率论 Probability	4	64					4	数学分析 2	
4050482130			数理统计 Mathematical Statistics	4	64					5	概率论	
4050020110			抽样调查 Sampling Survey	3	48					5	数理统计	
4050500130			应用随机过程 Applied Stochastic Processes	4	64					5	概率论	
4050372120			多元统计分析 Multivariate Statistical Analysis	3.5	56		8			6	数理统计	

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Number	课程名称 Course Title	学分 Crts	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur			
		4050405120	时间序列分析 Time Series Analysis	3.5	56		8			6	数理统计	
		4050407120	实用回归分析 Applied Regression Analysis	3	48		8			6	数理统计	
		4050191110	统计预测与决策 Statistical Forecasts and Decisions	3	48					7	数理统计	
		4050164110	试验设计与分析 Experimental Design and Analysis	3	48					7	数理统计	
		小 计 Subtotal		36	576		24					
	选修课 Elective Courses	4050184110	数值分析 A Numerical Analysis A	4	64		8			4	常微分方程	
		4050178110	数学模型 A Mathematical Model A	3.5	56		8			4		
		4010056110	计量经济学 Econometrics	3.5	56	8				5		
		4050142110	偏微分方程 Partial Differential Equation	2	32					5	常微分方程	
		4050090110	国民经济核算原理 The Principle of National Economic	3	48					5		
		4010214130	证券投资分析 Security Investment Analysis	3	48					5		
		4050489130	统计模式识别 Statistical Pattern Recognition	3	48		8			5	概率论	
		4050489130	数理金融学 Mathematical Finance	3	48					6	应用随机过程	
		4050169110	数据挖掘 A Data Mining A	3	48					6		
		4050257110	质量管理统计方法 Statistical Method in Quality Management	3	48					6	概率论	
		4050038110	非参数统计 Nonparametric Statistics	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	
		4050476130	可靠性统计与工程 Reliability Statistics and Engineering	3	48					6	数理统计	
		4050479130	实用计算方法与软件 Practical Calculation Method and Software	3	48		16			7		
		4050377120	风险理论 Risk Theory	3	48					7	数理金融学	
		4050497130	小波分析 Wavelet Analysis	3	48					7		
		4050496130	现代统计方法选讲 Selective Modern Mathematical Methods	2	32					7		
			小 计 Subtotal		51	816	8	40				
		修读说明：要求至少选修 17.5 学分。 NOTE: Minimum subtotal credits: 17.5.										

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Number	课程名称 Course Title	学分 Crts	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur			
个性化课程 Personalized Course	选修课 Elective Courses	修读说明：学生可跨专业自主选择修读全校其他专业的课程。要求至少选修 10 学分。 NOTE: Students can choose any courses from the other specialties. Minimum subtotal credits: 10.										

## 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	周数 Weeks	学分 Crts	建议修读学期 Suggested Term	第二专业 Second Major
1060002110	军事训练 Military Training	3	1.5	1	
4050502130	专业实习 Practice of Special	2	2	5	
4050446120	统计计算实验 Statistical Computation and Experiments	2	2	6	
4050284110	多元统计分析课程设计 Design of Course	2	2	6	
4050296110	六西格玛、SPC 训练 6σ、SPC Training	1	1	6（暑期）	
4050488130	统计案例分析 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	17	11	8	
小 计 Subtotal		32	24.5		

## 六、修读指导

### VI Recommendations on Course Studies

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

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

学院教学责任人：何 朗  
专业培养方案责任人：李 丹

# 【工程力学专业】2015 版本本科培养方案

## Undergraduate Education Plan for Engineering Mechanics (2015)

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

课程类 Course Classification 课程性质 Course Nature	通识课程 Public Basic Courses	学科大类课程 Basic Disciplinary Courses	专业课程 Specialized Courses	个性课程 Personalized Course	集中性实践 Practice Courses	课外学分 Study Credit after Class	总学分 Total Credits
必修课 Required Courses	35	47.5	40.5	\	28.5	\	190
选修课 Elective Courses	9	\	13.5	6	\	10	

### 一、培养目标与毕业要求

#### I Educational Objectives & Requirement

##### (一) 培养目标

- (1) 身心健康，具备良好的敬业精神、社会责任感和工程职业道德，关注当代全球和社会问题，具有质量意识、环境意识和安全意识。
- (2) 具有从事与力学相关工程领域工作所需的数理知识和其它相关自然科学知识，并将数学和科学工具运用于解决工程问题奠定基础。
- (3) 具有力学基础理论知识、专业知识和实验能力，能从事工程领域的力学测试、科学研究、技术开发、工程设计和工程管理工作。
- (4) 具有设计、开发和应用力学计算分析软件的能力，能从事工程领域的计算与仿真工作。
- (5) 具有良好的口头和书面表达和交流沟通能力、良好的团队意识和合作精神，具有终身学习的能力。

##### **Educational objectives:**

- (1) Taking care of physical and mental well-being, attaining a fairly high level of social morality and responsibility, and being focusing on current global and social issues in order to establish corresponding quality, environmental and security awareness.
- (2) Accumulating solid acquaintance of mathematics, physics, and other subjects in natural science for working in the engineering field associated with mechanics problems, and laying foundation of applying mathematical and scientific laws to solve engineering problems.
- (3) Receiving basic trainings on fundamental theories, professional knowledge and experimental methods related to mechanics, and being capable of pursuing mechanical test, research, creation, design and management in engineering circle.
- (4) Obtaining experience with renovation, development and application of analysis software



for computational mechanics, and being able to carry out numerical modeling and simulation in engineering field.

- (5) Possessing good self-expression skills such as writing, speaking and negotiating for communication, as well as good teamwork and co-operation spirit, and having the ability to realize lifelong learning.

## (二) 毕业要求

- (1) 学生掌握从事本专业领域所需的数学、相关自然科学和管理知识。
- (2) 学生掌握本专业的基本理论知识，能够利用原理性知识进行自主发现、自主设计和自主解决与力学相关的问题。
- (3) 学生掌握本专业的专业基础知识，能运用力学分析思维解决工程问题。
- (4) 学生掌握力学实验相关知识，能从事工程领域的力学测试与结构检测等工作。
- (5) 学生掌握力学计算分析软件的开发与应用，能从事工程领域的数值模拟与工程仿真等工作。
- (6) 学生掌握与工程结构相关的专业知识，能从事工程结构的设计、施工与管理等工作。
- (7) 学生了解本专业的发展动态和前沿，熟悉力学相关领域的最新开发工具种类和发展方向。
- (8) 学生具有良好的思想素质、身体素质、心理素质、文化修养、社会道德和责任担当等人文素养。
- (9) 学生了解当代全球问题和社会问题，在工程实践中综合考虑经济、环境、法律、安全和伦理等制约因素。
- (10) 学生具有逻辑思维和辩证思维的能力，具有批判意识和求真务实的科学思维方法，具有创新意识，掌握基本的创新方法。
- (11) 学生掌握运用现代信息技术跟踪并获取信息的方法，熟练进行文献检索和资料查询。
- (12) 学生具有良好的口头和书面表达和交流能力，至少熟练掌握一门外语进行技术沟通和交流能力。具有良好的团队意识和合作精神。
- (13) 学生能够胜任本专业入门级的职业岗位，具备研究生课程学习所需的认知和基础能力。
- (14) 学生具有进行终身学习的愿望和能力，具有适应工程领域不断发展的能力。

Graduate requirements:

- (1) The students accumulate solid foundation of mathematics, the natural science and administrative science for working in this professional field.
- (2) The students acquire fundamental theories in this major, and are able to use the principle knowledge to conduct independent finding, creating and solving of problems associated with mechanics.
- (3) The students master professional knowledge in this major, and are able to apply analytical thinking of mechanics to solve engineering problems.
- (4) The students obtain methods related to experimental mechanics, and are able to work on mechanical and structural tests in engineering field.
- (5) The students get experience with development and application of analysis software for computational mechanics, and are able to carry out numerical modeling and simulation in engineering field.
- (6) The students establish comprehensive acquaintance with engineering structure, and are able to undertake the mission for modeling, constructing and managing various

engineering structures

- (7) The students know something new about the development in this major, so as to obtain concepts on the latest theories, problems and solutions related to mechanical subjects.
- (8) The students attain a fairly high level of ideological, physical, psychological and cultural quality as well as the social morality and responsibility.
- (9) The students are aware of current global and social issues, and then take into account various influences such as economic, environmental, legal, security and ethical factors in their engineering practice.
- (10) The students are accustomed to putting problems in logical and dialectical way, and have the attribute of scientific thinking with innovative, critical and pragmatic consciousness.
- (11) The students can track, collect and get ride of necessary information by employing the modern computer and internet technology for making literature searching and data inquiry.
- (12) The students are fluent in at least a foreign language for technical communication, with good self-expression skills such as writing, speaking and negotiating, and possessing essential teamwork and co-operation spirit.
- (13) The students are competent for the junior work jobs in the industry, and are adequate to taking further graduate courses by having enough cognitive and basic ability.
- (14) The students have desire and ability to practice lifelong learning, and can keep pace with the growth and innovation of engineering topics.

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	培养目标 5
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		√	√	√	
毕业要求 13		√	√	√	√
毕业要求 14					√

## 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、结构力学、弹性力学、流体力学、计算力学、振动力学、实验力学、塑性力学、混凝土结构设计原理、钢结构力学分析。

Theoretical Mechanics, Mechanics of Materials, Structural Mechanics, Elastic Mechanics,

Fluid Mechanics, Computational Mechanics, Vibration Mechanics, Experimental mechanics, Mechanics of Plasticity, Principle of Concrete Structure Design, Mechanical Analysis of Steel Structures.

(二) 专业特色课程:

有限元分析与应用、复合材料力学与结构设计、纳米力学、结构力学、混凝土结构设计原理、钢结构力学分析。

Characteristic Courses: FEM Analysis and Application, Mechanics of Composite Materials and Structural Design, Nanomechanics, Structural Mechanics, Principle of Concrete Structure Design, Mechanical Analysis of Steel Structures..

附: 毕业要求实现矩阵:

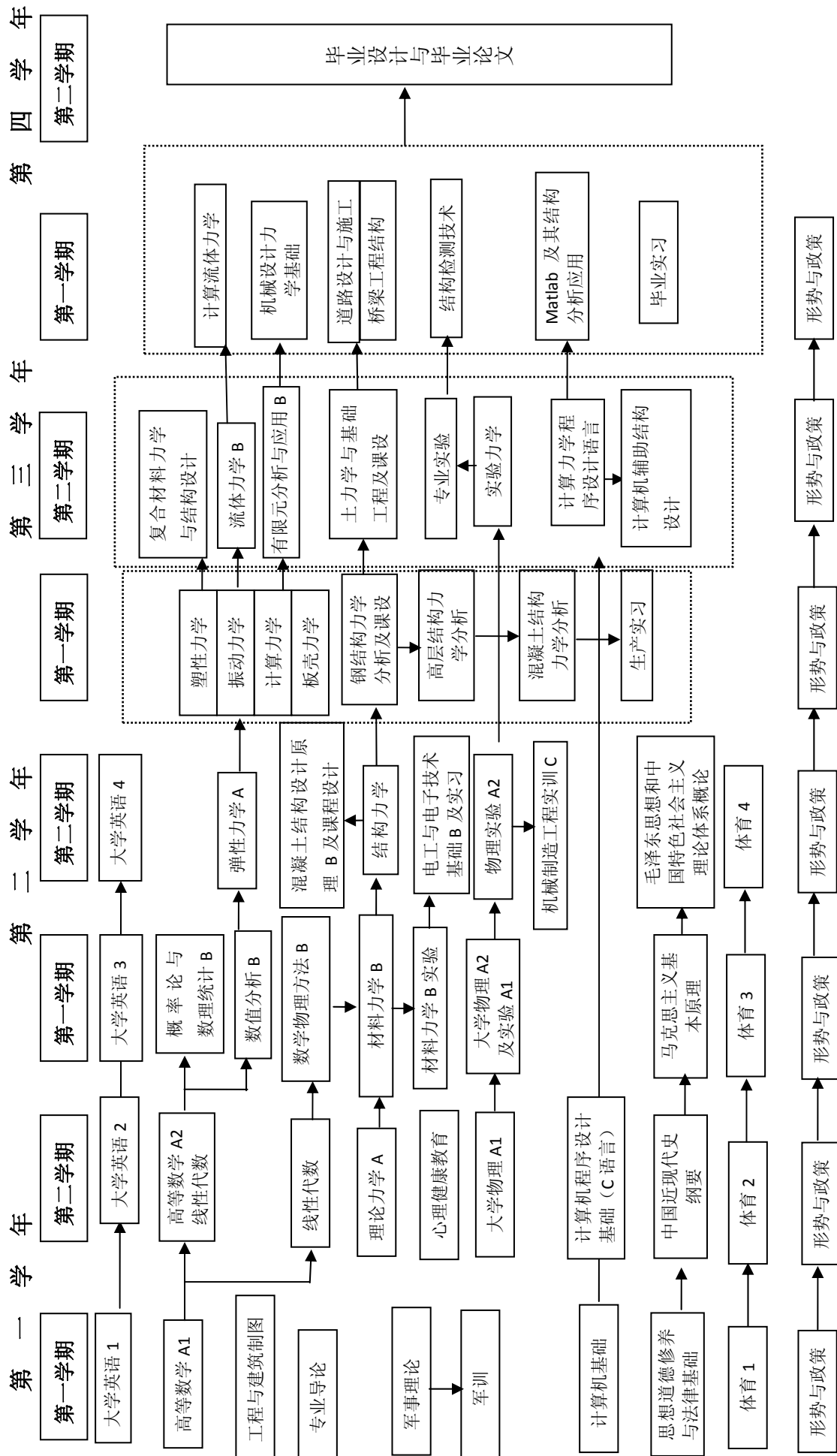
专业 核心 课程	专业 特色 课程	课程名称	工程力学专业毕业要求														
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	
		思想道德修养与法律基础								√	√				√		
		中国近现代史纲要								√	√						
		毛泽东思想和中国特色社会主义理论体系概论								√	√						
		马克思主义基本原理								√		√					
		军事理论								√							
		体育								√							
		大学英语													√	√	
		大学计算机基础	√										√			√	
		计算机程序设计基础(C语言)	√													√	
		心理健康教育									√						
		专业导论	√	√						√							√
		高等数学	√														√
		线性代数	√														√
		概率论与数理统计 B	√														√
		大学物理	√														√
		物理实验	√			√											√
		工程与建筑制图	√	√	√				√								√
		电工与电子技术基础 B	√														√
√		理论力学 A		√													√

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)	(13)	(14)
√		材料力学 B		√	√										√	
		材料力学 B 实验		√	√	√									√	
		数值分析 B	√	√											√	
		数学物理方法 B	√	√											√	
√		弹性力学 A			√										√	
√	√	混凝土结构设计原理 B							√						√	
√	√	结构力学 C			√				√						√	
√		计算力学			√		√								√	
√	√	钢结构力学分析							√						√	
√		振动力学			√										√	
√		塑性力学			√										√	
√		流体力学 B			√										√	
√		实验力学			√	√									√	
	√	有限元分析与应用 B						√	√						√	
		土力学与基础工程							√						√	
		分析力学			√											
		工程材料力学性能				√										
		工程结构构造与设计							√							
		结构概念与体系							√							
		板壳力学			√											
		结构力学矩阵方法					√	√								
		高层结构分析							√							√
		混凝土结构力学分析							√							
		断裂力学			√											√
		计算力学程序设计语言					√									√
	√	复合材料力学与结构设计														√

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)	(13)	(14)
		复合材料工艺基础														√
		工程结构抗震						√								√
		工程岩土学						√								√
		计算机辅助结构设计					√	√								
		MATLAB 及其结构分析应用					√									
		计算流体力学					√									√
		机械设计力学基础														√
		结构检测技术 B				√										
		道路设计与施工						√								
		桥梁工程结构						√								
√		纳米力学							√							√
		军事训练								√						
		认识实习			√				√							
		力学基础强化训练			√											
		机械制造工程实训 C				√										
		混凝土结构设计原理课程设计						√								
		电工电子实习 B				√										
		生产实习						√								
		钢结构力学分析课程设计						√								
		土力学与基础工程课程设计						√								
		力学专业实验				√										
		毕业实习						√								
		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

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Number	课程名称 Course Title	学分 Crs	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major		
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur					
通 识 课 程  Public Basic Courses	必 修 课 Required Courses	4220001110	思想道德修养与法律基础 Morals, Ethics and Fundamentals of Law	3	48			8		1-6				
		4220002110	中国近现代史纲要 Outline of Contemporary and Modern Chinese History	2	32					1-6				
		4220003110	毛泽东思想和中国特色社会主义理论体系概论 Introduction to Mao Zedong Thought and Socialism with Chinese Characteristics	4	96			32		1-6				
		4220005110	马克思主义基本原理 Marxism Philosophy	3	48			8		1-6				
		1060003130	军事理论 Military Theory	1	32			16		1				
		1050001130	心理健康教育 Mental Health Education	1	16					2				
		4210001110	体育 1 Physical Education I	1	32					1				
		4210002110	体育 2 Physical Education II	1	32					2	体育 1			
		4210003110	体育 3 Physical Education III	1	32					3	体育 2			
		4210004110	体育 4 Physical Education IV	1	32					4	体育 3			
		4030002110	大学英语 A1 College English A I	3	64				16	1				
		4030003110	大学英语 A2 College English A II	3	64				16	2	大学英语 A1			
		4030004110	大学英语 A3 College English A III	3	64				16	3	大学英语 A2			
		4030005110	大学英语 A4 College English A IV	3	64				16	4	大学英语 A3			
		4120017110	大学计算机基础 Foundation of Computer	2	32		12			1				
		程序设计语言课程组(二选一, 3 学分) Courses of Computer Program Design (select one out of two, Credits: 3)												
		4120023110	计算机程序设计基础(C 语言) Fundamentals of Computer Program Design(C)	3	48			12			2			
		4120025110	计算机程序设计基础(VB 语言) Fundamentals of Computer Program Design(VB language)	3	48			12			2			
		小 计 Subtotal				35	736		24	64	64			
		选 修 课 Elective Courses	创新创业类 Innovation and Entrepreneurship Courses			全校学生要求至少取得 9 个学分, 且必须选修艺术体育类课程中的艺术类相关课程, 取得至少 2 个学分。理工科专业学生至少选修一门人文社科类或经济管理类课程, 其他专业学生至少选修一门科学技术类课程。 All students are required to obtain at least 9 credits, and must select art courses from Art and Physical Education Courses to obtain at least 2 credits. Science and engineering students should select at least one course from Arts and Social Science Courses or Economy and Management Courses, and other students should select at least one course from Science and Technology 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														

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Number	课程名称 Course Title	学分 Crs	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major
					总学时 Tot hrs.	实验 Exp.	上机 Opera-tion	实践 Prac-tice	课外 Extra-cur			
		艺术体育类 Art and Physical Education Courses										
学 科 大 类 课 程 Basic Disciplinary Courses	必 修 课 Required Courses	4050259110	专业导论 Introduction to Engineering Mechanics	1	16					1		
		4130066110	工程与建筑制图 Engineering and Architectural Drawing	4	64					1		
		4100011110	电工与电子技术基础 B Fundamentals of Electrical Engineering &	5.5	88	20				4		
		4050063110	高等数学 A 上 Advanced Mathematics A I	5	80					1		
		4050064110	高等数学 A 下 Advanced Mathematics A II	5	80					2	高等数学 B 上	
		4050229110	线性代数 Linear Algebra	2.5	40					2		
		4050058110	概率论与数理统计 B Probability and Mathematics Statistic B	3	48					3		
		4050021110	大学物理 A 上 Physics A I	3.5	56					2		
		4050022110	大学物理 A 下 Physics A II	3.5	56					3	高等数学 B 线性代数	
		4050222110	物理实验 A 上 Physics Lab. A I	1	28	28				3	高等数学 B 下	
		4050223110	物理实验 A 下 Physics Lab. A II	1	28	28				4		
		4050129110	理论力学 A Theoretical Mechanics A	4.5	72					2		
		4050016110	材料力学 B Mechanics of Materials B	4.5	72					3		
		4050017110	材料力学 B 实验 Experiments of Materials Mechanics B	1	32	32				3		
		4050185110	数值分析 B Numerical Analysis B	2.5	40		8			3		
		小 计 Subtotal		47.5	800	108	8					
专 业 课 程 Specialized Courses	必 修 课 Required Courses	4050181110	数学物理方法 B Mathematical Physics Methods B	3.5	56					3		
		4050025110	弹性力学 A Mechanics of Elasticity A	4	64					4		
		4050097110	混凝土结构设计原理 B Principle of Concrete Structures Design B	4	64					4		
		4050119110	结构力学 C Structural Mechanics C	4.5	72		10			4		
		4050114110	计算力学 Computational Mechanics	4	64					5		
		4050059110	钢结构力学分析 Mechanical Analysis of Steel Structures	3	48					5		
		4050255110	振动力学 Vibration Mechanics	2.5	40					5		
		4050186110	塑性力学 Mechanics of Plasticity	2	32					5		



课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Number	课程名称 Course Title	学分 Crs	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major	
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur				
选修课 Elective Courses		4050135110	流体力学 B Fluid Mechanics B	3.5	56	6				6			
		4050162110	实验力学 Experimental Mechanics	2.5	40	8				6			
		4050536140	有限元分析与应用 FEM Analysis & Application	3.5	56		16	8		6			
		4050194110	土力学与基础工程 Soil Mechanics and Fundamental Engineering	3.5	56					6			
		小 计 Subtotal			40.5	648	14	26	8				
		4050046110	分析力学 Analysis Mechanics	2	32					3			
		4050350110	工程材料力学性能 Mechanical Properties of Engineering Materials	2	32					4			
		4050069110	工程结构构造与设计 Engineering Structural Construction and	4	64			4		4			
		4050116110	结构概念与体系 Structural Concept and System	2	32					4			
		4050006110	板壳力学 Mechanics of Plates and Shells	2	32					5			
		4050120110	结构力学矩阵方法 Matrix Method of Structural Mechanics	2	32		20			5			
		4050060110	高层结构分析 Structural Analysis of High-rise Buildings	2.5	40			8		5			
		4050096110	混凝土结构力学分析 Mechanical Analysis of Concrete Structures	2.5	40			8		5			
		4050034110	断裂力学 Fracture Mechanics	2	32					6			
		4050115110	计算力学程序设计语言 Program Design Language for Computational Mechanics	3.5	56		20			6			
		4050055110	复合材料力学与结构设计 Mechanics of Composite Materials and Structural Design	3.5	56					6			
		4050054110	复合材料工艺基础 Basic Technology of Composite Materials	2	32					6			
		4050070110	工程结构抗震 Engineering Structural Seismic	2.5	40			8		6			
		4050074110	工程岩土学 Soil and Rock Engineering	2	32	6				6			
		4050108110	计算机辅助结构设计 Computer Aided Structural Design	2	32		20			6			
	4050004110	MATLAB 及其结构分析应用 MATLAB and its Structural Analysis	2	32		16			7				
	4050351110	计算流体力学 Computational Fluid Mechanics	2	32					7				
	4050098110	机械设计力学基础 Fundamentals of Mechanical Design	3.5	56	6				7				

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Number	课程名称 Course Title	学分 Crts	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur			
		4050118110	结构检测技术 B Structural Testing Techniques B	2	32	10				7		
		4050027110	道路设计与施工 Roadway Design and Construction	2	32					7		
		4050147110	桥梁工程结构 Bridge Engineering Structure	2.5	40					7		
		4050537140	纳米力学 Nanomechanics	2	32					7		
		小 计 Subtotal		52.5	840	22	76	28				
修读说明：要求至少选修 13.5 学分。 NOTE: Minimum subtotal credits: 13.5												
个性化课程 Personalized Course	选修课 Elective Courses	修读说明：学生从以上个性课程和学校发布的其它专业的个性课程列表中选择课，要求至少选修 6 学分。 NOTE: Students can choose any courses from above courses or other majors' personalized courses released by the university. Minimum subtotal credits: 6.										

## 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	周数 Weeks	学分 Crts	建议修读学期 Suggested Term
1060002110	军事训练 Military Training	3	1.5	1
4050299110	认识实习 Practice of Understanding	1	1	3
4050294110	力学基础强化训练 Strengthening Training on Mechanics Foundation	2	2	3
4080151110	机械制造工程实训 C Practice of Mechanical Manufacturing Engineering C	2	2	4
4050286110	混凝土结构设计原理课程设计 Course Design on Concrete Structure Design	1	1	4
4100069110	电工电子实习 B Practice of Electrical Engineering & Electronics B	1	1	4
4050303110	生产实习 Production Practice	2	2	5
4050285110	钢结构力学分析课程设计 Course Design on Mechanical Analysis of Steel Structures	1	1	5
4050538140	土力学与基础工程课程设计 Course Design on Soil Mechanics and Fundamental Engineering	1	1	6
4050539140	力学专业实验 Mechanics Specialized Experiments	2	2	6
4050274110	毕业实习 Practice for Graduation	2	2	7

课程编号 Course Number	实践环节名称 Practice Courses Name	周数 Weeks	学分 Crs	建议修读学期 Suggested Term
4050295110	力学综合实验 Comprehensive Experiments on Mechanics (conducted	1	1	7 (分散)
4050434120	毕业设计 Graduation Design (Thesis)	17	11	8
小 计 Subtotal		36	28.5	

## 六、修读指导

### VI Recommendations on Course Studies

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

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

学院教学责任人：何 朗

专业培养方案责任人：张 梅

# 【应用数学实验班】2015 版本本科培养方案

## Undergraduate Education Plan for Specialty in Applied Mathematics Experimental Class (2015)

专业名称	信息与计算科学	主干学科	理学
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

课程类 Course Classification 课程性质 Course Nature	通识课程 Public Basic Courses	学科大类课程 Basic Disciplinary Courses	专业课程 Specialized Courses	个性课程 Personalized Course	集中性实践 Practice Courses	课外学分 Study Credit after Class	总学分 Total Credits
必修课 Required Courses	35	43	37	\	21.5	\	190
选修课 Elective Courses	9	5	19.5	10	\	10	

### 一、培养目标与毕业要求

#### I Educational Objectives & Requirement

##### (一) 培养目标

- (1) 身心健康，具备良好的敬业精神、社会责任感和工程职业道德，关注当代全球和社会问题，具有质量意识、环境意识和安全意识；
- (2) 具有扎实的数学基础，掌握信息科学或计算科学的基本理论和方法；
- (3) 具有综合运用科学理论、方法和技能解决某些科研或生产中的实际问题的能力；
- (4) 能熟练使用计算机（包括常用语言、工具以及一些专用软件），具有基本的算法分析、设计能力和较强的编程能力，具有一定的科学研究和软件开发的能力；
- (5) 具有良好的口头和书面表达和交流沟通能力、良好的团队意识和合作精神，具有终身学习的能力。

##### Educational Objectives:

- (1) physically and mentally healthy, has a good working spirit, sense of social responsibility and engineering professional ethics, concerned about the contemporary and social issues around the world, with consciousness of quality, environment and safety;
- (2) Solid grounding in mathematics, fundamental theories and knowledge in information and computing science;
- (3) Has ability of the integrated use of scientific theory, method and skill to solve some practical problems in scientific research or production;
- (4) Mastery of common computer language tools and necessary specialized software, skills in algorithm analysis, design and programming, having a practical ability to carry out science research and software development;
- (5) Efficient in both oral and written expression, good at communication, has good team consciousness and cooperation spirit and enjoys lifelong learning.

## (二) 毕业要求

- (1) 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；为人正直、诚实守信；具有良好的职业道德规范，自觉遵守所属职业体系的职业行为准则；具备团队合作精神，并具备一定的协调、管理、竞争与合作的初步能力。
- (2) 具有适应 21 世纪社会主义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、现代意识等。
- (3) 具有良好的科学素质，能够理解专业科学知识，了解科学研究过程和方法；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，并具有一定的应用它们处理实际问题、参与公共事务的能力。
- (4) 具备较强的适应能力，自信、灵活地处理新的和不断变化的人际环境和工作环境；具备较强的人际交往能力和团结合作精神。
- (5) 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。
- (6) 具有较强的工作责任感，在工作质量、工作效率、工作纪律、职业健康安全、维护企业形象、关注企业发展等方面体现对工作、对企业的责任。
- (7) 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数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。
- (8) 具有应用数学进行分析、推理、证明和计算的能力；针对具体的实际问题，具有能够应用所学的数学知识建模并计算解决问题的综合能力。
- (9) 具有应用计算机及相应数学软件的能力。
- (10) 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；具有创新的观念和创新欲望；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。
- (11) 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。
- (12) 熟练掌握计算机方面的知识，能过运用计算机进行科学计算和研究；掌握信息查询及文件检索方法。
- (13) 了解人文社会科学知识，包括文学、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。
- (14) 掌握物理学等自然科学知识和控制理论等相关的工程技术知识。
- (15) 具有扎实的数学基础，掌握信息科学与计算科学的基本理论和方法。

### Requirement:

- (1) Has good qualities in morality, body constitution and psychological disposition; With good social morality, consciously abide by social norms; With strong sense of law, to carry out work in accordance with the requirements of the standards and procedures; Be honest and trustworthy; Has good professional ethics, consciously abide by the professional code; Has team work spirit with ability of coordination, management, competition and cooperation.
- (2) Adapting to Chinese socialist state's construction in the 21st century, has cultural characters including literacy, literary and artistic appreciation and modern consciousness.

- (3) Has the good scientific quality to comprehend the professional scientific knowledge, understand the scientific research process and methods; Be capable of combining natural science, social science and information technology; Master the basic scientific method with the scientific thought to solve problems and participate in public affairs.
- (4) Have strong ability to adapt the work and to handle affairs in new and changing environment; obtains abilities of interpersonal communication the spirit of cooperation.
- (5) With strong sense of social responsibility, contributing to environmental protection, resource conservation, public security, social service, social welfare and public health, and social order.
- (6) Has strong sense of work responsibility, pursuing work quality, work efficiency, work discipline, occupational health and safety, maintaining the corporate image, concern about enterprise development.
- (7) Has strong learning ability and enjoys lifelong learning; to learn the knowledge and latest technology in the field and constantly improve professional level, flowing the technology trend of information and computation mathematics development; has ability of Collection, analysis, judgment, induction and selection of domestic and foreign relevant technical information, updating professional knowledge.
- (8) Applies mathematics to analysis, reasoning, prove and computing; In view of the specific practical problems, has comprehensive ability to apply mathematics knowledge to solve the problem with modeling and computing.
- (9) Has the ability of application of computer and the corresponding mathematical software.
- (10) With strong sense of innovation, initially acquires the ability to produce innovation in mathematics modeling; With innovative ideas and desire, has solid professional knowledge, good study habits and independent scientific thinking habit.
- (11) Has a good grasp of English, able to read the professional foreign language material, be capable of expressing and communicating in English.
- (12) Good command of the computer knowledge, has ability of computer operating for scientific computing and research; Master information query and document retrieval method.
- (13) Learn about humanities and social science knowledge, including literature, history, philosophy, ideological and moral, art, law, sociology, and psychology.
- (14) Obtains knowledge of not only natural science such as physics, also engineering and technology such as control theory and the correlative.
- (15) Has a solid mathematical foundation and master the basic theory and method of information and computation science.

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	培养目标 5
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				√	
毕业要求 13					√
毕业要求 14			√		
毕业要求 15		√			

## 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, 概率论与数理统计, 微分方程数值解, 实变函数, 泛函分析, 微分几何。

Core Courses: Mathematical Analysis, Higher Algebra, Ordinary Differential Equations, Probability and Statistics, Numerical Solution of Differential Equations, Functions of A Real Variable, Functional Analysis, Differential Geometry.

#### (二) 专业特色课程:

数学模型、智能计算、现代数据分析导论及应用、计算机图形学、数学建模在生物医学中的应用、并行计算

Characteristic Courses: Mathematical model, Artificial Computation、Introduction to modern data analysis and its applications、Computer Graphics、Mathematical modeling applications in biomedicine、Computer graphs、Parallel computing.

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	应用数学实验班毕业要求															
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	
		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	√	√		√										√		
		大学英语 A1-A4		√	√					√				√				
		大学计算机基础			√							√			√			
		计算机程序设计基础(C语言)			√					√		√			√			

专业 核心 课程	专业 特色 课程	课程名称	应用数学实验班毕业要求														
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
		专业导论			√	√			√								
		心理健康教育	√			√	√	√									
√		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 A			√						√						
		大学物理 B			√											√	
		物理实验 B			√											√	
√		实变函数			√				√			√					√
		数学实验与数学软件			√				√	√	√			√			
		运筹学			√							√					
		西方经济学 B		√	√												
		数值分析 A			√				√			√					
		面向对象程序设计方法			√									√			
		离散数学			√												
√		概率论与数理统计 A			√				√			√					√
		复变函数与积分变换 A			√				√			√					√
√		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 A			√					√		√					√
		数据分析			√				√								

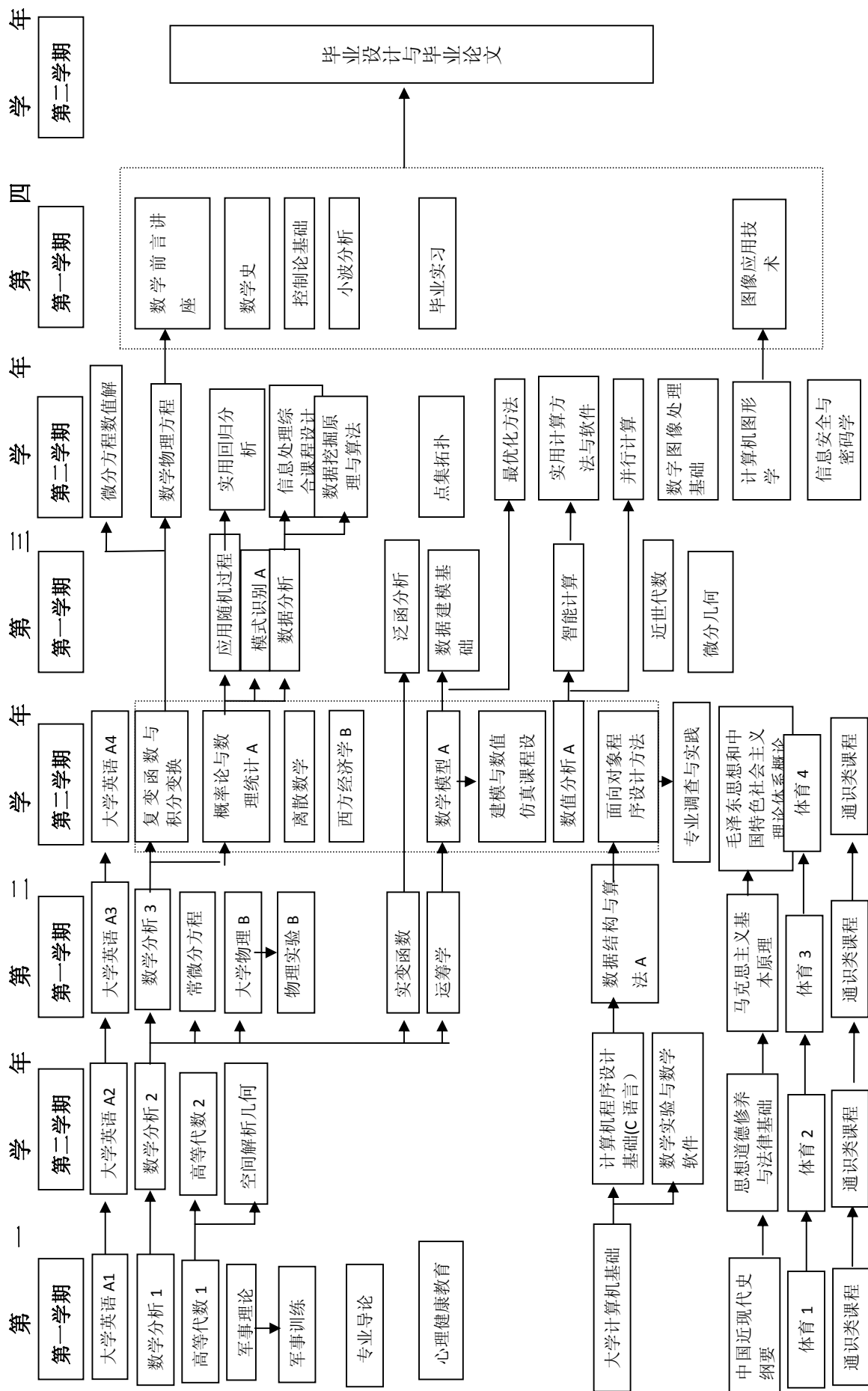


专业 核心 课程	专业 特色 课程	课程名称	应用数学实验班毕业要求														
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
		应用随机过程			√				√	√							
		数据建模基础			√					√							
	√	智能计算			√				√			√		√			
		模式识别 A			√				√			√					
	√	并行计算			√				√			√					
	√	现代数据分析导论及应用			√					√							
		数据挖掘原理与算法			√							√					
		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			√									√			
	√	数学建模在生物学中的应用							√	√							
		信息安全技术与密码学			√				√								
√		微分方程数值解			√				√								
		控制论基础			√												
		图像应用技术			√									√			
		小波分析			√												
		数学史		√	√											√	
		军事训练	√														
		专业调查与实践	√		√	√	√	√									
		建模与数值仿真课程设计			√					√							
		信息处理综合课程设计			√					√				√			
		数学前沿讲座							√								
		毕业实习	√		√	√	√	√									
		毕业设计			√												

### 三、课程教学进程图

#### III Teaching Process Map

信息与计算科学专业课程进程图



#### 四、理论教学建议进程表

#### IV Theory Course Schedule

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Number	课程名称 Course Title	学分 Crs	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major		
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur					
通识课程 Public Basic Courses	必修课 Required Courses	4220001110	思想道德修养与法律基础 Morals, Ethics and Fundamentals of Law	3	48			8		1-6				
		4220002110	中国近现代史纲要 Outline of Contemporary and Modern Chinese History	2	32					1-6				
		4220003110	毛泽东思想和中国特色社会主义理论体系概论 Introduction to Mao Zedong Thought and Socialism with Chinese Characteristics	4	96			32		1-6				
		4220005110	马克思主义基本原理 Marxism Philosophy	3	48			8		1-6				
		1060003130	军事理论 Military Theory	1	32			16		1-4				
		1050001130	心理健康教育 Mental Health Education	1	16					1-2				
		4210001110	体育 1 Physical Education I	1	32					1				
		4210002110	体育 2 Physical Education II	1	32					2	体育 1			
		4210003110	体育 3 Physical Education III	1	32					3	体育 2			
		4210004110	体育 4 Physical Education IV	1	32					4	体育 3			
		4030002110	大学英语 A1 College English A I	3	64				16	1				
		4030003110	大学英语 A2 College English A II	3	64				16	2	大学英语 A1			
		4030004110	大学英语 A3 College English A III	3	64				16	3	大学英语 A2			
		4030005110	大学英语 A4 College English A IV	3	64				16	4	大学英语 A3			
		4120017110	大学计算机基础 Foundation of Computer	2	32		12			1				
		4120023110	计算机程序设计基础(C语言) Fundamentals of Computer Program Design(C)	3	48		12			2				
					小计 Subtotal	35	736		24	64	64			
			选修课 Elective Courses	创新创业类 Innovation and Entrepreneurship Courses		全校学生要求至少取得 9 个学分,且必须选修艺术体育类课程中的艺术类相关课程,取得至少 2 个学分。理工科专业学生至少选修一门人文社科类或经济管理类课程,其他专业学生至少选修一门科学技术类课程。 All students are required to obtain at least 9 credits, and must select art courses from Art and Physical Education Courses to obtain at least 2 credits. Science and engineering students should select at least one course from Arts and Social Science Courses or Economy and Management Courses, and other students should select at least one course from Science and Technology 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														

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Number	课程名称 Course Title	学分 Crs	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major	
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur				
学 科 大 类 课 程  Basic Disciplinary Courses	必 修 课  Required Courses	4050335110	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		
		4050355120	高等代数 1 Higher Algebra I	5	80					1	高等代数 1		
		4050358120	高等代数 2 Higher Algebra II	2.5	40					2	高等代数 1		
		4050359120	空间解析几何 Space analytic geometry	2.5	40					2			
		4050019110	常微分方程 Ordinary Differential Equations	3	48					3	数学分析 2		
		4050166110	数据结构与算法 A Data Structure & Algorithms	3.5	56		16			3	计算机程序设计基础		
		4050463110	大学物理 B Physics B	5	80					3	数学分析 2		
		4050224110	物理实验 B Physics Lab. B	1	32	32				3	大学物理 B		
		4050406120	实变函数 Functions of A Real Variable	3.5	56					3	数学分析 2		
		小计 Subtotal				43	704	32	16				
	选 修 课  Elective Courses	4050180110	数学实验与数学软件 Mathematical experiments & Soft	2.0	32		12			2	大学计算机基础		
		4050254110	运筹学 Operation Research	3.0	48					3			
		4010097110	西方经济学 B West Economics B	3.0	48					4			
		小计 Subtotal				8	128	12					
		修读说明：要求至少选修 5 学分。 NOTE: Minimum subtotal credits:5											
	专 业 课 程  Specialized Courses	必 修 课  Required Courses	4050184110	数值分析 A Numerical Analysis A	4	64		8			4		
			4050477130	面向对象程序设计方法 Object-oriented programming method	4	64		24			4		
4050128110			离散数学 Discrete Mathematics	4	64					4			
4050057110			概率论与数理统计 A Probability and Statistics A	4.5	72					4	数学分析 3		
4050051110			复变函数与积分变换 A Complex Analysis & Transformation A	4	64					4	数学分析 3		
4050165110			微分几何 Differential Geometry	3	48					5			
4050394120			近世代数 Modern Algebra	3	48					5			

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Number	课程名称 Course Title	学分 Crs	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur			
		4050375120	泛函分析 Functional Analysis	3	48					5		
		4050408120	数学物理方程 Equations of Mathematical Physics	2.5	40					6		
		4050262110	最优化方法 Optimization Method	2.5	40		8			6		
		4050541140	点集拓扑 Point Set Topology	2.5	40					6		
		小计 Subtotal		37	592		40					
	选修课 Elective Courses	4050178110	数学模型 A Mathematical Model A	3.5	56		8			4	数学分析 3	
		4050165110	数据分析 Data Analysis	3	48					5		
		4050244110	应用随机过程 Applied Stochastic Processes	3	48					5		
		4050480130	数据建模基础 Data Modeling Foundation	3	48					5		
		4050258110	智能计算 Artificial Computation	2	32					5	运筹学	
		4050140110	模式识别 A Pattern Recognition A	3	48		8			5	概率论与数理统计 A	
		4050368120	并行计算 Parallel computing	4	64		16			6		
		4050542140	现代数据分析导论及应用 Introduction to Modern Data Analysis and its Applications	4	64					6	应用随机过程	
		4050170110	数据挖掘原理与算法 Data Mining Principles and Algorithms	3.5	56		16			6	概率论与数理统计 A	
		4050479130	实用计算方法与软件 Practical Calculation Method and Software	3	48		16			6		
		4050163110	实用回归分析 Applied Regression Analysis	3	48		8			6		
		4050474130	计算机图形学 Computer Graphics	3	48		8			6		
		4050487130	数字图像处理基础 Digital Image Processing	3	48		8			6		
		4050543140	数学建模在生物医学中的应用 Mathematical Modeling Applications in Biomedicine	3	48					6	数学模型 A	
		4050232110	信息安全技术与密码学 Information Safety and Cryptography	3	48		8			6		
		4050399120	微分方程数值解 Numerical Solution of Differential Equations	2.5	40					6		
		4050127110	控制论基础 The Foundation of Control Theory	2	32					7		
		4050491130	图像应用技术 Image Application Technology	2	32					7		
	4050497130	小波分析 Wavelet Analysis	3	48					7			

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Number	课程名称 Course Title	学分 Crs	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur			
		4050544140	数学史 History of Mathematics	2	32					7		
		小计 Subtotal		58.5	936		96					
修读说明：要求至少选修 19.5 学分。 NOTE: Minimum subtotal credits: 19.5												
个性化课程 Personalized Course	选修课 Elective Courses	修读说明：学生可跨专业自主选择修读全校其他专业的课程，建议修读以上课程。要求至少选修 10 学分。 NOTE: Students can choose any courses from the other specialties, and are especially suggested to choose the courses above. Minimum subtotal credits: 10.										

## 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	周数 Weeks	学分 Crs	建议修读学期 Suggested Term
1060002110	军事训练 Military Training	3	1.5	1
4050321110	专业调查与实践 Understanding of Specialty	2	2	4
4050440120	建模与数值仿真课程设计 Design of Modeling and Numeric Simulation	2	2	4
4050445120	信息处理综合课程设计 Course Design for Information Processing	2	2	6
4050545140	数学前沿讲座 Lecture of Mathematics Frontier	1	1	7
4050275110	毕业实习 Graduation Practice	2	2	7
4070432120	毕业设计 Graduation Design	17	11	8
小计 Subtotal		29	21.5	

## 六、修读指导

### VI Recommendations on Course Studies

专业选修课程选修建议：

Suggestion of specialized elective courses:

(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、数据建模基础、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、并行计算。

Suggestion of data information computing: Operation Research、Artificial Computation、Applied Stochastic Processes、Data Modeling Foundation、Data mining principles and algorithms、Introduction to modern data analysis and its applications、Practical Calculation Method and Software、Applied Regression Analysis 、Optimization Method、Parallel computing.

(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、图像应用技术、并行计算、小波分析、偏微分方程数值解。

Suggestion of image information science: Applied Stochastic Processes、Pattern Recognition、Artificial Computation、Computer Graphics、Digital Image Processing、Image Application Technology、Parallel computing、Wavelet Analysis、Functional Analysis、Numerical Solution of Partial Differential.

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

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

学院教学责任人：何 朗  
专业培养方案责任人：刘 扬

# 【应用物理实验班】2015 版本科培养方案

## Undergraduate Education Plan for Specialty in Applied Physics Experimental Class (2015)

专业名称 应用物理	主干学科 物理学
Major Applied Physics	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

课程类别 课程性质	通识课程 Public Basic Courses	学科大类课程 Basic Disciplinary Courses	专业课程 Specialized Courses	个性课程 Personalized Course	集中性实践 Practice Courses	课外学分 Study Credit after Class	总学分 Total Credits
必修课 Required Courses	35	46	43.5	\	21.5	\	190
选修课 Elective Courses	9	\	25	\	\	10	

### 一、培养目标与毕业要求

#### I Educational Objectives & Requirement

##### (一) 培养目标

本专业培养具有扎实的物理学基础和相关应用领域的专门知识，具有较强实践能力和创新意识，能在应用物理学可、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。

专业的培养目标为：

- 1) 培养学生具备良好的数学基础，掌握物理学的基本知识与原理、基本实验技能与技术；
- 2) 培养学生受到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；
- 3) 培养学生具备一定的独立获取知识的能力、动手能力、实践能力和技术开发能力。

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) To have good foundation of mathematics , to master the fundamentals and principles of physics, and to have basic experimental skills;
- 2) To have the way of scientific thinking and studying, to have scientific attitude and attainments, and to be innovative;
- 3) To have self-taught ability, hands-on skills, practical ability and ability to develop new technologies.



## (二) 毕业要求

应用物理学本科专业学制为四年，学生在完成相关课程学习并满足规定的各项基本要求后可授予理学或工学学士学位。

应用物理学本科专业培养的人才一般应符合以下几个方面的基本要求：

### 1. 素质要求

- ① 思想品德素质：具有良好的公民意识、法制意识、政治意识、思想素质、道德品质、诚信品质；
- ② 人文素质：具有文化素养、艺术素养、现代意识、全球意识、团队精神；
- ③ 专业素质：具有科学思维方法、科学精神、创新意识、技术应用意识和工程技术素养；
- ④ 身心素质：具有良好的身体素质和心理素质。

### 2. 能力要求

- ① 获取知识的能力：具有自学能力、获取和加工处理信息的能力；
- ② 应用知识的能力：具有综合应用知识解决问题的能力、实践和工程实践能力、计算机以及信息技术应用的能力；
- ③ 创新能力：具有一定的创造性思维能力、科学研究能力、技术开发能力；
- ④ 组织管理能力：具有技术管理能力、具有较好的书面和口头表达能力、与人沟通能力、团队协作能力。

### 3. 知识要求

- ① 专业知识：较为系统地掌握物理学领域的基本理论、基本实验技能以及所需的数学、计算机、电工电子学等方面的基础知识；了解应用物理学相关专业方向的前沿、发展动态、应用前景以及相关高新技术产业的发展状况；
- ② 工具知识：掌握外语、计算机以及信息技术、专利申请等方面的知识；
- ③ 人文社科知识：具有一定的哲学、政治学、法学、心理学、经济管理等方面的知识；
- ④ 其他自然科学和相关工程技术的基础知识。

The registration period of undergraduate study in the major “Applied Physics” is four years. The student is eligible for a bachelor’s degree in science or engineering after finishing the study of relative courses and fulfilling several prescriptive basic requirements.

Generally, graduates from the major “Applied Physics” should reach several basic requirements described as follows:

### 1. Quality requirements

- ① Moral Quality: have good qualities of consciousness of citizenship, legal consciousness, political consciousness, mind and thought, moral and honesty;
- ② Humanity Quality: have qualities of artistic appreciation, modernized consciousness, global consciousness and team spirit;
- ③ Professional Quality: master qualities of scientific thinking, scientific spirit, sense of innovation, sense of technological application and engineering technology;
- ④ Physical and Psychology Qualities: have good physical and psychology qualities.

### 2. Ability Requirements

- ① Ability to Acquire Knowledge: have abilities to self-learn, acquire and reduce information;
- ② Ability to Apply Knowledge: be able to solve problems with learned knowledge, handle general and engineering practice, and use computer and information technologies;
- ③ Innovation Ability: have certain abilities of creative thinking, scientific research and develop technologies;
- ④ Organizing and Administration Ability: master abilities of technique management, written and verbal expression, interpersonal communication and team cooperation.

### 3. Requirements for Learnt Knowledge

- ① Professional Knowledge: be able to systematically master basic theories, basic experimental skills, and other relative basic knowledge such as mathematics, computer science and electrical & electronic engineering, etc.; be aware of the advanced research, latest development, potential applications and progress of high-tech industry related to physics;
- ② Skill Knowledge: be able to master knowledge such as foreigner language, computer science, information technology and patent application, etc;
- ③ Humanities Knowledge: learn certain knowledge on philosophy, politics, law, psychology, economics, and management, etc.;
- ④ Obtain basic knowledge of other scientific fields and engineering technologies.

附：培养目标实现矩阵

	目标 1	目标 2	目标 3		目标 1	目标 2	目标 3
毕业要求 1-①		✓	✓	毕业要求 2-③	✓		✓
毕业要求 1-②		✓	✓	毕业要求 2-④	✓		✓
毕业要求 1-③		✓	✓	毕业要求 3-①	✓		✓
毕业要求 1-④		✓	✓	毕业要求 3-②	✓		✓
毕业要求 2-①	✓		✓	毕业要求 3-③	✓		✓
毕业要求 2-②	✓		✓	毕业要求 3-④	✓		✓

## 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、现代物理实验

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

#### (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、非线性物理、实验数据多元统计分析

Characteristic Courses: Semiconductor Physics, Solid State Physics, Computational Physics, Nonlinear Physics, Multivariate Statistical Analysis of Experimental Data

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	应用物理实验班专业毕业要求											
			1- ①	1- ②	1- ③	1- ④	2- ①	2- ②	2- ③	2- ④	3- ①	3- ②	3- ③	3- ④
		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	✓	✓									✓	

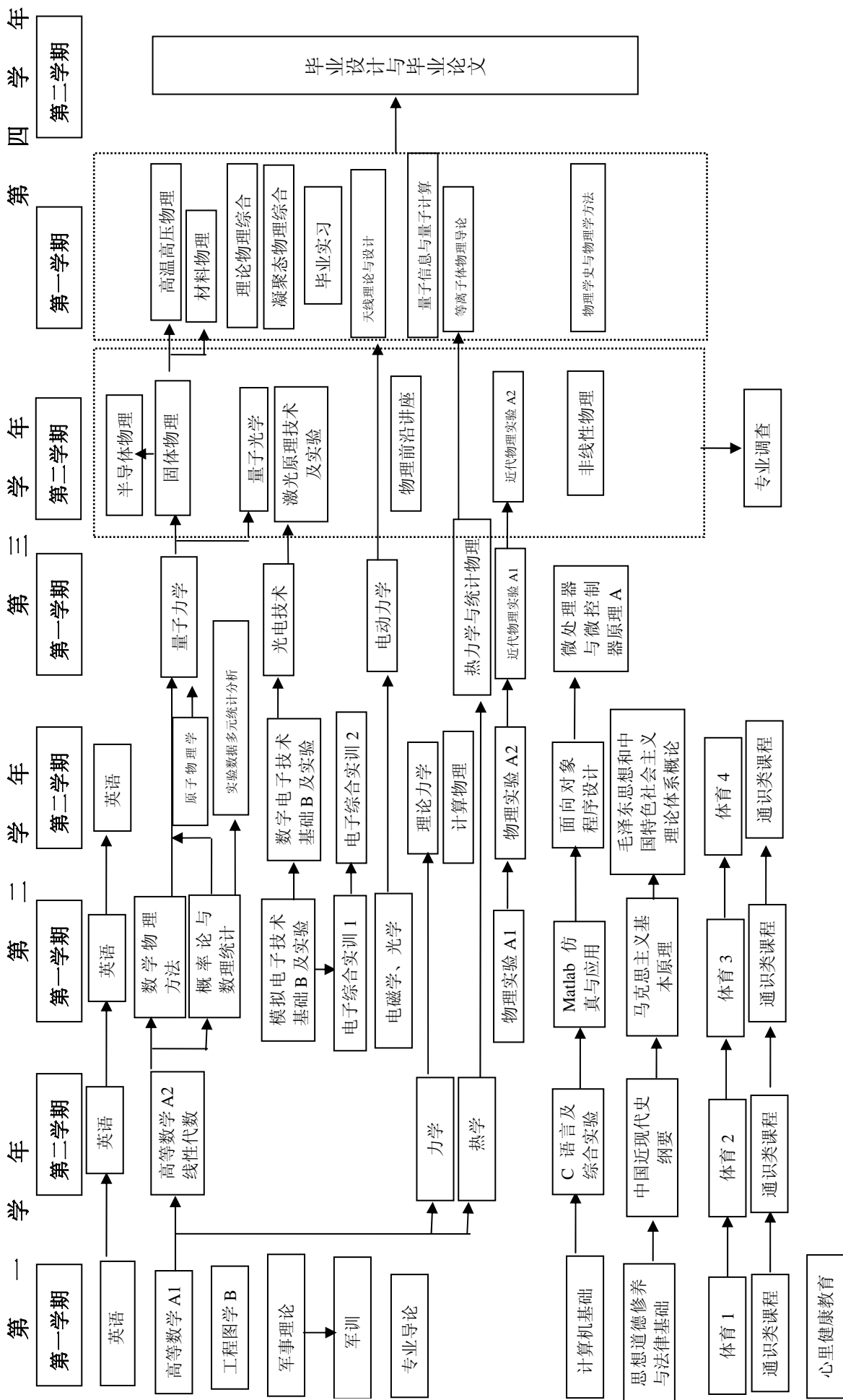
专业 核心 课程	专业 特色 课程	课程名称	应用物理实验班专业毕业要求														
			1- ①	1- ②	1- ③	1- ④	2- ①	2- ②	2- ③	2- ④	3- ①	3- ②	3- ③	3- ④			
		军事理论	√														
		体育 1-4				√											
		通识类课程	√	√	√												
		心理健康教育				√											
		大学英语 A1-A4											√				
		大学计算机基础							√			√	√				
		高等数学 A1、A2										√					
		计算机程序设计基础(C 语言)							√			√	√				
		专业导论			√							√					
		线性代数										√					
		概率论与数理统计 B										√					
		物理实验 A1、A2			√				√			√				√	
		模拟电子技术基础 B							√								√
		模拟电子技术基础实验							√								√
√		数学物理方法										√					
		数字电子技术基础 B							√								√
		数字电子技术基础实验							√								√
		力学										√					
		热学										√					
		电磁学										√					
		光学										√					
		原子物理学										√					
		C 语言综合实验							√			√	√				
	√	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						√				√				√	

专业 核心 课程	专业 特色 课程	课程名称	应用物理实验班专业毕业要求												
			1- ①	1- ②	1- ③	1- ④	2- ①	2- ②	2- ③	2- ④	3- ①	3- ②	3- ③	3- ④	
	√	计算物理					√					√			√
√		近代物理实验 A1、A2							√			√			√
	√	实验数据多元统计分析		√								√			
	√	非线性物理					√					√			√
		物理学史与物理学方法										√			
		光电技术							√						√
		微处理器与微控制器原理 A							√						√
		Matlab 仿真与应用						√				√	√		
		面向对象程序设计 B						√				√	√		
		高温高压物理专题										√			√
		量子光学										√			√
		物理前沿讲座										√			
		材料物理										√			√
		理论物理综合（量子与统计）										√			√
		凝聚态物理综合										√			√
		量子信息与量子计算										√			√
		天线理论与设计							√			√			√
		等离子体物理导论										√			√
		激光原理与技术							√						√
		激光原理与技术实验							√						√
		军事训练	√			√									
		电子综合实训 I、II		√	√		√	√	√	√					
		电工电子实习 A		√	√		√	√	√	√					
		专业调查								√	√				
		毕业实习			√			√		√	√				√
		毕业设计	√	√	√	√	√	√	√	√	√	√	√	√	√

### 三、课程教学进程图

#### III Teaching Process Map

应用物理专业课程进程图



#### 四、理论教学建议进程表

#### IV Theory Course Schedule

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Number	课程名称 Course Title	学分 Crts	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major		
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur					
通 识 课 程  Public Basic Courses	必 修 课  Required Courses	4220001110	思想道德修养与法律基础 Morals, Ethics and Fundamentals of Law	3	48			8		1-6				
		4220002110	中国近现代史纲要 Outline of Contemporary and Modern Chinese History	2	32					1-6				
		4220003110	毛泽东思想和中国特色社会主义理论体系概论 Introduction to Mao Zedong Thought and Socialism with Chinese Characteristics	4	96				32		1-6			
		4220005110	马克思主义基本原理 Marxism Philosophy	3	48				8		1-6			
		1060001110	军事理论 Military Theory	1	32				16		1-4			
		4210001110	体育 1 Physical Education I	1	32						1			
		4210002110	体育 2 Physical Education II	1	32						2	体育 1		
		4210003110	体育 3 Physical Education III	1	32						3	体育 2		
		4210004110	体育 4 Physical Education IV	1	32						4	体育 3		
		1050001110	心理健康教育 Mental Health Education	1	16						1-2			
		4030002110	大学英语 A1 College English A 1	3	64					16	1			
		4030003110	大学英语 A2 College English A II	3	64					16	2	大学英语 A1		
		4030004110	大学英语 A3 College English A III	3	64					16	3	大学英语 A2		
		4030005110	大学英语 A4 College English A IV	3	64					16	4	大学英语 A3		
		4120017110	大学计算机基础 Foundation of Computer	2	32			12			1			
		4120023110	计算机程序设计基础(C语言) Fundamentals of Computer Program Design(C)	3	48			12			2			
		小 计 Subtotal				35	736		24	64	64			
		选 修 课  Elective Courses	创新创业类 Innovation and Entrepreneurship Courses			全校学生要求至少取得 9 个学分，且必须选修艺术体育类课程中的艺术类相关课程，取得至少 2 个学分。理工科专业学生至少选修一门人文社科类或经济管理类课程，其他专业学生至少选修一门科学技术类课程。 All students are required to obtain at least 9 credits, and must select art courses from Art and Physical Education Courses to obtain at least 2 credits. Science and engineering students should select at least one course from Arts and Social Science Courses or Economy and Management Courses, and other students should select at least one course from Science and Technology 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														

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Number	课程名称 Course Title	学分 Crs	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major
					总学时 Tot hrs.	实验 Exp.	上机 Opera-tion	实践 Prac-tice	课外 Extra-cur			
学 科 大 类 课 程 Basic Disciplinary Courses	必 修 课 Required Courses	4050337110	专业导论 Introduction of Specialty	1	16					1		
		4050063110	高等数学 A1 Advanced Mathematics A I	5	80					1		
		4050064110	高等数学 A2 Advanced Mathematics A II	5	80					2	高等数学 A1	
		4050229110	线性代数 Linear Algebra	2.5	40					2		
		4050533140	力学 Mechanics	4	64					2		
		4050534140	热学 Thermology	3	48					2		
		4050546140	电磁学 Electromagnetics	4	64					3		
		4050547140	光学 Optics	4	64					3		
		4050548140	原子物理学 Atomic Physics	3	48					4		
		4050466130	物理实验 A1 Physics Lab. A I	1	32	32				3		
		4050467130	物理实验 A2 Physics Lab. A II	1	32	32				4	物理实验 A1	
		4110049110	模拟电子技术基础 B Fundamentals of Analog Electronic Circuit B	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		
		4050182110	数学物理方法 A Method Of Mathematical Physics A	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		
				小 计 Subtotal		46	784	104				
专 业 课 程 Specialized Courses	必 修 课 Required Courses	4050361120	C 语言综合实验 Integrated Experiments of C language	1	32		32			2	计算机程序设计基础(C 语言)	
		4050058110	概率论与数理统计 B Probability and Mathematics Statistic B	3	48					3		
		4050549140	理论力学 Theoretical Mechanics	4	64					4	力学	
		4050554140	计算物理 Computational Physics	3	48					4		
		4050557140	多元统计分析 Multivariate Statistical Analysis	3	48					4		
		4050550140	电动力学 Electrodynamics	4	64					5	电磁学	
		4050551140	热力学与统计物理 Thermodynamics and Statistical Physics	4	64					5	热学	
		40505521140	量子力学 Quantum Mechanics	4.5	72					5	数学物理方法 A	

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Number	课程名称 Course Title	学分 Crs	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur			
		4050555140	近代物理实验 A1 Lab of Modern Physics A1	1	32	32				5		
		4050079110	光电技术 Optoelectronic Technology	2.5	40					5	数字电子技术基础 B	
		4050556140	近代物理实验 A2 Lab of Modern Physics A2	1	32	32				6		
		4050008110	半导体物理 Semiconductor Physics	3	48					6	量子力学	
		4050553140	固体物理 Solid State Physics	4	64					6		
		4050558140	非线性物理 Nonlinear Physics	3.5	56					6		
		4050559140	物理学史与物理学方法 History and Methods of Physics	2	32					7		
			小 计 Subtotal	43.5	744	64	32					
	选修课 Elective Courses	4050003110	Matlab 仿真与应用 Matlab Simulation and Application	1	32		32			3		
		4050111110	微处理器与微控制器原理 A Theory of Microcontroller and Microprocessor A	4	64					4	数字电子技术基础 B	
		4050139110	面向对象程序设计 B Object Oriented Programming B	3.5	56		24			4	计算机程序设计基础(C语言)	
		4050561140	量子光学 Quantum Optics	3	48					6	量子力学	
		4050562140	物理前沿讲座 Advanced Special Topics of Physics	2	32					6		
		4050103110	激光原理与技术 Principles and Techniques of Laser	3	48					6		
		4050104110	激光原理与技术实验 Experiment on Principles and Techniques of Laser	0.5	16	16				6	激光原理与技术	
		4050568140	材料物理 Materials Physics	3	48					7		
		4050563140	理论物理综合（量子与统计） Integrated Theoretical Physics (Quantum and Statistics)	4	64					7	量子力学	
		4050564140	凝聚态物理综合 Integrated Condensed Matter Physics	4	64					7	固体物理	
		4050565140	量子计算与量子信息 Quantum Computation and Quantum Information	3	48					7	量子力学	
		4050566140	等离子体物理导论 Introduction to Plasma Physics	3	48					7		
	4050567140	天线理论与设计 Antenna Theory and Design	3	48					7			



课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Number	课程名称 Course Title	学分 Crs	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur			
		4050560140	高温高压物理专题 Topics of High-Temperature and High-Pressure Physics	3	48					7	固体物理	
		小 计 Subtotal		40	654	16	32					
修读说明：要求至少选修 25 学分。 NOTE: Minimum subtotal credits: 25.												

### 九、集中性实践教学环节建议进程表

#### IX Practice Schedule

课程编号 Course Number	实践环节名称 Practice Courses Name	周数 Weeks	学分 Crs	建议修读学期 Suggested Term	第二专业 Second Major
1060002110	军事训练 Military Training	3	1.5	1	
4100068110	电工电子实习 A Practice in Electrical Engineering & Electronics	2	2	3	
4050438120	电子综合实训 I Comprehensive training of electronics I	2	2	3	
4050439120	电子综合实训 II Comprehensive training of electronics II	1	1	4	
4050319110	专业调查 Specialty Investigation	2	2	6	
4050276110	毕业实习 Practice for Graduation	2	2	7	
4050268110	毕业设计 Graduation Design	17	11	8	
小 计 Subtotal		29	21.5		

### 十、其它要求

#### X Other Demands

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

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

学院教学责任人：何 朗  
专业培养方案责任人：郭 斌

# 【工程力学专业（卓越工程师班）】2015 版本本科培养方案

## Undergraduate Education Plan for Engineering Mechanics (Excellent Engineer Class) (2015)

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

课程类 Course Classification 课程性质 Course Nature	通识课程 Public Basic Courses	学科大类课程 Basic Disciplinary Courses	专业课程 Specialized Courses	个性课程 Personalized Course	集中性实践 Practice Courses	课外学分 Study Credit after Class	总学分 Total Credits
必修课 Required Courses	35	47.5	41.5	\	33.5	\	190
选修课 Elective Courses	9	\	13.5	\	\	10	

### 一、培养目标与毕业要求

#### I Educational Objectives & Requirement

##### (一) 培养目标

- (1) 身心健康，具备良好的敬业精神、社会责任感和工程职业道德，关注当代全球和社会问题，具有质量意识、环境意识和安全意识。
- (2) 具有从事与力学相关工程领域工作所需的数理知识和其它相关自然科学知识，并将数学和科学工具运用于解决工程问题奠定基础。
- (3) 具有力学基础理论知识、专业知识和实验能力，能从事车辆工程领域的力学测试、科学研究、技术开发和管理工作的。
- (4) 具有较强的有限元计算分析能力，良好的工程素质和工程实践能力，能从事车辆工程领域产品以及新技术研发过程中的分析和实验等方面的工作。
- (5) 具有良好的口头和书面表达和交流沟通能力、良好的团队意识和合作精神，具有终身学习的能力。

##### **Educational objectives:**

- (1) Taking care of physical and mental well-being, attaining a fairly high level of social morality and responsibility, and being focusing on current global and social issues in order to establish corresponding quality, environmental and security awareness.
- (2) Accumulating solid acquaintance of mathematics, physics, and other subjects in natural science for working in the engineering field associated with mechanics problems, and laying foundation of applying mathematical and scientific laws to solve engineering problems.
- (3) Receiving basic trainings on fundamental theories, professional knowledge and experimental methods related to mechanics, and being capable of pursuing mechanical test, research, creation, design and management in vehicle engineering circle.
- (4) Obtaining ability of finite element analysis, good engineering quality and engineering

practice ability, and being able to carry out products and new technology research and development in the process of analysis and experiment in vehicle engineering field.

- (5) Possessing good self-expression skills such as writing, speaking and negotiating for communication, as well as good teamwork and co-operation spirit, and having the ability to realize lifelong learning.

## (二) 毕业要求

- (1) 学生掌握从事本专业领域所需的数学、相关自然科学和管理知识。
- (2) 学生掌握本专业的基本理论知识，能够利用原理性知识进行自主发现、自主设计和自主解决与力学相关的问题。
- (3) 学生掌握本专业的专业基础知识，能运用力学分析思维解决工程问题。
- (4) 学生掌握力学实验相关知识，能从事车辆工程领域的力学测试与结构检测等工作。
- (5) 学生掌握力学计算分析软件的开发与应用，能从事车辆工程领域的数值模拟与工程仿真等工作。
- (6) 学生掌握与车辆工程相关的专业知识，能从事汽车零部件的设计、制造与生产管理等工作。
- (7) 学生了解本专业的发展动态和前沿，熟悉力学相关领域的最新开发工具种类和发展方向。
- (8) 学生具有良好的思想素质、身体素质、心理素质、文化修养、社会道德和责任担当等人文素养。
- (9) 学生了解当代全球问题和社会问题，在工程实践中综合考虑经济、环境、法律、安全和伦理等制约因素。
- (10) 学生具有逻辑思维和辩证思维的能力，具有批判意识和求真务实的科学思维方法，具有创新意识，掌握基本的创新方法。
- (11) 学生掌握运用现代信息技术跟踪并获取信息的方法，熟练进行文献检索和资料查询。
- (12) 学生具有良好的口头和书面表达和交流能力，至少熟练掌握一门外语进行技术沟通和交流能力。具有良好的团队意识和合作精神。
- (13) 学生能够胜任本专业入门级的职业岗位，具备研究生课程学习所需的认知和基础能力。
- (14) 学生具有进行终身学习的愿望和能力，具有适应工程领域不断发展的能力。

### Graduate requirements:

- (1) The students accumulate solid foundation of mathematics, the natural science and administrative science for working in this professional field.
- (2) The students acquire fundamental theories in this major, and are able to use the principle knowledge to conduct independent finding, creating and solving of problems associated with mechanics.
- (3) The students master professional knowledge in this major, and are able to apply analytical thinking of mechanics to solve engineering problems.
- (4) The students obtain methods related to experimental mechanics, and are able to work on mechanical and structural tests in vehicle engineering field.
- (5) The students get experience with development and application of analysis software for computational mechanics, and are able to carry out numerical modeling and simulation in vehicle engineering field.
- (6) The students master professional knowledge associated with vehicle engineering, and are

- able to engage in auto parts design, manufacturing and production management.
- (7) The students know something new about the development in this major, so as to obtain concepts on the latest theories, problems and solutions related to mechanical subjects.
  - (8) The students attain a fairly high level of ideological, physical, psychological and cultural quality as well as the social morality and responsibility.
  - (9) The students are aware of current global and social issues, and then take into account various influences such as economic, environmental, legal, security and ethical factors in their engineering practice.
  - (10) The students are accustomed to putting problems in logical and dialectical way, and have the attribute of scientific thinking with innovative, critical and pragmatic consciousness.
  - (11) The students can track, collect and get ride of necessary information by employing the modern computer and internet technology for making literature searching and data inquiry.
  - (12) The students are fluent in at least a foreign language for technical communication, with good self-expression skills such as writing, speaking and negotiating, and possessing essential teamwork and co-operation spirit.
  - (13) The students are competent for the junior work jobs in the industry, and are adequate to taking further graduate courses by having enough cognitive and basic ability.
  - (14) The students have desire and ability to practice lifelong learning, and can keep pace with the growth and innovation of engineering topics.

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	培养目标 5
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		√	√	√	√
毕业要求 13		√	√	√	√
毕业要求 14					√

## 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、结构力学、弹性力学、流体力学、计算力学、振动力学、实验力学、塑性力学。

Theoretical Mechanics, Mechanics of Materials, Structural Mechanics, Elastic

Mechanics, Fluid Mechanics, Computational Mechanics, Vibration Mechanics, Experimental mechanics, Mechanics of Plasticity.

(二) 专业特色课程:

有限元分析与应用、纳米力学、汽车理论、汽车构造、汽车试验学。

Characteristic Courses: FEM Analysis and Application, Nanomechanics, Theory of Automobile, Automobile Structure, Automobile Test.

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)	(13)	(14)
		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								√						
		大学英语											√	√		
		大学计算机基础	√										√		√	
		计算机程序设计基础(C语言)	√												√	
		心理健康教育								√						
		专业导论	√	√					√						√	
		高等数学	√												√	
		线性代数	√												√	
		概率论与数理统计 B	√												√	
		大学物理	√												√	
		物理实验	√			√									√	
		工程图学 B	√	√	√			√							√	
		电工与电子技术基础 B	√												√	
√		理论力学 A		√											√	
√		材料力学 B		√	√										√	

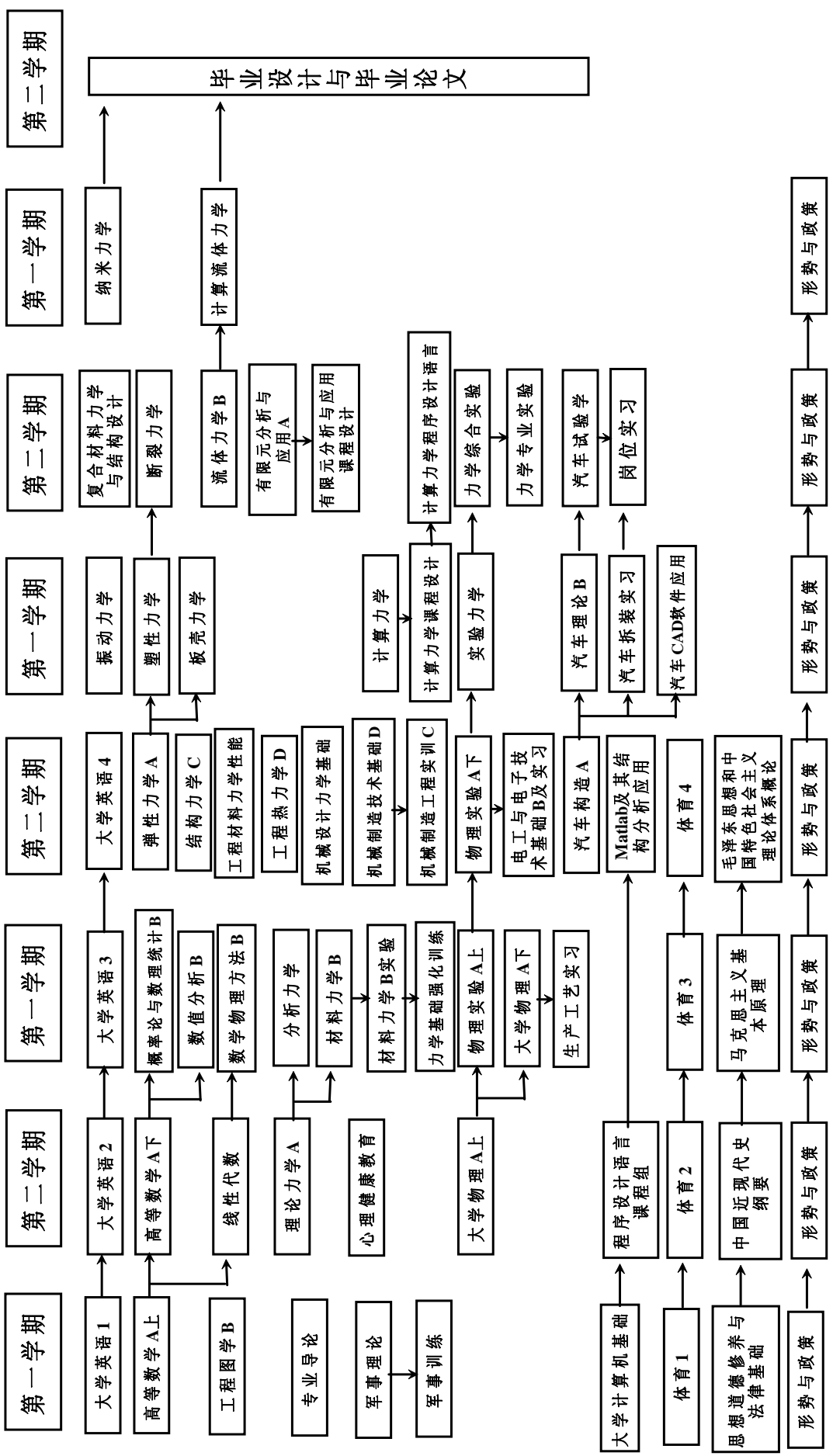
专业 核心 课程	专业 特色 课程	课程名称	工程力学专业（卓越工程师班）毕业要求														
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	
		材料力学 B 实验		√	√	√										√	
		数值分析 B	√	√												√	
		数学物理方法 B	√	√												√	
√		弹性力学 A			√											√	
√		结构力学 C			√			√								√	
√		计算力学			√		√									√	
√		振动力学			√											√	
√		塑性力学			√											√	
√		流体力学 B			√											√	
√		实验力学			√	√										√	
	√	有限元分析与应用 A					√	√								√	
		机械设计力学基础				√		√									
	√	汽车理论 B				√	√	√									
	√	汽车构造 A				√	√	√									
		分析力学			√												
		工程材料力学性能				√											
		工程热力学 D					√										
		MATLAB 及其结构分析应用					√										
		汽车 CAD 软件应用					√	√									
		板壳力学			√												
		断裂力学			√												√
		计算力学程序设计语言					√										√
		复合材料力学与结构设计						√									√
		计算流体力学					√										√
		机械制造技术基础 D						√									√

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)	(13)	(14)
		汽车试验学				√		√								
	√	纳米力学							√							√
		军事训练								√						
		力学基础强化训练			√											
		机械制造工程实训 C				√										
		电工电子实习 B				√										
		生产工艺实习						√								
		汽车拆装实习				√		√								
		计算力学课程设计					√	√								
		力学专业实验				√										
		岗位实习						√								
		力学综合实验				√										
		毕业设计				√	√	√								√

### 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

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Number	课程名称 Course Title	学分 Crs	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major		
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur					
通 识 课 程  Public Basic Courses	必 修 课 Required Courses	4220001110	思想道德修养与法律基础 Morals, Ethics and Fundamentals of Law	3	48			8		1-6				
		4220002110	中国近现代史纲要 Outline of Contemporary and Modern Chinese History	2	32					1-6				
		4220003110	毛泽东思想和中国特色社会主义理论体系概论 Introduction to Mao Zedong Thought and Socialism with Chinese Characteristics	4	96			32		1-6				
		4220005110	马克思主义基本原理 Marxism Philosophy	3	48			8		1-6				
		1060003130	军事理论 Military Theory	1	32			16		1-4				
		1050001130	心理健康教育 Mental Health Education	1	16					1-2				
		4210001110	体育 1 Physical Education I	1	32					1				
		4210002110	体育 2 Physical Education II	1	32					2	体育 1			
		4210003110	体育 3 Physical Education III	1	32					3	体育 2			
		4210004110	体育 4 Physical Education IV	1	32					4	体育 3			
		4030002110	大学英语 A1 College English A I	3	64				16	1				
		4030003110	大学英语 A2 College English A II	3	64				16	2	大学英语 A1			
		4030004110	大学英语 A3 College English A III	3	64				16	3	大学英语 A2			
		4030005110	大学英语 A4 College English A IV	3	64				16	4	大学英语 A3			
		4120017110	大学计算机基础 Foundation of Computer	2	32		12			1				
		程序设计语言课程组(二选一, 3 学分) Courses of Computer Program Design (select one out of two, Credits: 3)												
				4120023110	计算机程序设计基础(C 语言) Fundamentals of Computer Program Design(C)	3	48		12			2		
				4120025110	计算机程序设计基础(VB 语言) Fundamentals of Computer Program Design(VB language)	3	48		12			2		
				小 计 Subtotal		35	736		24	56	64			
			选 修 课 Elective Courses	创新创业类 Innovation and Entrepreneurship Courses		全校学生要求至少取得 9 个学分, 且必须选修艺术体育类课程中的艺术类相关课程, 取得至少 2 个学分。理工科专业学生至少选修一门人文社科类或经济管理类课程, 其他专业学生至少选修一门科学技术类课程。 All students are required to obtain at least 9 credits, and must select art courses from Art and Physical Education Courses to obtain at least 2 credits. Science and engineering students should select at least one course from Arts and Social Science Courses or Economy and Management Courses, and other students should select at least one course from Science and Technology 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														

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Number	课程名称 Course Title	学分 Crs	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major
					总学时 Tot hrs.	实验 Exp.	上机 Opera-tion	实践 Prac-tice	课外 Extra-cur			
		艺术体育类 Art and Physical Education Courses										
学 科 大 类 课 程 Basic Disciplinary Courses	必 修 课 Required Courses	4050259110	专业导论 Introduction to Engineering Mechanics	1	16					1		
		4080041110	工程图学 B Engineering Graphics B	4	64					1		
		4100011110	电工与电子技术基础 B Fundamentals of Electrical Engineering &	5.5	88	20				4		
		4050063110	高等数学 A 上 Advanced Mathematics A I	5	80					1		
		4050064110	高等数学 A 下 Advanced Mathematics A II	5	80					2	高等数学 B 上	
		4050229110	线性代数 Linear Algebra	2.5	40					2		
		4050058110	概率论与数理统计 B Probability and Mathematics Statistic B	3	48					3		
		4050021110	大学物理 A 上 Physics A I	3.5	56					2		
		4050022110	大学物理 A 下 Physics A II	3.5	56					3	高等数学 B 线性代数	
		4050466130	物理实验 A 上 Physics Lab. A I	1	32	32				3	高等数学 B 下	
		4050467130	物理实验 A 下 Physics Lab. A II	1	32	32				4		
		4050129110	理论力学 A Theoretical Mechanics A	4.5	72					2		
		4050016110	材料力学 B Mechanics of Materials B	4.5	72					3		
		4050017110	材料力学 B 实验 Experiments of Materials Mechanics B	1	32	32				3		
		4050185110	数值分析 B Numerical Analysis B	2.5	40		8			3		
				小 计 Subtotal		47.5	808	116	8			
专 业 课 程 Specialized Courses	必 修 课 Required Courses	4050181110	数学物理方法 B Mathematical Physics Methods B	3.5	56					3		
		4050025110	弹性力学 A Mechanics of Elasticity A	4	64					4		
		4050119110	结构力学 C Structural Mechanics C	4.5	72		10			4		
		4050098110	机械设计力学基础 Fundamentals of Mechanical Design	3.5	56	6				4		
		4090037110	汽车构造 A Automobile Structure A	4	64			4		4		
		4050114110	计算力学 Computational Mechanics	4	64					5		
		4050255110	振动力学 Vibration Mechanics	2.5	40					5		

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Number	课程名称 Course Title	学分 Crs	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major	
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur				
		4050186110	塑性力学 Mechanics of Plasticity	2	32					5			
		4090043110	汽车理论 B Theory of Automobile B	2	32					5			
		4050162110	实验力学 Experimental Mechanics	2.5	40	8				5			
		4050135110	流体力学 B Fluid Mechanics B	3.5	56	6				6			
		4050349110	有限元分析与应用 A FEM Analysis & Application A	3.5	56		24			6			
		4090198150	汽车试验学 Automobile Test	2	32	4				6			
		小 计 Subtotal		41.5	664	24	34	4					
	选修课 Elective Courses	4050046110	分析力学 Analysis Mechanics	2	32					3			
		4050350110	工程材料力学性能 Mechanical Properties of Engineering Materials	2	32						4		
		4050004110	MATLAB 及其结构分析应用 MATLAB and its Structural Analysis	2	32		16				4		
		4090013110	工程热力学 D Engineering Thermodynamics D	2	32						4		
		4080067110	机械制造技术基础 D Fundamentals of Mechanical Manufacturing Technology D	2.5	40	4					4		
		4050006110	板壳力学 Mechanics of Plates and Shells	2	32						5		
		4090199150	汽车 CAD 软件应用 Automobile CAD software application	3	48		20				5		
		4050034110	断裂力学 Fracture Mechanics	2	32						6		
		4050115110	计算力学程序设计语言 Program Design Language for Computational Mechanics	3.5	56		20				6		
		4050055110	复合材料力学与结构设计 Mechanics of Composite Materials and Structural Design	3.5	56						6		
		4050351110	计算流体力学 Computational Fluid Mechanics	2	32						7		
		4050537140	纳米力学 Nanomechanics	2	32						7		
			小 计 Subtotal		28.5	456	4	56					
		修读说明：要求至少选修 13.5 学分。 NOTE: Minimum subtotal credits: 13.5											

#### 四、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	周数 Weeks	学分 Crns	建议修读学期 Suggested Term	
1060002110	军事训练 Military Training	3	1.5	1	
4050569140	力学基础强化训练 Strengthening Training on Mechanics Foundation	2	2	3	
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 B	1	1	4	
4050353110	生产工艺实习 Production Craft Internship	1	1	3	
4050289110	计算力学课程设计 Course Design on Computational Mechanics	2	2	5	
4090084110	汽车拆装实习 Automobile Construction Practice	2	2	5	
4050318110	有限元分析与应用课程设计 Course Design on FEM Analysis & Application	2	2	6	
4050298110	力学专业实验 Mechanics Specialized Experiments	2	2	6	
4050540140	岗位实习 Job Internship	5	5	6 (分散)	
4050295110	力学综合实验 Comprehensive Experiments on Mechanics (conducted individually)	2	2	7 (分散)	
4050434120	毕业设计 Graduation Design (Thesis)	17	11	8	
小 计 Subtotal		41	33.5		

#### 五、修读指导

##### VI Recommendations on Course Studies

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

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

学院教学责任人: 何 朗  
专业培养方案责任人: 张 梅