电子信息工程专业 2017 版本科培养方案
Undergraduate Education Plan for Specialty in Electronic Information Technology （2017）

专业名称	**电子信息工程**	主干学科	**信息与通信工程，电子科学与技术**
Major	Electronic Information Technology	Major Disciplines	Information and Communication Engineering, Electronic Science and Technology
计划学制	**四年**	授予学位	**工学学士**
Duration	4 Years	Degree Granted	Bachelor of Engineer
所属大类	**电子信息类（工学）**	大类培养年限	**1 年**
Disciplinary	Electronic Information （Engineer）	Duration	1 years

最低毕业学分规定

Graduation Credit Criteria

课程分类 / 课程性质	通识教育课程	专业教育课程	个性课程P	集中性实践教学环节	课外学分	总学分
必修课	29	71.5	\	24.5	\	170
选修课	9	20	6	\	10	

一、培养目标与毕业要求

I. Educational Objectives & Requirements

（一） 培养目标

Educational Objectives

“培养人格健全、视野开阔、严谨自律，具备电子信息工程领域坚实基础理论、专门知识和基本技能，具有创新能力，能从事电子信息工程处理领域研究、设计、开发、运营或管理工作的高级工程技术专门人才。”

本专业培养目标要求学生在毕业五年后达到以下目标：

（1）具备跟随社会经济和现代电子信息技术发展的能力，善于独立发现、研究与解决电子信息系统或信号处理相关领域复杂工程问题；

（2）具备拓展工程专业知识和技术原则的能力，在电子信息相关领域胜任研究、设计、开发、运营或管理工作；

（3）具备健全的人格和科学文化素养，能够团队合作中加强工作的协调和友善高效的沟通；

（4）具备职业道德素养、社会责任感和安全环境意识，理解科学技术的发展与伦理道德问题，结合我国的国情，合理解决工作生活中遇到的工程实践问题；

（5）具备自主学习和终身学习的能力，能够主动获取国内外学习资源更新知识，加强全球化意识和国际化视野，深化工程创新能力，能够适应形势和环境的变化。

The educational objective is to cultivate high-quality engineering and technical professionals in electronic information engineering. Graduates should master fundamental theories and professional skills in electronic information engineering. Moreover, they should have a good personality, broad professional vision, rigorous self-discipline, and creative ability to engage in research, design, development, operation, or management in electronic information engineering.

Specifically, we expect our graduates to achieve the following capabilities five years after graduation:

(1) Be able to adapt to the development of socio-economic and modern electronic information technology, be good at independently discovering, researching and solving complex engineering problems in electronic information systems or signal processing related fields;
(2) Be able to expand engineering expertise and technical principles to perform research, design, development, operations or management in electronic information related fields;
(3) Have a sound personality and scientific and cultural literacy, able to strengthen work coordination and communicate efficiently and friendly in teamwork;
(4) Possess professional ethics, social responsibility, and safety environment awareness, understand the development of science and technology, understand the ethical and moral issues in society, and reasonably solve engineering problems encountered in work and life considering our country's national conditions;
(5) Possess the ability of independent learning and lifelong learning, can actively obtain domestic and foreign learning resources to update knowledge, strengthen global awareness and international visions, deepen engineering innovation abilities, and be able to adapt to changes in the situation and environment.

（二） 毕业要求

Requirement for Graduation

（1）工程知识：能够掌握电子信息工程所需的数学、自然科学、工程基础和专业知识，并能运用所学知识和技能解决电子信息工程领域的复杂工程问题。

1.1 掌握电子信息工程领域复杂工程问题所需的数学和自然科学知识；

1.2 能够将数学、自然科学、工程基础和专业知识用于复杂工程问题的恰当表述；

1.3 能够针对电子信息系统设计、开发、应用和集成等复杂工程问题进行建模和求解；

1.4 能够利用相关知识和数学模型方法对电子信息系统设计、开发、应用和集成等复杂工程问题模型进行推演与综合分析。

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

2.1 能够基于数学、自然科学、工程科学原理识别、判断电子信息系统设计、开发、应用和集成等复杂工程问题的关键环节；

2.2 能够基于数学、自然科学、工程科学原理和数学模型方法正确表述电子信息系统设计、开发、应用和集成等复杂工程问题；

2.3 借助文献研究，寻求解决电子信息系统设计、开发、应用和集成等复杂工程问题的解决方案；

2.4 能够运用数学、自然科学和工程科学的基本原理对解决方案的正确性进行分析，获得有效结论。

（3）设计/开发解决方案：能够从信号与系统的角度，针对电子信息工程领域的复杂工程

问题，设计满足实际工程需求的电子信息系统解决方案，并能够在设计环节中体现创新意识，综合考虑社会、健康、安全、法律、文化以及环境等因素。

3.1 掌握工程设计和产品开发全周期、全流程的基本设计/开发方法和技术；

3.2 设计/开发解决方案时能够综合考虑社会、健康、安全、法律、文化以及环境等因素，并能体现创新意识；

3.3 能够根据特定需求，完成电子信息系统模块、系统或网络等复杂工程问题解决方案的设计/开发。

（4）研究：能够基于科学原理并采用科学方法对电子信息领域的复杂工程问题进行研究，包括建立系统模型、设计实验方案、采集数据、分析与解释数据、并通过综合数据得到合理有效的结论。

4.1 针对电子信息系统设计、开发、应用和集成等复杂工程问题，查阅文献资料，调研分析相关技术的特点与局限性；

4.2 根据复杂工程问题的具体特征，基于系统理论和相关科学原理选择研究路线，设计实验/仿真方案，并分析方案的可行性；

4.3 能够利用计算机软硬件技术或仿真工具实现实验/仿真方案，正确采集实验/仿真数据；

4.4 能够对实验或仿真结果进行分析和解释，并通过信息综合得到合理有效的结论。

（5）使用现代工具：能够针对电子信息工程领域的复杂工程问题，使用恰当的技术、资源、专业仪器设备和工具，搭建满足特定需求的开发环境，对电子信息工程领域的复杂工程问题的仿真模拟和合理预测，并能够理解其局限性。

5.1 具备使用计算机、网络、现代工程工具等信息技术，掌握常用电子仪器设备及软硬件开发工具的使用技能；

5.2 能够选择与使用恰当的技术、信息资源、专业仪器设备和工具对复杂工程问题进行分析、计算与设计；

5.3 能够根据特定需求，开发或选用现代工具对复杂工程问题进行模拟和预测，并分析其局限性。

（6）工程与社会：能够基于电子信息工程相关背景知识进行合理分析，评价电子信息工程实践和复杂工程问题解决方案对社会、健康、安全、法律以及文化的影响，并理解应承担的责任。

6.1 了解电子信息工程领域的产业规划、技术标准、知识产权及相关政策、法律法规，理解不同社会文化对工程实践活动的影响；

6.2 能够合理分析、评价电子信息工程实践和复杂工程问题解决方案与社会、健康、安全、法律以及文化的相互影响，理解应承担的责任。

（7）能够理解和评价针对电子信息工程领域的复杂工程问题的专业工程实践对环境、社会可持续发展的影响。

7.1 能够建立环境保护、社会和谐、经济可持续发展、生态可持续发展和人类社会可持续发展的意识；

7.2 能够在针对电子信息工程领域中复杂工程问题的工程实践中关注、理解、评价环境和可持续发展问题。

（8）职业规范：具有人文社会科学素养、社会责任感，能够在电子信息工程实践中理解并遵守工程职业道德和规范，履行责任。

8.1 具有正确的价值观，理解个人与社会的关系，了解中国国情；

8.2 能够在电子信息工程实践中遵守职业道德规范，具备社会责任感，并能自觉履行责任。

（9）个人和团队：能够在电子信息工程相关的多学科背景下的团队中承担个体、团队成员以及负责人的角色。

9.1 能够理解团队及个体、成员及负责人的角色职责，具有团队合作精神和沟通能力；

9.2 能够在多学科背景下的团队中承担不同的角色，履行相应的职责。

（10）沟通：能够就电子信息工程领域的复杂工程问题与业界同行及社会公众进行有效沟通和交流，包括撰写报告和设计文稿、陈述发言、清晰表达或回应指令。并具备一定的国际视野，能够在跨文化背景下进行沟通和交流。

10.1 能够就复杂工程问题准确表达自己的观点，能够与业界同行和社会公众进行有效沟通和交流，包括撰写报告、设计文稿、陈述发言或回应指令；

10.2 至少掌握一门外语，能够跟踪、掌握电子信息工程领域的国际发展趋势和研究热点，能够在跨文化背景下进行基本沟通和交流。

（11）项目管理：理解并掌握工程管理原理与经济决策方法，能在电子信息相关的多学科环境中应用。

11.1 理解并掌握工程项目中涉及的管理与经济决策方法；

11.2 能够在电子信息工程相关的多学科环境中应用工程管理与经济决策方法进行分析和决策。

（12）终身学习：能够意识到电子信息工程领域处于持续的演进与发展，具有自主学习和终身学习的能力，有不断学习和适应电子信息领域发展的能力。

12.1 能够意识到电子信息工程领域处于持续的演进与发展，能够认识到学习的必要性和重要性，形成自主学习和终身学习的意识；

12.2 具有自主学习和终身学习的能力，能够运用信息资源和文献工具自主学习知识，适应社会发展需求。

(1) Engineering knowledge: Graduates should be able to master the mathematics, natural science, engineering foundation and professional knowledge required for electronic information engineering, and be able to apply the knowledge and skills to solve complex engineering problems in electronic information engineering.

1.1 Graduates should master the mathematical and natural science knowledge required for complex engineering problems in electronic information engineering.

1.2 Graduates should have the ability to apply mathematics, natural sciences, engineering fundamentals and expertise to the appropriate formulation of complex engineering problems.

1.3 Graduates should be able to model and solve complex engineering problems such as electronic information system design, development, application and integration.

1.4 Graduates should be able to use relevant knowledge and mathematical methods to deduce and comprehensively analyze complex engineering problem models such as

electronic information system design, development, application and integration.

(2) Problem analysis: Graduates should be able to apply fundamental principles of mathematics, natural sciences, and engineering sciences to identify, express, and analyze complex engineering problems in electronic information engineering through literature research to obtain valid conclusions.

2.1 Graduates should be able to identify and judge the key links of complex engineering problems such as electronic information system design, development, application and integration based on the principles of mathematics, natural science and engineering science.

2.2 Graduates should be able to correctly express complex engineering problems such as electronic information system design, development, application and integration based on mathematics, natural science, engineering science principles and mathematical model methods.

2.3 Graduates should be able to seek solutions to complex engineering problems such as electronic information system design, development, application and integration, with the help of literature research.

2.4 Graduates should be able to use the basic principles of mathematics, natural sciences and engineering sciences to analyze the correctness of solutions and obtain valid conclusions.

(3) Design/development of solutions: Graduates should be able to design electronic information systems to meet practical engineering needs from the perspective of signals and systems, aiming at complex engineering problems in electronic information engineering. Graduates also need to be able to reflect innovation in the design process, taking social, health, safety, legal, cultural and environmental factors into consideration.

3.1 Graduates should master the basic design/development methods and technologies in the whole cycle and process of engineering design and product development.

3.2 Graduates are able to integrate social, health, safety, legal, cultural and environmental factors when designing/developing solutions, and demonstrate a sense of innovation.

3.3 Graduates are able to complete the design/development of solutions to complex engineering problems such as electronic information system modules, networks, etc., according to specific needs.

(4) Research: Graduates are able to conduct research on complex engineering problems in electronic information engineering based on scientific principles, including building system models, designing experimental plans, collecting data, analyzing and interpreting data, and synthesizing data to reach reasonable and valid conclusions.

4.1 Graduates are able to consult literature and research and analyze the characteristics and limitations of related technologies for complex engineering problems such as electronic information system design, development, application and integration.

4.2. Graduates can choose research routes based on system theory and related scientific principles, design experimental/simulation schemes, and analyze the feasibility of schemes according to the specific characteristics of complex engineering problems.

4.3 Graduates are able to use computer software and hardware technology or simulation tools to implement experimental/simulation programs and correctly collect experimental/simulation data.

4.4 Graduates are able to analyze and interpret experimental or simulation results and draw reasonable and valid conclusions through information synthesis.

(5) Using modern tools: Graduates can use appropriate technologies, resources, professional equipment and tools to build a development environment that meets specific needs for complex engineering problems in electronic information engineering, can simulate and reasonably predict complex engineering problems, and understand its limitations.

5.1 Graduates are able to use information techniques such as computers, network, modern engineering tools, etc., mastering the skills of using electronic equipment and software/hardware development tools.

5.2 Graduates are able to select and use appropriate techniques, information resources, professional equipment and tools to analyze, calculate and design complex engineering problems.

5.3 Graduates are able to develop or select modern tools to simulate and predict complex engineering problems and analyze their limitations according to specific needs.

(6) Engineering and society: Graduates are able to conduct rational analysis based on the relevant background knowledge of electronic information engineering, evaluating the impact of engineering practice and solutions on society, health, safety, law and culture, and understanding the responsibility.

6.1 Graduates understand industrial planning, technical standards, intellectual property rights and related policies, laws and regulations in electronic information engineering, and understand the impact of different social cultures on engineering practical activities.

6.2 Graduates can reasonably analyze and evaluate the interaction of engineering practices and complex engineering solutions with society, health, safety, law and culture, and understand the responsibilities that should be taken.

(7) Environment and sustainable development: Graduates are able to understand and evaluate the impact of professional engineering practices on complex engineering problems in electronic information engineering on environmental and social sustainability.

7.1 Graduates are able to build the awareness of environmental protection, social harmony, economic sustainable development, ecological sustainable development and sustainable development of human society.

7.2 Graduates are able to focus, understand, and evaluate environmental and sustainable development issues in engineering practice addressing complex engineering problems in electronic information engineering.

(8) Professional norms: Graduates have humanities and social science literacy and a sense of social responsibility, and can understand and abide by engineering professional ethics and norms in the practice of electronic information engineering, and fulfill their responsibilities.

8.1 Graduates have right values, understand the relationship between individuals and society, and understand China's national conditions.

8.2 Graduates are able to abide by professional ethics in the practice of electronic information engineering, have a sense of social responsibility, and consciously fulfill their responsibilities.

(9) Individuals and teams: Graduates are able to take on the roles of individuals, team members and leaders in teams in a multidisciplinary context related to electronic information engineering.

9.1 Graduates can understand the roles and responsibilities of teams and individuals, members and leaders, and have teamwork and communication skills.

9.2 Graduates are able to take on different roles and perform corresponding responsibilities

in teams in a multidisciplinary context.

(10) Communication: Graduates are able to effectively communicate with industry peers and the general public on complex engineering issues in electronic information engineering, including writing reports and designing manuscripts, making presentations, expressing clearly or responding to instructions, and possessing a certain international perspective, being able to communicate in cross-cultural contexts.

10.1 Graduates are able to accurately express their views on complex engineering issues, and can communicate effectively with peers in the industry and the public, including writing reports, designing manuscripts, making presentations or responding to instructions.

10.2 Graduates should master at least one foreign language, can track and master international development trends and research hotspots in electronic information engineering, and can communicate in a cross-cultural context.

(11) Project management: Graduates understand and master engineering management principles and economic decision-making methods, and can apply them in a multidisciplinary environment related to electronic information.

11.1 Graduates understand and master the management and economic decision-making methods involved in engineering projects.

11.2 Graduates are able to apply engineering management and economic decision-making methods for analysis and decision-making in a multidisciplinary environment related to electronic information engineering.

(12) Lifelong learning: Graduates can realize that electronic information engineering is in continuous evolution and development, have the ability of independent learning and lifelong learning, and have the ability to continuously learn and adapt to the development of electronic information.

12.1 Graduates can realize that electronic information engineering is in continuous evolution and development, can recognize the necessity and importance of learning, and form a consciousness of independent and lifelong learning.

12.2 Graduates have the ability of independent and lifelong learning, and can use information resources and literature tools to learn knowledge independently and adapt to the needs of social development.

附：培养目标实现矩阵

	培养目标 1	培养目标 2	培养目标 3	培养目标 4	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	✓	✓	✓	✓	✓

二、专业核心课程与专业特色课程

II. Core Courses and Specialized Courses

（一） 专业核心课程：

电路理论系列课程（电路分析基础、模拟电子技术基础、数字电子技术基础、高频电子线路）、计算机系列课程（计算机程序设计基础(C 语言)、嵌入式技术原理与应用）、信息传输与处理系列课程（信号与系统、数字信号处理、通信原理、信息理论与编码、电磁场与电磁波、现代检测技术）

Circuit Theory Series Courses (Circuit Analysis, Fundamentals of Analog Electronic Circuit, Fundamentals of Digital Electronic Circuit, High- frequency Electronic Circuits); Computer Series Courses (C Language Programming, Principle and Application of Embedded Technology); Information Transmission and Processing Series Courses (Signals and Systems, Digital Signal Processing, Communication Principles, Information Theory and Coding, Electromagnetic Fields and Waves, Modern Detection Technology)

（二） 专业特色课程：

DSP 原理及应用、数字图像处理、数字语音处理、数据采集与智能仪器、
FPGA 技术应用、嵌入式操作系统、信息安全技术

Principle and Application of DSP, Digital Image Processing, Digital Speech Processing, Data Collection and Intelligent Instrumentation, FPGA Technology and Application, Embedded Operating System, Information Security Technology

附：毕业要求实现矩阵：

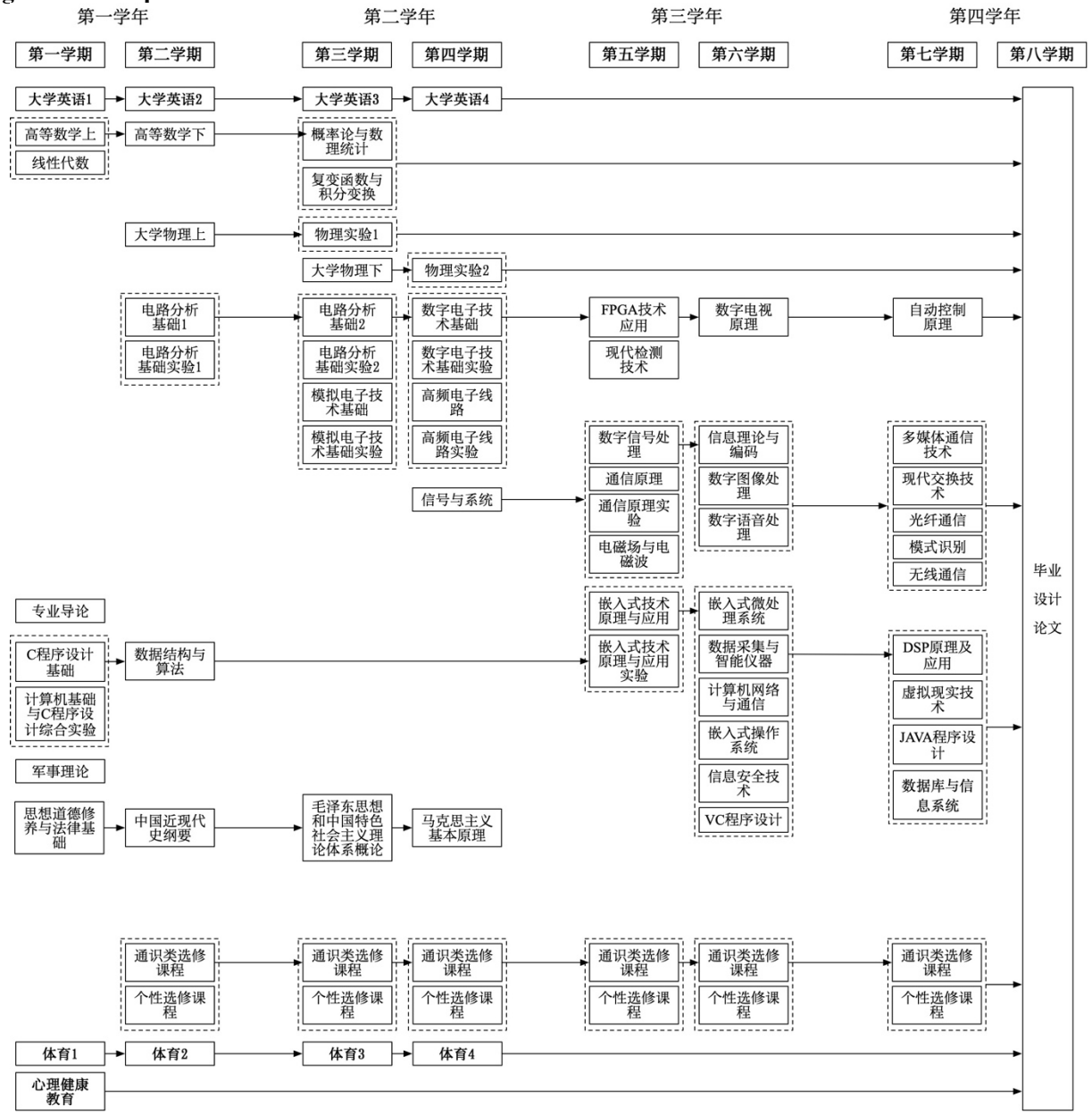
课程名称	2017版培养方案电子信息工程专业毕业要求																															
	1				2				3			4				5			6		7		8		9		10		11		12	
	1	2	3	4	1	2	3	4	1	2	3	1	2	3	4	1	2	3	1	2	1	2	1	2	1	2	1	2	1	2	1	2
思想道德修养与法律基础																							H									
中国近现代史纲要																										M						
毛泽东思想和中国特色社会主义理论体系概论																					H											
马克思主义基本原理																										M						
军事理论																											M					
体育																					M											
大学英语																												M				
C 程序设计基础					M																											
计算机基础与C 程序设计综合实验																		H														
专业导论																			M			M						H			H	M
高等数学	H																															
线性代数					M																											
概率论与数理统计					M																											
大学物理	H																															
物理实验																										H						
复变函数与积分变换					M																											
电路分析基础		H				H										L																
电路分析基础实验																M																
模拟电子技术基础			M				H		M		H																					
模拟电子技术基础实验											M						H										M					
数字电子技术基础			H				M						L																			
数字电子技术基础实验											M						H										M					
信号与系统		H				H							L				M															
数据结构与算法											M						H													L		
高频电子线路			L		H						M																					
高频电子线路实验							M				M					H										H						
嵌入式技术原理与应用							M				H					L																

	1				2				3			4				5			6		7		8		9		10		11		12	
	1	2	3	4	1	2	3	4	1	2	3	1	2	3	4	1	2	3	1	2	1	2	1	2	1	2	1	2	1	2	1	2
嵌入式技术原理与应用实验							M				M	H					L															
数字信号处理						M					H		M																			
通信原理				L			M				H			M																		
通信原理实验							M				M			H				H														
电磁场与电磁波	L					H						M																				
现代检测技术							H										M			H											
信息理论与编码		H					H				M																					
FPGA 技术应用				L				H			M						L															
数据采集与智能仪器											M		M				M					L										
嵌入式操作系统							L					H				M																
信息安全技术					H																		M					L			
计算机网络与通信							M		H													L	L									
VC 程序设计					L				H								L					M										
数字图像处理							M				M											H						M				
数字语音处理								M							H		M														L	
自动控制原理							M										L					M										
DSP 原理及应用											M				M				L			L										
JAVA 程序设计					L				M								H					L										
光纤通信							M														M											
数据库与信息系统						L			M																L							
多媒体通信技术											M		M								L											
机器学习与模式识别								M							H		L					L										
无线通信			H								M																			M		
现代交换技术							M																									
虚拟现实技术								L														L		M						L		
大数据基础			H								M		H																	L		
云计算与分布式存储															L							M							M			
军事训练																									M							

机械制造工程实训																					M									
电工电子实习								M											H										M	
模拟电子技术基础课程设计								H																				L		
数字电子技术基础课程设计								H																				L		
嵌入式技术应用课程设计						L			L					H			M													
信号分析与处理课程设计				H																								L		
数字通信系统课程设计																				H		H						L		L
专业综合实践											H		H				M					L								
毕业实习																							H	H		H			H	
毕业设计（论文）										H																	H	H		H

三、课程教学进程图

III. Teaching Process Map



四、 理论教学建议进程表

IV. Theoretical Course Schedule

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

课程编号 Course Number	课 程 名 称 Course Title	学分 Crs	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course
			总学时 Tot hrs.	实验 Exp.	上机 Ope-ration	实践 Prac-tice	课外 Extra-cur		
（二）通识教育选修课程 General Education Elective Courses									
创新创业类 Innovation and Entrepreneurship Courses		要求至少取得 9 个学分，且必须选修艺术体育类课程中的艺术类相关课程并取得至少 2 个学分，在创新创业类课程中至少选修一门课程，在人文社科类或经济管理类课程中至少选修一门。 Students are required to abtain at least 9 credits，which must cotain art courses of 2 credits from the category of Art and Physical Education Courses,at least one course from the category of Innovation and Entrepreneurship Courses, and at least one course from the category of Arts and Social Science Courses or the category of Economy and Management Courses.							
人文社科类 Arts and Social Science Courses									
经济管理类 Economy and Management Courses									
科学技术类 Science and Technology Courses									
艺术体育类 Art and Physical Education Courses									
（三）专业教育必修课程 Basic Disciplinary RequiredCourses									
4110144110	专业导论 Introduction to Speciality	1	16					1	
4050229110	线性代数 Linear Algebra	2.5	40					1	
4050063110	高等数学A 上 Advanced Mathematics I	5	80					1	
4050064110	高等数学A 下 Advanced Mathematics II	5	80					2	
4110309170	电路分析基础B 上 Fundamentals of Circuit Analysis I	2	32					2	高等数学上
4110017110	电路分析基础B 下 Fundamentals of Circuit Analysis II	3	48					3	电路分析基础 1
4100028110	电路分析基础实验上 Experiments of Circuit AnalysisI	0.5	16	16				2	电路分析基础 1
4100029110	电路分析基础实验下 Experiments of Circuit AnalysisII	0.5	16	16				3	电路分析基础 2
4110270140	数据结构与算法F Data Structure And Algorithm	2.5	40		8			3	C 程序设计基础
4050021110	大学物理A 上 Physics I	3.5	56					2	
4050022110	大学物理A 下 Physics II	3.5	56					3	
4050466130	物理实验A 上 Physics Lab. I	1	32	32				3	
4050467130	物理实验A 下 Physics Lab. II	1	32	32				4	
4050058110	概率论与数理统计B Probability and Mathematical Statistics	3	48					3	

课程编号 Course Number	课 程 名 称 Course Title	学分 Crs	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course
			总学时 Tot hrs.	实验 Exp.	上机 Ope-ration	实践 Prac-tice	课外 Extra-cur		
4050469130	复变函数与积分变换D Complex Function and Integral Transform	2.5	40					3	
4110048110	模拟电子技术基础A Fundamentals of Analog Electronic Circuit	4	64					3	电路分析基础1 电路分析基础2
4110051110	模拟电子技术基础实验 Experiments of Analog Electronics Circuit	0.5	16	16				3	模拟电子技术基础
4110066110	数字电子技术基础C Fundamentals of Digital Electronic Circuit	4	64					4	模拟电子技术基础
4110068110	数字电子技术基础实验 Experiments of Digital Electronics Circuit	0.5	16	16				4	数字电子技术基础
4110093110	信号与系统A Signal and System	4	64	8				4	复变函数与积分变换
4110310170	高频电子线路D High-frequency Electronic Circuits	3	48					4	模拟电子技术基础
4110378170	高频电子线路实验 Experiments of High- frequency Electronic Circuit	0.5	16	16				4	高频电子线路
4110311170	嵌入式技术原理与应用 Principles and Application of Embedded Technique	3	48					5	数字电子技术基础
4110312170	嵌入式技术原理与应用实验 Experiments of Embedded Technique	1	32	32				5	数字电子技术基础
4110313170	数字信号处理B Digital Signal Processing	3.5	56	8				5	信号与系统
4110314170	通信原理D Communication Principles	3	48					5	信号与系统
4110379170	通信原理实验 Experiments of Communication Principles	0.5	16	16				5	通信原理
4110244130	电磁场与电磁波C Electromagnetic Fields and Wave	2.5	40					5	电路分析基础 2
4110088110	现代检测技术B Modern Sense Technique	2.5	40	8				5	模拟电子技术基础实验
4110315170	信息理论与编码C Information Theory and Coding	2.5	40	8				6	概率论与数理统计
小　　计 Subtotal		71.5	1240	224	8	0	0		

课程编号 Course Number	课 程 名 称 Course Title	学分 Crs	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course
			总学时 Tot hrs.	实验 Exp.	上机 Ope-ration	实践 Prac-tice	课外 Extra-cur		
（四）专业教育选修课程 Specialized Elective Courses									
4110316170	FPGA 技术应用A FPGA Technique Application	3	48	32				5	数字电子技术基础
4110319170	JAVA 程序设计 JAVA Programming	2	32	8				5	C 程序设计基础
4110493190	大数据技术基础 Introduction to Big Data	2	32	8				5	
4110060110	数据采集与智能仪器A Data Collection and Intelligent Instrumentation	2	32	8				6	嵌入式技术原理与应用
4110317170	嵌入式操作系统 Embedded operating system	2	32	8				6	嵌入式技术原理与应用
4110095110	信息安全技术 Information Security Technology	2	32					6	C 程序设计基础
4110043110	计算机网络与通信B Computer Networks and Communication	2	32	8				6	通信原理
4110006110	VC程序设计B Visual C++ Programming	2	32	8				6	C 程序设计基础
4110318170	数字图像处理E Digital Image Processing	2	32	8				6	数字信号处理
4110074110	数字语音处理B Digital Speech Processing	2	32	8				6	数字信号处理
4110494190	云计算与分布式存储 Cloud Computing and Distributed Storage System	2.5	40	8				6	大数据技术基础
4110495190	机器学习与模式识别 Machine Learning and Pattern Recognition	2.5	40	8				6	数字信号处理
4100065110	自动控制原理C Automatic Control Theory	2.5	40	8				7	信号与系统
4110001110	DSP原理及应用C Principle and Application of DSP	2	32	8				7	嵌入式技术原理与应用
4110037110	光纤通信C Optical Fiber Communication	2	32	8				7	通信原理
4110063110	数据库与信息系统 Data Base and Information Systems	2	32	8				7	C 程序设计基础

4110025110	多媒体通信技术 Multimedia Communication Technology	2	32	8				7	数字图像处理 数字语音处理
4110186120	无线通信B Wireless Communication	2	32					7	通信原理
4110090110	现代交换技术B Stored Program Control Switching Technology	2	32	8				7	通信原理
4110282130	虚拟现实技术D Virtual Reality Technology	2.5	40		16			7	C 程序设计基础
小　　计 Subtotal		40	592	104	24	0	0		
修读说明：要求至少选修 20 学分。 NOTE: Minimum subtotal credits 20									
（五）个性课程 Personalized Elective Courses									
4110245130	移动设备应用开发技术 Mobile Device Application Development Technology	2	32	8				6	C 程序设计基础
4110261120	QT 程序设计 QT Program Design	2	32	8				6	C 程序设计基础
4110247130	智能信息处理 Intelligent Information Processing	2.5	40	8				7	高等数学上
小　　计 Subtotal		6.5	104	24	0	0	0		
修读说明：学生从以上个性课程和学校发布的其它个性课程目录中选课，要求至少选修 6 学分。 NOTE: Students can select courses from above and the other personalized elective courses, and are required to obtain at least 6 credits.									

五、 集中性实践教学环节

V. Practice Schedule

课程编号 Course Number	实践环节名称 Practice Courses Name	学分 Crs	周数 Weeks	建议修读学期 Suggested Term
1060002110	军事训练 Military Training	1.5	3	1
4080152110	机械制造工程实训 Mechanical Manufacturing Engineering Training	1	1	2
4100068110	电工电子实习 Electrical and Electronics Internship	2	2	3
4110128110	模拟电子技术基础课程设计 Course Design on Fundamentals of Analog Electronic Circuit	1	1	3
4110129110	数字电子技术基础课程设计 Course Design on Fundamentals of Digital Electronic Circuit	1	1	4
4110320170	信号分析与处理课程设计 Course Design on Signal Analysis and Processing	1	1	5
4110130110	数字通信系统课程设计 Course Design on Digital Communication System	1	1	5

4110321170	嵌入式技术应用课程设计 Practice of Single Chip Microcomputer Application	1	1	6
4110210120	专业综合实践 Practice of Specialty Synthesis	1	1	6
4110322170	毕业实习 Graduation Internship	3	3	7
4110323170	毕业论文 Graduation Thesis	11	17	8
小　　计 Subtotal		24.5	32	

六、其它要求

VI. Other Requirements

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

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

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

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

学院教学责任人： 艾青松

电子科学与技术专业 2017 版本科培养方案
Undergraduate Education Plan for Specialty in Electronic Science and Technology (2017)

专业名称 Major	**电子科学与技术** Electronic Science and Technology	主干学科 Major Disciplines	**电子科学与技术** Electronic Science and Technology
计划学制 Duration	**四年** 4 Years	授予学位 Degree Granted	**工学学士** Bachelor of Engineering
所属大类 Disciplinary	**电子信息类（工学）** Electronic Information	大类培养年限 Duration	**1 年** 1 year

最低毕业学分规定

Graduation Credit Criteria

课程分类 Course Classification / 课程性质 Course Nature	通识教育课程 Public Basic Courses	专业教育课程 Specialized Courses	个性课程 Personalized Course	集中性实践教学环节 Practice Courses	课外学分 Study Credit after Class	总学分 Total Credits
必修课 Required Courses	29	73	\	22.5	\	170
选修课 Elective Courses	9	20.5	6	\	10	

一、培养目标与毕业要求

Ⅰ Educational Objectives &Requirement

（一） 培养目标

本专业将培养德、智、体全面发展，具有电子科学与技术领域系统、扎实的理论基础，具有工程实践和创新能力的高素质科技人才。

（1）具有良好的品德与人文素养，了解当代全球的社会问题和道德问题；

（2）具有电子科学与技术专业扎实的自然科学基础，能运用数学和科学工具解决工程问题；

（3）能胜任微电子或光电子或电路与系统专业领域的研究、开发、制造及管理工作；

（4）具备对电子科学与技术学科发展趋势的敏感性，具有创新意识以及跟踪掌握本专业新理论、新知识、新技术的能力。

（5）具有口头和书面的沟通技能、良好的团队意识和合作精神，具有自我管理能力、终身学习能力和职业提升能力。

Educational objectives

This program is designed to produce fully - developed engineers in morality, intelligence and heath that are trained to develop the fundamental theories and skills, a consolidated knowledge structure and to be enhanced with hands - on engineering experiences and innovative initiatives in electronic science and technology.

1. Comply with professional ethics, cultural scientific literacy and social responsibility, and the students shall understand the contemporary global social issues and moral issues.

2. Know well about mathematics and nature science related to electronic science and technology, research, engineering design and technology service. The students shall be able to solve the engineering problems with mathematical and scientific tools.
3. Be able to research, development, manufacture and management in microelectronics or optoelectronics or circuit and system professional
4. Has sensitivity to the development trends of electronic science and technology. The students with innovation consciousness shall be able to continuously grasp new theories, and master new knowledge and new techniques in electronics.
5. Have the capacity of verbal and written communication, teamwork and cooperative. Own the abilities of self-management, lifelong learning, and Engaged in the professional enterprise.

（二） 毕业要求

1. 工程知识：能够运用数学、自然科学、工程基础和电子科学与技术专业知识，将电子科学与技术专业复杂工程问题抽象为数学、物理问题，选择适当的模型进行描述，对模型进行分析求解。

1.1 掌握数学、物理等自然科学知识。

1.2 掌握电子学、信息技术、微电子学、光电子学和电路与系统的基础知识。

1.3 将复杂工程问题抽象为数学、物理问题，选择适当的模型进行描述，对模型进行推理求解和必要修正，并理解其局限性。

2. 问题分析：能够对微电子、光电子和电路与系统中的复杂工程问题进行识别和明确表达，通过文献研究及分析、模型构建及分析，最终形成有效的结论。

2.1 明确设计需求，确定设计目标、实际限制条件，确定设计性能指标。

2.2 结合文献研究，将工程问题进行有效分解和明确表述。

2.3 运用数学物理及专业基本原理，对工程问题进行建模分析，获得有效结论。

3. 设计/开发解决方案：能够综合考虑经济、社会、健康、安全、法律、文化及环境因素，针对微电子、光电子、电路与系统复杂工程问题提出有效的解决方案，能够设计出满足一定需求条件的微电子器件、集成电路、光电子器件、电路与系统模块，在设计过程中体现创新意识，对设计的系统进行功能测试、性能测试，并改进方案。

3.1 综合考虑经济、社会、健康、安全、法律、文化及环境因素，分析对比候选方案的可行性与性能，确定解决方案。

3.2 依据解决方案，实现系统或模块，在设计实现环节上体现创造性。

3.3 对设计系统进行功能和性能测试，进行必要的方案改进。

4. 研究：能够针对微电子、光电子、电路与系统工程中的复杂问题，包括设计性实验及综合专题研究等环节中的相关数据，基于相关科学原理进行研究，通过收集信息、查阅文献、仿真分析、硬件调试实验等科学方法，分析数据并综合信息，最终给出有效的结论。

4.1 针对工程问题，收集信息、查阅文献、分析现有技术的特点与局限性。

4.2 设计候选方案，考虑技术限制条件，评估方案可行性。

4.3 利用计算机软硬件技术及仿真工具，以及专业基础知识，设计实验或仿真方案，分析数据并综合信息，评估并比较方案技术性能。

5. 使用现代工具：针对微电子、光电子、电路与系统复杂工程问题，能够选择与使用适合的现代工具和已有的技术资源，对问题进行预测和模拟，并在使用这些工具和技术资源过程中，理解其应用的局限性。

5.1 学会使用现代工程工具，如：计算机、设计平台、开发平台、仿真平台等工具，进行建模与仿真，并能够理解其局限性。

5.2 能够开发、选择与使用恰当的技术、资源和现代工具，进行复杂工程问题的预测与模拟。

6. 工程与社会：能够基于工程相关背景知识进行合理分析，评价专业工程实践和电子复杂工程问题

解决方案对社会、健康、安全、法律以及文化的影响，并理解应承担的责任。

6.1 了解电子科学与技术领域的科技发展动态及产业发展方向。

6.2 了解国家对微电子、光电子、电路与系统和电子信息产业政策及国内外有关知识产权的法律法规。

6.3 具备社会、健康、安全、法律以及文化的基本素养。

6.4 能够分析评价专业工程实践和复杂工程问题解决方案对社会、健康、安全、法律以及文化的影响，并理解应承担的责任。

7. 环境与可持续发展：能够理解和评价针对电子复杂工程问题的工程实践对环境、社会可持续发展的影响。

7.1 理解工程方案可能产生的社会和环境影响。

7.2 评估工程方案的可持续性。

8. 职业规范：具有人文社会科学素养、身体素质、心理素质、社会责任感，能够在工程实践中理解并遵守工程职业道德和规范，履行责任。

8.1 具备人文社会科学素养，理解应担负的社会责任，愿意为社会服务。

8.2 理解并在工程实践中遵守工程职业道德规范。

9. 个人与团队：具有协作精神和团队意识，能够在多学科背景下的团队中担任负责人或普通成员，并承担相应的责任，共同完成团队任务。

9.1 理解团队工作中不同角色的责任，具有协作精神。

9.2 能够与本专业及不同学科的团队成员合作，担任成员或领导者，承担个人责任，并协作完成团队任务。

10. 沟通：能够就电子复杂工程问题与业界同行及社会公众进行有效沟通和交流，包括撰写报告和设计文稿、陈述发言、清晰表达或回应指令。并具备一定的国际视野，能够在跨文化背景下进行沟通和交流。

10.1 能够就复杂工程问题进行有效的书面和口头表述，并能与他人进行有效沟通，包括撰写报告、陈述发言、清晰表达或回应指令。

10.2.掌握至少一种外国语，能够用于追踪专业领域技术发展前沿，能够进行跨文化交流。

11. 项目管理：理解并掌握工程管理原理与经济决策方法，并能在多学科环境中应用。

11.1 理解并掌握工程管理的基本原则，在个人或多学科团队任务中进行有效管理。

11.2 运用成本效益评估方法，进行工程方案的成本效益分析。

12. 终身学习：具有自主学习能力，具有较强的自我管理和控制能力，理解在电子科学与技术领域及未来职业发展过程中终身学习的重要性，具有基于职业发展需求不断学习和发展的能力。

12.1 学生具备入职本专业职业岗位的能力，以及职业提升能力；

12.2 具有进行终身学习的愿望和能力，具有较强的自我管理和控制能力，能够运用信息和文献工具，自主学习知识。

12.3 理解终身学习的重要性，形成终身学习的意识，适应电子科学与技术持续的职业发展。

1. Engineering knowledge：Have the abilityto abstract the complex engineering problems of Electronic Science and Technology into mathematical and physical problems,select the appropriate model to describe and analyze with mathematics, natural science, engineering foundation and Electronic Science and technology knowledge.

1.1 Master the knowledge of natural science, such as mathematics, physics, etc.

1.2 Master the basic knowledge of electronics, information technology, microelectronics, optoelectronics, circuits and systems.

1.3 Abstract the complex engineering problems into mathematical and physical problems,choosing the appropriate model to describe, reasoning and modifying. More important understanding its limitations.

2. Problem analysis: Have the capacity to recognition and express clearly the complex engineering

problems belongs to microelectronics, optoelectronics, circuits and systems.

2.1 Clear design requirements, confirm design goals and limitations, determine the design performance index.

2.2 Effective decomposition and explicit expression of engineering problems,according to the literature research.

2.3 Using the basic principles of mathematical, physical and specialty to mode and analysis the engineering problems. Finally, get a valid conclusion.

3. Design/develop solutions: Offer an effective solution to the complex engineering problems of microelectronics, optoelectronics, circuits and systems by considering economic, social, health, safety, legal, cultural and environmental factors synthetically. Have the capacity to design microelectronic devices, integrated circuits, optoelectronic devices, circuit and system modules that meet certain requirements. Be able to test the function and performance of the design system, further more have the ability to improve the solution and show a sense innovation in design procedure.

3.1 Analyze and compare the feasibility and performance of the candidate solution by considering economic, social, health, safety, legal, cultural and environmental factors synthetically. Finally confirm the solution.

3.2 According to the solution, realize the system or module, and reflect creativity in design stage.

3.3 Testing the function and performance of the design system. Make improvement in a necessary program.

4. Research: Have the ability to solve the complex problems in microelectronics, optoelectronics, circuit and system, including related data in design experiments and comprehensive thematic studies. Doing some research based on the related science principles, and through collecting information, consulting documents, simulation analysis, hardware debugging experiments etc. scientific methods to analyze data and integrated information, finally give an effective conclusion.

4.1 According to engineering problems, collecting information, consulting documents, analyzing the characteristics and limitations of existing technology.

4.2 Design candidate solutions, consider the technology limitations, assessthe feasibility of the scheme.

4.3 Using computer software, hardware technology, simulation tools and professional basic knowledge to design experiment or simulation scheme, analyze data and integrated information
assess and compare the performance of the scheme.

5. Using modern tools: To solve the complex problems in microelectronics, optoelectronics, circuit and system, select or use suitable modern tools and existing technology to make a prediction and simulation of the problem, meanwhile understand the limitations of the application.

5.1 Learning use modern tools such as computer, design platform, develop platform, simulate platform. Have the ability to use these tools to mode and simulate, and know the limitations of the application.

5.2 Select or use suitable modern tools and existing technology to make a prediction and simulation of the problem.

6. Engineering and society: Make reasonable analysis based on related engineering background knowledge, evaluate the impact of professional engineering practice and complex electronic engineering solutions to social, health, safety, legal and cultural, and under the responsibility.

6.1 Know the development dynamic of science and the direction of industry development in the field of Electronic Science and technology.

6.2 Know the laws and regulations of microelectronics, optoelectronics, circuit and system, electronic information industry and foreign intellectual property.

6.3 Have basic literacy about health, social security, law and culture.

6.4 Evaluate the impact of professional engineering practice and complex electronic engineering solutions to social, health, safety, legal and cultural, and under the responsibility.

7. Environment and sustainable development: understand and assess the impact of professional engineering practice and complex electronic engineering to environment,sustainable development of society.

7.1 Understand the possible social and environmental impact of engineering project.

7.2 Evaluate the sustainability of engineering solutions.

8. Occupation standard: Possess humanities and social science literacy, physical quality, psychological quality and social responsibility. Be able to understand and comply with engineering occupation ethics in engineering practice, and show responsibility.

8.1 Possess humanities and social science literacy, understand the social responsibility needing take on, willing to server the society.

8.2 Understand and comply with engineering occupation ethics in engineering practice.

9. Individual and team: possess cooperation spirit and team spirit, to be a leader or a member in a team with a multidisciplinary background,assume the corresponding responsibility and complete the task together.

9.1 Understand the responsibility that different role play in teamwork, have the cooperation spirit.

9.2 Have the ability to cooperate with the professional and different disciplines team members, be a leader or a member, possess individual responsibility, cooperate with each other and complete team task.

10. Communication: Have an effectively communicate with industry counterparts and the public about complex electronic engineering problem, including write a report, design a manuscript, make a statement, clear express or response instruction. Possess a certain international vision, communicate with each other in a cross-cultural background.

10.1Have an effective written and oral expression about complex electronic engineering problem, make a valid communicate, including write a report, design a manuscript, make a statement, clear express or response instruction.

10.2Master a foreign language at least. Traced to the development frontiers of professional technical field and cross cultural communication is the minimum requirement.

11. Project management: Understand and master the principle of engineering management and the method of economic decision.Applying in a multidisciplinary environment is the most important.

11.1Understand and master the principle of engineering management, make an effective management in individual or multidisciplinary team tasks.

11.2Using the appraisal procedure of cost-effectiveness to analyze the cost-effectiveness of the solutions.

12. Lifelong learning: Have the capacity to learn by oneself, self-management and self-control. Understanding the importance of lifelong learning in Electronic Science and Technology field and future professional development.

12.1Students should be competent for the entry level of this major.

12.2Have the ability and willing to learn for lifelong. Self-management and self-control is necessary. Using information and literature tools to learn knowledge by oneself.

12.3Understanding the importance of lifelong learning, developingthe consciousness of lifelong learning, adapting to the continuous professional development of Electronic Science and technology.

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		√	√	√	

	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 6	√	√	√	√	
毕业要求 7	√	√	√	√	
毕业要求 8	√				√
毕业要求 9	√				√
毕业要求 10	√				√
毕业要求 11		√		√	√
毕业要求 12				√	√

二、专业核心课程与专业特色课程

II Core Courses and Characteristic Courses

（一） 专业核心课程：

电路分析基础、模拟电子技术基础、数字电子技术基础、信号与系统、量子力学、固体物理、半导体物理基础、光电子技术、单片机原理与应用。

Core Courses: Fundamentals of Circuit Analysis, Fundamentals of Analog Electronic Circuit, Fundamentals of Digital Electronic Circuit, Signal and System, Quantum Mechanics, Solid State Physics, Hardware Description Language and Digital System Design and Application, Semiconductor Physics, Photo-electronics Technology, Principles and Application of Single Chip Microcomputer.

（二） 专业特色课程：

半导体物理基础、物理光学、光电子技术、硬件描述语言与数字系统设计、单片机原理及应用、微电子器件与集成电路设计、微电子工艺原理、集成电路测试技术、光电测试技术、激光原理与技术、电子封装与表面组装技术。

Characteristic Courses: Semiconductor Physics, Physical Optics, Photo-electronics Technology, Hardware Description Language and Digital System Design and Application, Principles and Application of Single Chip Microcomputer, Microelectronic Devices and IC Design, Theory of Microelectronic Manufacturing, Measurement Techniques for IC, Photoelectric Testing Technology,Principle and Technology of Laser, Electronic Packaging and Surface Assembling.

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	电子科学与技术专业毕业要求											
			（1）	（2）	（3）	（4）	（5）	（6）	（7）	（8）	（9）	（10）	（11）	（12）
		思想道德修养与法律基础								√				
		中国近现代史纲要								√				
		毛泽东思想和中国特色社会主义理论体系概论								√				
		马克思主义基本原理								√				
		军事理论								√				
		体育 1								√				
		体育 2								√				
		体育 3								√				
		体育 4								√				

专业核心课程	专业特色课程	课程名称	电子科学与技术专业毕业要求											
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
		大学英语 1										√		√
		大学英语 2										√		√
		大学英语 3										√		√
		大学英语 4										√		√
		C 程序设计基础	√	√	√	√	√							√
		计算机基础与C程序设计综合实验	√	√	√	√	√							√
		专业导论										√		√
		高等数学上	√	√										
		高等数学下	√	√										
		线性代数	√	√										
		概率论与数理统计	√	√										
		大学物理 1	√	√	√									
		大学物理 2	√	√	√									
		物理实验 1	√		√							√		
		物理实验 1	√		√							√		
√		电路分析基础 1	√	√	√									√
√		电路分析基础 2	√	√	√									√
√		电路分析基础实验 1	√		√							√		√
√		电路分析基础实验 2	√		√							√		√
√		模拟电子技术基础	√	√	√		√							√
√		模拟电子技术基础实验	√		√		√					√		√
√		数字电子技术基础	√	√	√		√							√
√		数字电子技术基础实验	√		√		√					√		√
√		信号与系统	√	√	√		√							√
		复变函数与积分变换	√	√	√									√
√		量子力学	√	√	√									√
		微机原理与通信接口	√		√		√							√
		电磁场与电磁波	√	√	√									√
√	√	光电子技术	√	√	√		√							√
√		固体物理	√	√	√									√
	√	物理光学	√	√	√									√
	√	电子 EDA 与数字系统设计实验	√	√	√		√							√
√	√	单片机原理与应用	√		√		√							√

专业核心课程	专业特色课程	课程名称	电子科学与技术专业毕业要求											
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
		高频电子线路	√	√	√		√							√
√	√	半导体物理基础	√	√	√									√
	√	微电子工艺原理	√	√	√									√
	√	光电测试技术	√	√	√		√							√
		计算机网络与通信	√		√		√							√
		通信原理	√	√	√		√							√
		光纤通信	√	√	√									√
	√	激光原理与技术	√	√	√									√
		嵌入式微处理器系统	√		√		√							√
	√	微电子器件与集成电路设计	√	√	√		√							√
	√	电子封装与表面组装技术	√	√	√									√
	√	集成电路测试技术	√	√	√									√
		CMOS 模拟集成电路设计	√	√	√		√							√
		传感器原理与检测技术	√	√	√									√
		机器人原理及应用	√	√	√		√							√
		计算机虚拟仪器技术	√	√	√		√							√
		Java 语言与面向对象程序设计	√	√	√		√							√
		集成电路设计与仿真	√	√	√		√							√
		电子科学与技术专业综合实验	√		√	√	√	√	√		√	√	√	√
		电子创新工程设计实验	√		√	√	√	√	√		√	√	√	√
		军事训练								√	√			
		金工实习	√								√	√		
		电工电子实习	√					√			√	√		
√		模拟电子技术基础课程设计	√	√	√	√	√	√	√			√	√	√
√		数字电子技术基础课程设计	√	√	√	√	√	√	√			√	√	√
		MATLAB 应用专项实践	√	√	√	√	√	√	√			√		√
√		单片机应用课程设计	√	√	√	√	√	√	√			√	√	√
√		专业方向课程设计	√	√	√	√	√	√	√			√	√	√
		专业实习						√	√		√	√	√	
		毕业设计（论文）	√	√	√	√	√	√	√	√	√	√	√	√

三、课程教学进程图

Ⅲ　Teaching Process Map

黄色为双语课程
第一学年
第二学年
第三学年
第四学年
第一学期
第二学期
第三学期
第四学期
第五学期
第六学期
第七学期
第八学期
大学英语1
大学英语2
大学英语3
大学英语4
支撑双语课程 支撑毕业设计
高等数学上
高等数学下
概率论与数理统计
信号与系统
复变函数与积分变换
通信原理
线性代数
电路分析基础1
电路分析基础2
电路分析基础实验1
电路分析基础实验2
高频电子线路
计算机网络与通信
Java语言
与面向对象的设计
模拟电子技术基础
数字电子技术基础
机器人原理及应用
C程序设计基础
模拟电子技术基础实验
数字电子技术基础实验
电子EDA与
数字系统设计实验
嵌入式微处理器系统
计算机虚拟仪器技术
计算机基础与C程序设计
综合实验
模拟电子技术课程设计
微机原理与通信接口
单片机原理与应用
数字电子技术课程设计
专业导论
大学物理1
大学物理2
量子力学
固体物理
半导体物理基础
物理实验1
物理实验2
电磁波与电磁场
超大规模集成电路设计
电子组装与表面组装技术
微电子工艺原理
集成电路测试技术
微电子器件
与集成电路设计
集成电路设计与仿真
物理光学
光纤通信
激光原理与技术
光电子技术
光电测试技术
机械制造工程实训
电工电子实习
电子科学与技术专业
综合实验I
电子科学与技术专业
综合实验II
电子科学与技术专业
综合实验III
专业实习
电子创新工程设计实验
军事理论
军事训练
思想道德修养
与法律基础
中国近现代史纲要
马克思主义基本原理
毛泽东思想和中国特色
社会主义理论体系概论
体育1
体育2
体育3
体育4
通识类选修课程
通识类选修课程
通识类选修课程
通识类选修课程
通识类选修课程
通识类选修课程
毕业设计
电路与系统课群
微电子课群
光电子课群
实践课群
通识课课群

四、 理论教学建议进程表

Ⅳ Theory Course Schedule

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

课程编号 Course Number	课 程 名 称 Course Title	学分 Crs	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course
			总学时 Tot hrs.	实验 Exp.	上机 Ope-ration	实践 Prac-tice	课外 Extra-cur		
（二）通识教育选修课程 General Education Elective Courses									
创新创业类 Innovation and Entrepreneurship Courses	要求至少取得 9 个学分，且必须选修艺术体育类课程中的艺术类相关课程并取得至少 2 个学分，在创新创业类课程中至少选修一门课程，在人文社科类或经济管理类课程中至少选修一门。 Students are required to abtain at least 9 credits，which must cotain art courses of 2 credits from the category of Art and Physical Education Courses,at least one course from the category of Innovation and Entrepreneurship Courses, and at least one course from the category of Arts and Social Science Courses or the category of Economy and Management Courses.								
人文社科类 Arts and Social Science Courses									
经济管理类 Economy and Management Courses									
科学技术类 Science and Technology Courses									
艺术体育类 Art and Physical Education Courses									
（三）专业教育必修课程 Basic Disciplinary RequiredCourses									
4110144110	专业导论 Introduction to Speciality	1	16					1	
4050229110	线性代数 Linear Algebra	2.5	40					1	
4050063110	高等数学 A 上 Advanced Mathematics Ⅰ	5	80					1	
4050064110	高等数学 A 下 Advanced Mathematics Ⅱ	5	80					2	
4110309170	电路分析基础 B 上 Fundamentals of Circuit Analysis Ⅰ	2	32					2	高等数学上
4110017110	电路分析基础 B 下 Fundamentals of Circuit Analysis Ⅱ	3	48					3	电路分析基础上
4100028110	电路分析基础实验上 Experiments of Circuit Analysis Ⅰ	0.5	16	16				2	电路分析基础上
4100029110	电路分析基础实验下 Experiments of Circuit Analysis Ⅱ	0.5	16	16				3	电路分析基础下
4050021110	大学物理 A 上 Physics Ⅰ	3.5	56					2	
4050022110	大学物理 A 下 Physics Ⅱ	3.5	56					3	
4050466130	物理实验 A 上 Physics Lab. Ⅰ	1	32	32				3	
4050467130	物理实验 A 下 Physics Lab. Ⅱ	1	32	32				4	
4050058110	概率论与数理统计 B Probability and Mathematical Statistics	3	48					3	
4050469130	复变函数与积分变换 D Complex Function and Integral Transform	2.5	40					3	

课程编号 Course Number	课 程 名 称 Course Title	学分 Crs	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course
			总学时 Tot hrs.	实验 Exp.	上机 Ope-ration	实践 Prac-tice	课外 Extra-cur		
4110048110	模拟电子技术基础 A Fundamentals of Analog Electronic Circuit	4	64					3	电路分析基础下
4110051110	模拟电子技术基础实验 Experiments of Analog Electronics Circuit	0.5	16	16				3	
4110066110	数字电子技术基础 C Fundamentals of Digital Electronic Circuit	4	64					4	
4110068110	数字电子技术基础实验 Experiments of Digital Electronics Circuit	0.5	16	16				4	
4110093110	信号与系统 A Signal and System A	4	64	8				4	复变函数与积分变换
4110047110	量子力学 A Quantum Mechanics A	4	64					4	复变函数与积分变换
4110324170	电子 EDA 与数字系统设计实验 Electronic Design Automatic and Digital System Design	1.5	48	48				5	数字电子技术基础
4110325170	光电子技术 C Photo-electronics Technology	3	48					5	大学物理
4110032110	固体物理 A Solid State Physics A	4	64					5	量子力学
4110326170	单片机原理与应用 B Principles and Application of Single Chip Microcomputer	2.5	40					5	
4110327170	半导体物理基础 A Fundamentals of Semiconductor Physics	2.5	40					6	固体物理
4110083110	微电子工艺原理 Theory of Microelectronic Manufacturing	2.5	40					6	半导体物理基础
4110328170	电子科学与技术专业综合实验 1 Comprehensive Experiment of Electronic Science and Technology I	1.5	48	48				5	
4110329170	电子科学与技术专业综合实验 2 Comprehensive Experiment of Electronic Science and Technology II	2	64	64				6	
4110330170	电子科学与技术专业综合实验 3 Comprehensive Experiment of Electronic Science and Technology III	1	32	32				7	
4110331170	电子创新工程设计实验 Design Experiment of Electronic Innovation Engineering	1.5	48	48				7	
小 计 Subtotal		73	1352	376	0	0	0		

课程编号 Course Number	课 程 名 称 Course Title	学分 Crs	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course
			总学时 Tot hrs.	实验 Exp.	上机 Ope-ration	实践 Prac-tice	课外 Extra-cur		
（四）专业教育选修课程 Specialized Elective Courses									
4110184120	微机原理与通信接口 C Principles of Microcomputer and Communication Interface	2.5	40					4	
4110011110	电磁场与电磁波 A Electromagnetic Fields and Waves	3	48					5	复变函数与积分变换
4050639170	物理光学 C Physical Optics	3	48					5	大学物理下
4110310170	高频电子线路 D High Frequency Electronic Circuits	3	48					5	模拟电子技术基础
4110332170	微电子器件与集成电路设计 B Microelectronic Devices and IC Design	1.5	24					6	半导体物理基础
4110333170	嵌入式微处理器系统 B Embedded Microprocessor System	2	32					6	单片机原理与应用
41100356170	计算机网络与通信 C Computer Networks and Communication	2	32					6	通信原理
4110314170	通信原理 D Communication Principles	3	48					6	数字电子技术基础实验
4110384170	光纤通信 E Optical Fiber Communications	2.5	40					6	通信原理
4110334170	激光原理与技术 D Principle and Technology of Laser	2	32					7	大学物理下
4110335170	电子封装与表面组装技术 A Electronic Packaging and Surface Assembling	1.5	24					7	微电子工艺原理
4110336170	集成电路测试技术 B Measurement Techniques for IC	2	32					7	微电子器件与集成电路设计
4110337170	光电测试技术 B Photoelectric Testing Technology	2	32					7	光电子技术
4110338170	CMOS 模拟集成电路设计 CMOS Analog Circuit Design	2	32					7	
4110339170	传感器原理与检测技术 Sensor Principle and Detection Technology	1.5	24					7	
小 计 Subtotal		33.5	536	0	0	0	0		
修读说明：要求至少选修 20.5 学分。 NOTE：Minimum subtotal credits:20.5									

课程编号 Course Number	课 程 名 称 Course Title	学分 Crs	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course
			总学时 Tot hrs.	实验 Exp.	上机 Ope-ration	实践 Prac-tice	课外 Extra-cur		
（五）个性课程 Personalized Electice Courses									
4110340170	安卓应用程序设计 Android application programming	2.5	40	16				4	
4110341170	机器人原理及应用实验 Robot Principle and Application	1	32	32				5	数字电子技术基础
4110342170	计算机虚拟仪器技术 C Computer Virtual Instrument Technology	2.5	40	16				5	数字电子技术基础
4110185120	无线传感网技术 Technology of Wireless Sensor Network	2.5	40	8				6	
4110275130	数据库应用 Database Application	2.5	40					6	
4110300140	Java 语言与面向对象程序设计 B Java language and object oriented programming	2	32	16				7	C 程序设计基础
小 计 Subtotal		13	224	88	0	0	0		
修读说明：学生从以上个性课程和学校发布的其它个性课程目录中选课，要求至少选修 6 学分。 NOTE: Sudents can select courses from above and the other personalized courses in catalog, and are required to obtain at least 6 credits.									

五、 集中性实践教学环节

Ⅴ Practice Schedule

课程编号 Course Number	实践环节名称 Practice Courses Name	学分 Crs	周数 Weeks	建议修读学期 Suggested Term
1060002110	军事训练 Military Training	1.5	3	1
4080152110	机械制造工程实训 D Training on Mechanical Manufacturing Engineering	1	1	2
4100068110	电工电子实习 A Practice in Electrical Engineering & Electronics A	2	2	3
4110128110	模拟电子技术基础课程设计 Course Design on Fundamentals of Analog Electronics Circuit	1	1	3
4110129110	数字电子技术基础课程设计 Course Design on Fundamentals of Digital Electronic Circuit	1	1	4
4110105110	MATLAB 应用课程设计 C Course Design of MATLAB Application	1	1	5（分散）

课程编号 Course Number	实践环节名称 Practice Courses Name	学分 Crs	周数 Weeks	建议修读学期 Suggested Term
4110343170	电子科学与技术专业方向课程设计 Course Design on speciality	1	1	6（分散）
4110140110	专业实习 Speciality practice	3	3	7
4110344170	毕业论文 Graduation Thesis	11	17	8
小　　计　Subtotal		22.5	30	

六、其它要求

Ⅵ Recommendations on Course Studies

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

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

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

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

学院教学责任人：　艾青松

专业培养方案责任人：　吴友宇

通信工程专业 2017 版本科培养方案
Undergraduate Education Plan for Specialty in Communication Engineering (2017)

专业名称 Major	**通信工程** Communication Engineering	主干学科 Major Disciplines	**信息与通信工程** Information and Communication Engineering
计划学制 Duration	**四年** 4 Years	授予学位 Degree Granted	**工学学士** Bachelor of Engineering
所属大类 Disciplinary	**电子信息类（工学）** Electronic Information	大类培养年限 Duration	**1 年** 1 year

最低毕业学分规定

Graduation Credit Criteria

课程分类 Course Classification / 课程性质 Course Nature	通识教育课程 General Education Courses	专业教育课程 Specialized Courses	个性课程 Personalized Course	集中性实践教学环节 Practice Courses	课外学分 Extracurricular Credits	总学分 Total Credits
必修课 Required Courses	29	68	\	28	\	170
选修课 Elective Courses	9	20	6	\	10	

一、培养目标与毕业要求

I Educational Objectives &Requirement

（一）培养目标

Educational Objectives

培养适应社会主义现代化建设和信息产业发展需要，在通信工程领域具备扎实的理论基础、工程知识、专业技术、实践能力和创新创业能力，能够在通信工程及相关领域从事系统、设备和器件的研究、设计、开发、制造、应用、维护、管理等工作，并具备一定人文社会科学素养与国际化视野的高素质专门人才。学生毕业五年左右能达到工程师等中级技术职称任职条件，具体应达到的目标如下：

（1）具有健全的人格和良好科学文化素养，具有职业道德和社会责任感。

（2）具有国际化视野和跨文化交流与合作能力，具有团队分工协作、交流沟通的能力，能胜任技术负责、经营与管理等工作。

（3）理解科学技术的发展与伦理道德问题，并能够根据国家法律、行业法规及相关技术标准，合理运用所学专业知识来分析、解决通信工程及相关行业领域内遇到的工程实践问题。

（4）能够独立承担通信工程及相关领域中通信器件、通信系统的设计、应用研究和科技开发工作，成为所在单位技术骨干。

（5）具有终身学习的能力，能够通过继续教育或其它学习渠道更新知识，实现能力和技术水平的提高，具备不断适应社会发展和行业竞争的能力。

Cultivate high-quality professionals that adapt to the needs of socialist modernization and information industry development; have solid theoretical foundation, engineering knowledge, professional technology and practical ability, as well as innovation and entrepreneurial abilities; can conduct research, design, development, manufacture, application, maintenance, and management of

systems, equipment, and devices in communication engineering and related fields; and are equipped with humanities and social science literacy, as well as international vision. A graduate should be able to achieve qualifications for intermediate technical titles such as Engineers about five years after graduation. The specific objectives are as follows:

(1) The graduate should have a sound personality, good scientific and cultural literacy, professional ethics and a sense of social responsibility.

(2) The graduate should possess international vision and the capabilities of cross-cultural communication and cooperation; be able to communicate and work in a team; and be competent to work as a technical leader, operator and manager.

(3) The graduate should understand the development of scientific and technology, as well as the related ethical issues; and be able to analyze and solve practical engineering problems in communication engineering and related fields using professional knowledge, while abiding the national law, complying with the industry regulations, and meeting related technical standards.

(4) The graduate should be able to undertake individually the design, application research and technology development of devices and systems in communication engineering and related fields; and become the technical backbone of the unit.

(5) The graduate should have the ability of lifelong learning; improve one's capability and technical level by updating the knowledge base through continuous learning or other channels; and be able to constantly adapt to social development and industry competition.

（二） 毕业要求

Requirement for graduation

1. 工程知识：能够将数学、自然科学、工程基础和专业知识用于解决通信工程领域的复杂工程问题。

1-1 掌握高等数学、工程数学、物理等数学与自然科学的知识，能将其用于通信工程相关问题的描述、建模和求解；

1-2 掌握从事通信行业工作所需的专业基础知识，能用于通信工程问题的建模、推理和分析、计算；

1-3 掌握从事通信行业工作所需的分析、设计和应用等专业知识，能用于解决通信工程领域的复杂工程问题。

2. 问题分析：能够将数学、自然科学和工程科学的基本原理综合运用于通信工程专业复杂工程问题的分析、识别、表达、处理，并通过查阅、检索、分析文献研究分析通信工程领域的复杂工程问题，以获得有效结论。

2-1 能够应用数学、自然科学和工程科学的基本原理分析、识别通信工程领域复杂工程问题中的关键环节和参数；

2-2 能够应用数学、自然科学和工程科学的基本原理对通信工程领域复杂工程问题进行合理的表达与处理；

2-3 能够通过查阅文献寻求解决方案并分析通信工程领域复杂工程问题的影响因素，获得有效结论。

3. 设计（开发）解决方案：能够设计（开发）满足通信工程特定需求的体系、结构、构件（节点）或者解决方案，并在设计环节中考虑社会、健康、安全、法律、文化以及环境等因素，在提出通信工程复杂工程问题的解决方案时具有创新意识。

3-1 能够运用通信工程专业所讲授的工程设计方法和特定系统设计方法，设计通信工程专业复杂工程问题的解决方案，并具有一定的创新意识；

3-2 能够在 3-1 的解决方案框架中，设计满足特定需求的电路、系统或算法；

3-3 能够从系统的角度权衡解决方案所涉及的社会、健康、安全、法律、文化以及环境等因素。

4. 研究：能够基于科学原理、采用科学方法对通信工程领域复杂工程问题进行研究，包括设计实验、收集、处理、分析与解释数据，通过信息综合得到合理有效的结论并应用于工程实践。

4-1 掌握通信系统性能和指标的获取方法，具备通信系统测试与调试的基本技能，能综合利用所学科学原理及方法，对电子元件、模块、系统等相关的各类特性，设计可行的实验方案；

4-2 掌握通信系统的一般结构组成、性能指标和技术参数，能够根据实验方案构建实验系统进行实验，合理规范安全地进行实验，并能正确观察、采集实验数据；

4-3 能够参照科学的理论模型解释和分析实验数据结果，并能够通过分析工具或图表对数据结果进行综合分析，得出科学合理的结论。

5. 使用现代工具：能够针对通信工程领域的复杂工程问题，开发、选择与使用恰当的技术、资源、现代工程工具和信息技术工具，包括对通信工程领域复杂工程问题的预测与模拟，并能够理解其局限性。

5-1 具备使用计算机、网络等现代信息技术的能力，掌握常用电子仪器设备、EDA 仿真等软硬件开发工具的使用技能；

5-2 能够针对通信工程领域的复杂工程问题，选用恰当的技术手段、现代工程工具或开发相应辅助工具，进行建模、仿真、预测，并能够在实践过程中领会相关现代工具在模拟和预测复杂工程问题中存在的局限性。

6. 工程与社会：能够基于通信工程领域相关的背景知识和标准，评价通信工程项目的设计、施工和运行的方案，以及复杂工程问题的解决方案，包括其对社会、健康、安全、法律以及文化的影响，并理解因方案实施可能会产生的后果及应承担的责任。

6-1 了解通信工程领域相关的历史文化背景、技术标准体系、知识产权、产业政策和法律法规，并能正确认识通信工程和客观世界的相互作用关系；

6-2 能够客观评价通信工程实践中复杂问题解决方案对社会、健康、安全、法律以及文化的影响，并理解应承担的责任。

7. 环境和可持续发展：能够理解和评价针对通信工程领域复杂工程问题的工程实践对环境、社会可持续发展的影响。

7-1 树立科学发展观，理解环境保护和可持续发展的理念与内涵；

7-2 理解并合理评价通信工程生产实践对环境、社会可持续发展的负面影响。

8. 职业规范：了解中国国情、具有人文社会科学素养、社会责任感，能够在通信工程实践中理解并遵守工程职业道德和行为规范，做到责任担当、贡献国家、服务社会。

8-1 具有正确的世界观、人生观和价值观，具有一定的文学、艺术、经济等人文社会科学素养，理解中国可持续发展的科学道路以及个人的社会责任；

8-2 能够理解工程师的职业性质和责任、具有法律意识，理解并能够在工程实践中自觉遵守工程师基本职业道德和行为规范。

9. 个人和团队：在解决通信工程领域复杂工程问题时，能够在多学科组成的团队中承担个体、团队成员或负责人的角色。

9-1 能够理解通信工程领域复杂工程问题的多学科技术背景和特点，具有跨学科的适应能力和合作意识，能够在团队合作中与其他人员进行分工协作，在团队中做好自己承担的角色，完成相应任务；

9-2 具备一定的组织管理能力，能够制订工作计划，根据团队成员能力与特长合理分配工作任务，能够综合团队成员的意见，进行合理决策，协调进度，并完成任务。

10. 沟通：能够就通信工程领域复杂工程问题与业界同行及社会公众进行有效沟通和交流，包括撰写报告和设计文稿、陈述发言、表达或回应指令；具备一定的国际视野，能够在跨文化背景下进行沟通和交流。

10-1 能够通过撰写报告、设计文档、陈述发言等多种沟通手段清晰表达通信工程领域相关问题，实现与不同专业知识水平的对象人群进行有效回应、沟通和交流；

10-2 具备一定的国际视野，具有英语听说读写的基本能力，了解通信工程领域的国际发展动态，能够阅读国内外相关领域科技文献，并能够在跨文化背景下进行有效的沟通和交流。

11. 项目管理：能够在与通信工程领域相关的多学科环境中理解、掌握、应用工程管理原理与经济决策方法，具有一定的组织、管理和领导能力。

11-1 了解通信工程领域生产实践的周期和过程，理解并掌握与通信工程领域相关的工程管理原理与经济决策方法；

11-2 能够在多学科环境中（包括模拟环境），在设计开发复杂工程问题的解决方案过程中，应用管理和经济决策知识，具有一定的组织、管理和领导能力。

12. 终身学习：具有自主学习和终身学习的意识，具有提高自主学习和适应通信工程新发展的能力。

12-1 理解通信工程领域技术发展迅速、多学科交叉的特点，对于自我探索和终身学习的必要性有正确的认识；

12-2 具有自主学习的能力，能够适应社会及行业发展变化。

1. Engineering knowledge: the graduate should be able to apply mathematics, natural science, engineering fundamentals and professional knowledge to solve complex engineering problems in communication engineering.

1-1 The graduate should master the knowledge of mathematics and natural science such as advanced mathematics, engineering mathematics, physics, etc., and use it to describe, model and solve problems related to communication engineering.

1-2 The graduate should master the basic professional knowledge required to work in the communications industry, which can be used for modeling and reasoning, as well as analysis and calculation of communication engineering problems.

1-3 The graduate should master the profession knowledge in analysis, design and application, which are required by the communications industry; be able to compare and integrate solutions to the engineering problems in the field of communication engineering, and solve complex engineering problems in the field.

2. Problem analysis: the graduate should be able to apply the basic principles of mathematics, natural science and engineering science to the analysis, identification, expression and processing of complex engineering problems in communication engineering; analyze the complex engineering problems in the field of communication engineering by consulting, retrieving and analyzing literature; and obtain valid conclusions.

2-1 The graduate should be able to analyze and identify the key components and parameters in complex engineering problems in communication engineering, by applying the basic principles of mathematics, natural science and engineering science.

2-2 The graduate should be able to rationally express and process complex engineering problems in communication engineering by applying the basic principles of mathematics, natural science and engineering science.

2-3 The graduate should be able to find a variety of solutions to complex engineering problems in communication engineering through literature research; and analyze the influencing factors of complex engineering problems in communication engineering with the assistance of the basic principles and literature research, which eventually leads to valid conclusions.

3. Design (development) solution: the graduate should be able to design (develop) systems, structures, components (nodes) or solutions that meet the specific needs of communication engineering, while considering social, health, safety, legal, cultural and environmental factors in the design (developing) process; and propose innovative solutions to complex engineering problems in communication engineering.

3-1 The graduate should be able to conduct system or process design by applying the engineering design methods and design methods for specific systems, taught in the communication engineering profession; and provide solutions to complex engineering problems in communication engineering, with a sense of innovation.

3-2 The graduate should be able to design circuits, systems or algorithms that meet the specific needs, under the solution framework given by 3-1.

3-3 The graduate should be able to weigh the social, health, safety, legal, cultural and environmental factors involved in the design solutions from a systematic perspective.

4. Research: the graduate should be able to conduct research on complex engineering problems in communication engineering based on scientific principles and methods, including the experiment design, as well as the collection, processing, analysis and explanation of experimental data; and obtain valid conclusions for engineering practice through integration of information.

4-1 The graduate should master the acquisition methods of communication system performance and indicators; be able to perform basic testing and debugging of communication systems; and be able to analyze and design feasible experimental solutions considering the characteristics of electronics components, modules, systems, etc., based on the scientific principles and methods, as well as literature research.

4-2 The graduate should master the general structural composition, performance indicators and technical parameters of the communication systems; be able to build experimental systems in accordance with the experimental schemes, carry out experiments reasonably and safely, and correctly observe and collect the experimental data.

4-3 The graduate should be able to interpret and analyze the experimental data with reference to theoretical models;

comprehensively analyze the data using analytical tools or charts; and obtain scientific and reasonable conclusions.

5. Using modern tools: the graduate should be able to develop, select and use the appropriate technologies, resources, modern engineering tools and information technology tools for the complex engineering problems in communication engineering, including the predictions and simulations of complex engineering problems in communication engineering; and understand the limitations of the modern tools.

5-1 The graduate should be able to use computers, network and other information technology; master the use of common electronic equipment, EDA simulation tools, and other software and hardware developing tools; and understand the limitations.

5-2 The graduate should be able to develop or select the modern tools that meet the specific needs, according to the specific complex engineering problems in communication engineering; simulate and predict complex engineering problems; and understand the limitations of related modern tools in the simulation and prediction of complex engineering problems in practice.

6. Engineering and society: the graduate should be able to evaluate the design, construction and operation of communication engineering projects, as well as solutions to complex engineering problems, including their influence to society, health, safety, law and culture, based on relevant background knowledge and standards in communication engineering; ad understand the consequences and responsibilities that may result from the implementation of the projects/solutions.

6-1 The graduate should know the historical and cultural background, technical standard system, intellectual property rights, industrial policies and laws and regulations related to communication engineering; and understand correctly the interaction between communication engineering and the objective world.

6-2 The graduate should be able to objectively evaluate the impact of complex problem solutions on society, health, safety, law and culture, as well as the influence of these constraints on the project implementation; and understand the responsibilities that should be assumed.

7. Environment and sustainable development: the graduate should be able to understand and evaluate the influence of the engineering practices on complex engineering problems in communication engineering to environmental and social sustainability.

7-1 The graduate should establish the scientific concept of development and understand the concept and connotation of environmental protection and sustainable development.

7-2 The graduate should understand and reasonably evaluate the negative impact of engineering practices on complex engineering problems in communication engineering on environmental and social sustainable development.

8. Professional norms: the graduate should understand China's national conditions; be equipped with humanities and social science literacy, and a sense of social responsibility; understand and abide by the engineering professional ethics and behavior norms in communication engineering practice; and fulfill one's responsibility, contribute to the country and serve the society.

8-1 The graduate should have a correct outlook on the world, life and values; have humanities and social science literacy including literature, art, economics, etc.; understand China's sustainable development and related social responsibility of individuals; and be clarified about the responsibility and mission of individuals as socialist builders and successors.

8-2 The graduate should understand the professional nature and responsibility of engineers; have a legal awareness; understand the social responsibility of engineers to the safety, health and well-being of the public; and be able to consciously fulfill his/her responsibility during engineering practice.

9. Individual and team: the graduate should be able to take the role of an individual, a team member, or a team leader in a multidisciplinary team, when solving complex engineering problems in communication engineering.

9-1 The graduate should understand the multidisciplinary technical background and characteristics of complex engineering problems in communication engineering; adapt to the multidisciplinary nature of complex engineering problems in communication engineering and have a sense of cooperation; be able to communicate effectively with other team members, carry out division of labor and cooperate, take the responsibility defined by one's role, and complete tasks individually or cooperatively.

9-2 The graduate should be equipped with organizational management capabilities; be able to formulate work plans, assign tasks to team members according to their abilities and strengths, integrate TEM members' opinions, make reasonable decisions, coordinate progress, and complete tasks.

10. Communication: the graduate should be able to communicate effective with industry peers and the public on complex engineering problems in communication engineering, by means of writing reports and planning portfolios, presenting statement, expressing or responding to instructions; have an international vision and can communication in a cross-cultural context.

10-1 The graduate should be able to clearly express relevant issues in communication engineering by writing reports, planning portfolios and presenting statements; and realize effective responding to and communication with target groups of different professional knowledge levels.

10-2 The graduate should have an international vision; have the basic ability of listening, speaking, reading and writing in English; understand the international development of communication engineering; be able to read relevant domes and foreign scientific and technological literature; and communicate effectively in a cross-cultural context.

11. Project management: the graduate should be able to understand, master and apply engineering mana principles and economic decision-making methods related to communication engineering in a multidisciplinary environment.

11-1 The graduate should understand the cycle and process of production practice in the field of communication engineering, understand and master the engineering management principles and economic decision-making methods related to communication engineering.

11-2 The graduate should be able to apply management and economic decision-making knowledge in a multidisciplinary environment (including simulation environment), in the process of designing and developing the solutions to complex engineering problems; and be equipped with organizational, management and leadership skills.

12. Lifelong learning: The graduate should have the awareness of independent learning and lifelong learning; and improve one's capability of self-learning and adapt to the new development of communication engineering.

12-1 The graduate should understand the rapid technology development and multidisciplinary nature of communication engineering in the context of social development; and understand the necessity of self-exploration and lifelong learning.

12-2 The graduate should have the ability of independent learning, including the ability to understand technical issues in communication engineering, as well as summarize and question; and adapt to the evolution of society and industry.

附：培养目标实现矩阵

The Matrix for Educational Objectives

	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					√

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：

信号与系统、电路分析基础、数字电子技术基础、模拟电子技术基础、单片计算机原理与通信接口、通信原理、数字信号处理、信息理论与编码、高频电子线路。

Core Courses: Signal and System, Fundamentals of Circuit Analysis, Fundamentals of Digital Electronic Circuit, Fundamentals of Analog Electronic Circuit, Principle of Single Chip Computer and Communication Interface, Principle of Communication, Digital Signal Processing, Information Theory and Coding, High-Frequency Electronic Circuit.

（二）专业特色课程：

信号与系统、高频电子线路、通信原理、电磁场与电磁波、移动通信、光纤通信、现代交换技术、信息理论与编码、计算机网络与通信。

Characteristic Courses: Signal and System, High-frequency Electronic Circuit, Communication Principles, Electromagnet Field and Electromagnetic Wave, Mobile Communication, Optic Fiber Communication, Modern Switching Technology, Information Theory and Coding, Computer Network and Communication.

附：毕业要求实现矩阵：

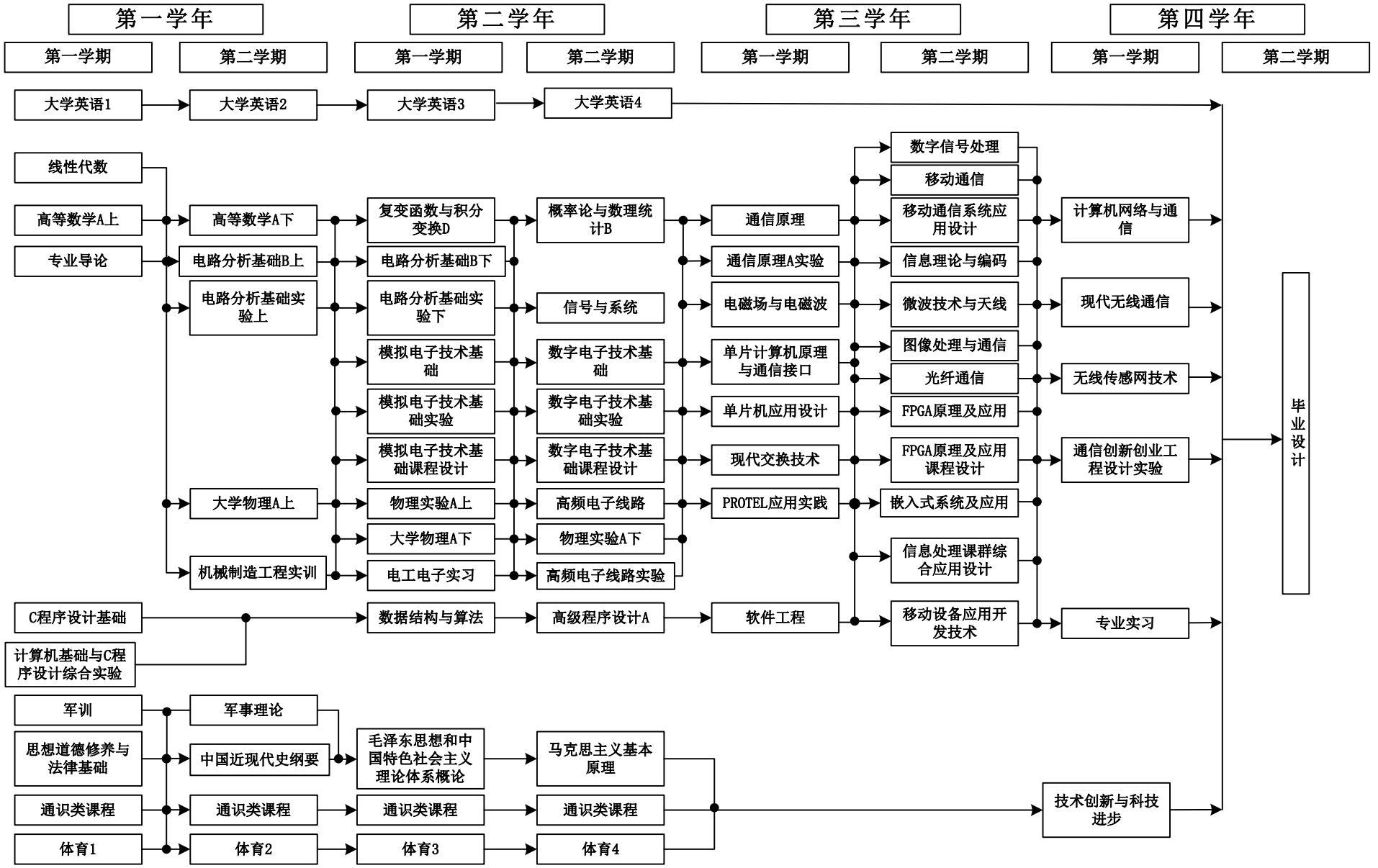
专业核心课程	专业特色课程	课程名称	通信工程专业毕业要求											
			1	2	3	4	5	6	7	8	9	10	11	12
		思想道德修养与法律基础						√	√	√				
		中国近现代史纲要								√				√
		毛泽东思想和中国特色社会主义理论体系概论							√	√				√
		马克思主义基本原理								√				√
		军事理论								√	√			
		体育									√			
		大学英语										√		

专业核心课程	专业特色课程	课程名称	通信工程专业毕业要求											
			1	2	3	4	5	6	7	8	9	10	11	12
		C 程序设计基础					√							
		计算机基础与 C 程序设计综合实验					√							
		专业导论						√	√			√		√
		高等数学	√											
		线性代数	√											
		复变函数与积分变换	√											
		概率论与数理统计	√											
		大学物理	√											
		物理实验				√								
√		电路分析基础	√	√			√							
		电路分析基础实验		√		√	√							
√		模拟电子技术基础	√	√	√									
		模拟电子技术基础实验				√						√		
√		数字电子技术基础	√	√	√									
		数字电子技术基础实验				√						√		
√	√	信号与系统	√	√		√								
√	√	高频电子线路	√	√										
√		单片计算机原理与通信接口			√	√	√							
	√	电磁场与电磁波	√	√			√							
√	√	通信原理	√	√		√		√						
√		数字信号处理	√	√		√								
√	√	信息理论与编码	√	√	√									
		通信创新创业工程设计实验			√	√		√			√		√	
		数据结构与算法	√	√	√									
		高频电子线路实验	√			√	√							
		通信原理实验	√			√	√							
	√	现代交换技术	√		√	√		√						√

专业核心课程	专业特色课程	课程名称	通信工程专业毕业要求											
			1	2	3	4	5	6	7	8	9	10	11	12
		嵌入式系统及其应用	√	√	√									
	√	光纤通信	√	√		√								
	√	移动通信	√	√		√								
	√	计算机网络与通信	√		√									
		高级程序设计	√	√	√									
		FPGA 原理及应用	√	√	√									
		微波技术与天线	√	√			√							
		软件工程			√						√	√		
		图像处理与通信		√	√					√				√
		现代无线通信		√			√			√				
		军事训练									√			
		机械制造工程实训			√			√		√				
		电工电子实习		√	√					√	√			
		模拟电子技术基础课程设计	√		√		√					√		
		数字电子技术基础课程设计	√		√		√					√		
		移动通信系统应用设计		√	√	√	√					√		
		PROTEL 应用实践		√	√		√					√		
		FPGA 原理与应用课程设计		√	√		√					√		
		信息处理课群综合应用设计		√	√	√	√					√		
		单片机应用设计	√		√		√					√		
		专业实习			√	√		√	√	√	√	√	√	
		毕业设计		√	√	√	√					√		

三、课程教学进程图

III Teaching Process Map


第一学年
第二学年
第三学年
第四学年
第一学期
第二学期
第一学期
第二学期
第一学期
第二学期
第一学期
第二学期
大学英语1
大学英语2
大学英语3
大学英语4
线性代数
高等数学A上
专业导论
高等数学A下
电路分析基础B上
电路分析基础实验上
复变函数与积分变换D
电路分析基础B下
电路分析基础实验下
模拟电子技术基础
模拟电子技术基础实验
模拟电子技术基础课程设计
物理实验A上
大学物理A下
电工电子实习
概率论与数理统计B
信号与系统
数字电子技术基础
数字电子技术基础实验
数字电子技术基础课程设计
高频电子线路
物理实验A下
高频电子线路实验
通信原理
通信原理A实验
电磁场与电磁波
单片计算机原理与通信接口
单片机应用设计
现代交换技术
PROTEL应用实践
数字信号处理
移动通信
移动通信系统应用设计
信息理论与编码
微波技术与天线
图像处理与通信
光纤通信
FPGA原理及应用
FPGA原理及应用课程设计
嵌入式系统及应用
信息处理课群综合应用设计
计算机网络与通信
现代无线通信
无线传感网技术
通信创新创业工程设计实验
大学物理A上
机械制造工程实训
C程序设计基础
计算机基础与C程序设计综合实验
数据结构与算法
高级程序设计A
软件工程
移动设备应用开发技术
专业实习
毕业设计
军训
思想道德修养与法律基础
通识类课程
体育1
军事理论
中国近现代史纲要
通识类课程
体育2
毛泽东思想和中国特色社会主义理论体系概论
通识类课程
体育3
马克思主义基本原理
通识类课程
体育4
技术创新与科技进步

四、 理论教学建议进程表

IV Theory Course Schedule

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

课程编号 Course Number	课 程 名 称 Course Title	学分 Crs	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course
			总学时 Tot hrs.	实验 Exp.	上机 Ope-ration	实践 Prac-tice	课外 Extra-cur		
（二）通识教育选修课程 General Education Elective Courses									
创新创业类 Innovation and Entrepreneurship Courses 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	要求至少取得 9 个学分，且必须选修艺术体育类课程中的艺术类相关课程并取得至少 2 个学分，在创新创业类课程中至少选修一门课程，在人文社科类或经济管理类课程中至少选修一门。 Students are required to obtain at least 9 credits，which must contain art courses of 2 credits from the category of Art and Physical Education Courses, at least one course from the category of Innovation and Entrepreneurship Courses, and at least one course from the category of Arts and Social Science Courses or the category of Economy and Management Courses.								
（三）专业教育必修课程 Basic Disciplinary Required Courses									
4110144110	专业导论 Introduction to Specialty	1	16					1	
4050229110	线性代数 Linear Algebra	2.5	40					1	
4050063110	高等数学 A 上 Advanced Mathematics I	5	80					1	
4050064110	高等数学 A 下 Advanced Mathematics II	5	80					2	
4110309170	电路分析基础 B 上 Fundamentals of Circuit Analysis I	2	32					2	高等数学下
4110017110	电路分析基础 B 下 Fundamentals of Circuit Analysis II	3	48					3	电路分析基础上
4100028110	电路分析基础实验上 Experiments of Circuit Analysis I	0.5	16	16				2	电路分析基础上
4100029110	电路分析基础实验下 Experiments of Circuit Analysis II	0.5	16	16				3	电路分析基础下
4110048110	模拟电子技术基础 A Fundamentals of Analog Electronic Circuit	4	64					3	电路分析基础
4110051110	模拟电子技术基础实验 Experiments of Analog Electronics Circuit	0.5	16	16				3	
4050021110	大学物理 A 上 Physics I	3.5	56					2	
4050022110	大学物理 A 下 Physics II	3.5	56					3	
4050466130	物理实验 A 上 Physics Lab. I	1	32	32				3	

课程编号 Course Number	课 程 名 称 Course Title	学分 Crs	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course
			总学时 Tot hrs.	实验 Exp.	上机 Ope-ration	实践 Prac-tice	课外 Extra-cur		
4050467130	物理实验 A 下 Physics Lab. II	1	32	32				4	
4050469130	复变函数与积分变换 D Complex Function and Integral Transform	2.5	40					3	
4050058110	概率论与数理统计 B Probability and Mathematical Statistics	3	48					4	
4110066110	数字电子技术基础 C Fundamentals of Digital Electronic Circuit	4	64					4	模拟电子技术基础
4110068110	数字电子技术基础实验 Experiments of Digital Electronics Circuit	0.5	16	16				4	
4110093110	信号与系统 A Signal and System	4	64	8				4	复变函数与积分变换
4110310170	高频电子线路 D High-Frequency Electronic Circuit	3	48					4	
4110378170	高频电子线路实验 Experiments of High-Frequency Electronic Circuit	0.5	16	16				4	
4110345170	单片计算机原理与通信接口 B Principle of Single Chip Computer and Communication Interface	3	48	8				5	
4110011110	电磁场与电磁波 A Electromagnetic Field and Electromagnetic Wave	3	48					5	
4110314170	通信原理 D Principle of Communication	3	48					5	
4110379170	通信原理实验 Experiments of Principle of Communication	0.5	16	16				5	
4110313170	数字信号处理 B Digital Signal Processing	3.5	56	8				6	
4110315170	信息理论与编码 C Information Theory and Coding	2.5	40	8				6	
4110346170	通信创新创业工程设计实验 Experiment of Innovative and Entrepreneurial Communication Engineering Design	2	64	64				7	
小 计 Subtotal		68	1200	256	0	0	0		
（四）专业教育选修课程 Specialized Elective Courses									
4110270140	数据结构与算法 F Data Structure and Algorithm	2.5	40		8			3	
4110304150	高级程序设计 A Advanced Programming	3	48	8				4	

课程编号 Course Number	课 程 名 称 Course Title	学分 Crs	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course
			总学时 Tot hrs.	实验 Exp.	上机 Ope-ration	实践 Prac-tice	课外 Extra-cur		
4110089110	现代交换技术 A Modern Switching Technology	2.5	40	12				5	
4110224130	软件工程 D Software Engineering	2	32					5	
4110347170	微波技术与天线 A Microwave Technology and Antenna Theory	3	48	8				6	
4110223130	嵌入式系统及其应用 B Embedded System and Application	3	48	8				6	
4110036110	光纤通信 B Optical Fiber Communication	2.5	40	12				6	
4110098110	移动通信 A Mobile Communication	2.5	40	8				6	
4110348170	FPGA 原理及应用 B Principle and Application of FPGA	3	48	32				6	
4110349170	图像处理与通信 B Image Processing and Communication	2.5	40	8				6	
4110170120	计算机网络与通信 D Computer Network and Communication	2.5	40	8				7	
4110385170	现代无线通信 Modern Wireless Communication	2.5	40					7	
小 计 Subtotal		31.5	504	104	8	0	0		
修读说明：要求至少选修 20 学分。 NOTE：Minimum subtotal credits:20.									
（五）个性课程 Personalized Elective Courses									
4110350170	移动设备应用开发技术 B Mobile Device Application Development Technology	2.5	40	8				6	
4110185120	无线传感网技术 Wireless Sensing Network Technology	2.5	40	8				7	
4110268140	技术创新与科技进步 Technology Innovation and Scientific and Technological Progress	1	16					7	
小 计 Subtotal		6	96	16	0	0	0		
修读说明：学生从以上个性课程和学校发布的其它个性课程目录中选课，要求至少选修 6 学分。 NOTE: Sudents can select courses from above and the other personalized courses in catalog, and are required to obtain at least 6 credits.									

五、 集中性实践教学环节
V Practice Schedule

课程编号 Course Number	实践环节名称 Practice Courses Name	学分 Crs	周数 Weeks	建议修读学期 Suggested Term
1060002110	军事训练 Military Training	1.5	3	1
4080152110	机械制造工程实训 D Training on Mechanical Manufacturing Engineering	1	1	2
4100068110	电工电子实习 A Practice in Electrical Engineering and Electronics	2	2	3
4110128110	模拟电子技术基础课程设计 Course Design on Fundamentals of Analog Electronics Circuit	1	1	3
4110129110	数字电子技术基础课程设计 Course Design on Fundamentals of Digital Electronic Circuit	1	1	4
4110214130	单片机应用设计 Application Practice on Single Chip Computer	2	2	5
4110351170	PROTEL 应用实践 B Courses Design on PROTEL Application	1	1	5
4110236130	信息处理课群综合应用设计 Comprehensive Training and Design on Signal Processing	2	2	6
4110352170	移动通信系统应用设计 Application Design on Mobile Communication Systems	2	2	6
4110353170	FPGA 原理与应用课程设计 Course Design on FPGA Principle and Application	2	2	6
4110152110	专业实习 Speciality Practice	3	3	7
4110354170	毕业设计 Graduation Design	9.5	17	8
小　　计　Subtotal		28	37	

六、其它要求
VI Recommendations on Course Studies

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

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

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

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

学院教学责任人：艾青松

专业培养方案责任人：王原丽

信息工程专业 2017 版本科培养方案
Undergraduate Education Plan for Specialty in Information Engineering (2017)

专业名称	**信息工程**	主干学科	**信息与通信工程、电子科学与技术**
Major	Information Engineering	Major Disciplines	Information and Communication Engineering, Electronics Science and Technology
计划学制	**四年**	授予学位	**工学学士**
Duration	4 Years	Degree Granted	Bachelor of Engineering
所属大类	**电子信息类（工学）**	大类培养年限	**1 年**
Disciplinary	Electronics and Information	Duration	1 year

最低毕业学分规定

Graduation Credit Criteria

课程分类 Course Classification / 课程性质 Course Nature	通识教育课程 Public Basic Courses	专业教育课程 Specialized Courses	个性课程 Personalized Course	集中性实践教学环节 Practice Courses	课外学分 Study Credit after Class	总学分 Total Credits
必修课 Required Courses	29	74.5	\	21.5	\	170
选修课 Elective Courses	9	20	6	\	10	

一、培养目标与毕业要求

Ⅰ Educational Objectives &Requirement

（一） 培养目标

本专业旨在培养基础扎实、适应能力强、具有创新能力和国际化视野的高素质专业技术人才与管理人才，学生应达到以下培养目标：

（1） 具备一定的人文素养、较强的社会责任感和工程职业道德；具备基本的沟通能力和较好的团队协作精神;具有一定的专业英语能力。

（2） 具备较扎实的自然科学和工程科学基础，较好地掌握从信息获取、传递、处理到应用等各方面的信息工程专业核心知识。

（3） 具备在专业相关技术领域从事软硬件开发的专业技能，具有一定的工程素养。

（4） 了解信息工程专业的技术发展趋势，具有终身学习的愿望和能力。

（5） 具备创新创业精神和意识，具有一定的创新创业能力。

1. Helps students develop their humanity accomplishment as well as their social responsibility and professional ethics of engineering. Equips students with good communication skills and teamwork spirits. Makes students with ability of basic professional English.
2. Helps students improve their foundations of natural science and engineering with a well planned core curriculum of this discipline which covers all fields: the information acquire, translation, process and application.

3. Prepares students for careers and research fields where an understanding of both hardware and software systems is essential.
4. Makes students rich in both desire and ability to further study for a life time by giving them a holistic view of this field and its big trends.
5. Equips students with the spirit and essential ability of innovation and entrepreneurship.

（二） 毕业要求

（1） 具备较强的社会责任感、职业道德以及良好的思想素质、心理素质、身体素质和相关人文素养。

（2） 掌握本专业的基本理论及工程知识，能够胜任本专业领域的初级职业要求。

（3） 具备进行终身学习的愿望和能力，具有相应的自我管理能力，具有适应信息工程技术不断发展的能力。

（4） 具备一定的创新创业能力，能够满足社会创业、科技创新的基本要求。

（5） 具备基本的英语文献阅读能力，能够运用英语进行有效的技术沟通和交流；掌握运用现代信息技术进行文献检索和获取专业信息的能力。

（6） 具备良好的团队合作及协作能力，具有相应的口头和书面沟通能力，能够使用工程技术语言有效地进行交流。

（7） 具备有效完成试验和模拟仿真设计的能力，并能够运用所学知识对实验数据和结果进行分析和解释。

（8） 具备基本的高级语言知识体系及程序设计能力。

（9） 能够理解和使用基本的数据结构和数据库，并进行相应的数据库开发。

（10） 具备初步的网络体系结构知识，了解网络的常用建立方法和过程，并具备相应的网络工程应用能力。

（11） 掌握电子电路的基础体系结构，能有效运用数字电子技术基础、模拟电子技术基础、电路分析基础、高频电子线路等相关知识，对电子电路进行分析。

（12） 能够理解电路系统结构，具备基本的电路设计与调试能力。

（13） 能够理解微处理器体系结构，能有效运用单片机及嵌入式系统原理、单片机系统设计与调试、电子线路 EDA、微机原理与通信接口、FPGA 系统设计与调试等相关知识，开发微处理器应用系统。

（14） 掌握信号与系统的基础理论及信号处理的基本方法。

（15） 能够理解信息处理系统的结构，能有效运用信号与系统、数字信号处理、数字图像处理、随机信号分析、数字语音处理等相关知识，开发信息处理系统。

1. Having strong social responsibility, professional ethics and good ideological quality, psychological quality, physical quality and relative humanity accomplishment.
2. Mastering the basic theory and engineering knowledge. Being well qualified for the entry-level jobs of the relative fields.
3. Being rich in both desire and ability of further study for a life time. Having suitable abilities of self-management, and abilities of adapting to the continuous development of information engineering and technology.
4. Having essential ability of innovation and entrepreneurship. It can be used on social entrepreneurship and technical innovation.
5. Being able to read and understand the English literatures in a superficial level, and to communicate with other person about technology effectively. Being able to retrieve literatures for specialized knowledge and information with the help of modern information technology.
6. Having the capacity of cooperation, teamwork. Feeling free in both oral and written communicating especially with engineering expression in technical language.

7. Being able to finish experiments and simulation designs effectively, then analyze and interpret the experiment data and result based on what the students have learned.
8. Being equipped with the basic knowledge structure on high-level programming language, and the coding capability.
9. Being able to understand and apply basic data structures and databases in a flexible way, and can develop some simple databases.
10. Having the elementary knowledge on network system structure, and grasping the usually used methods and processes on establishing a network system, then mastering the basic ability on network engineering application.
11. Being well equipped with the basic knowledge on electronics and circuits in order to conduct a basic analyzing.
12. Having the basic knowledge structure on circuit, and Possessing the basic ability of circuit design and debugging based on the understanding on fundamentals of analog electronic circuit, fundamentals of digital electronic circuit, circuit analysis，high-frequency electronic circuits，principle of MCU and embedded system，etc.
13. Having the basic knowledge structure on micro-processor, and Possessing the basic ability of micro-processor application system developing based on the understanding on principle of MCU and embedded system, design and debug of MCU based system, electronic design automation of electronic circuit，principles of microcomputer and communication interface，design and debug of FPGA based system，etc.
14. Mastering the fundamentals of signal and system as well as the basic methods of signal processing.
15. Having the basic knowledge structure on information processing system, and Possessing the basic ability of information processing system developing based on the understanding on Signal and System, Digital Signal Processing, Digital Image Processing, Random Signal Analysis, Digital Speech Processing, etc.

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：

电路分析基础、信号与系统、模拟电子技术基础、数字电子技术基础、信息理论基础、感测技术、通信原理、数字信号处理、计算机网络与通信。

Fundamentals of Circuit Analysis, Signal and System, Fundamentals of Analog Electronic Circuit, Fundamentals of Digital Electronic Circuit, Fundamentals of Information Theory, Sensor and Detection Technology, Communication Principles, Digital Signal Processing, Computer Networks and Communication.

（二） 专业特色课程：

单片机及嵌入式系统原理、虚拟仪器、电子线路设计与制作、无线传感网技术、数字图像处理。

Characteristic Courses: Principle of MCU and Embedded System, Virtual instrument, Electronic Circuit Design and Practice, Computer Networks and Communication, Wireless Sensing Network Technology, Digital image processing.

附：毕业要求实现矩阵：

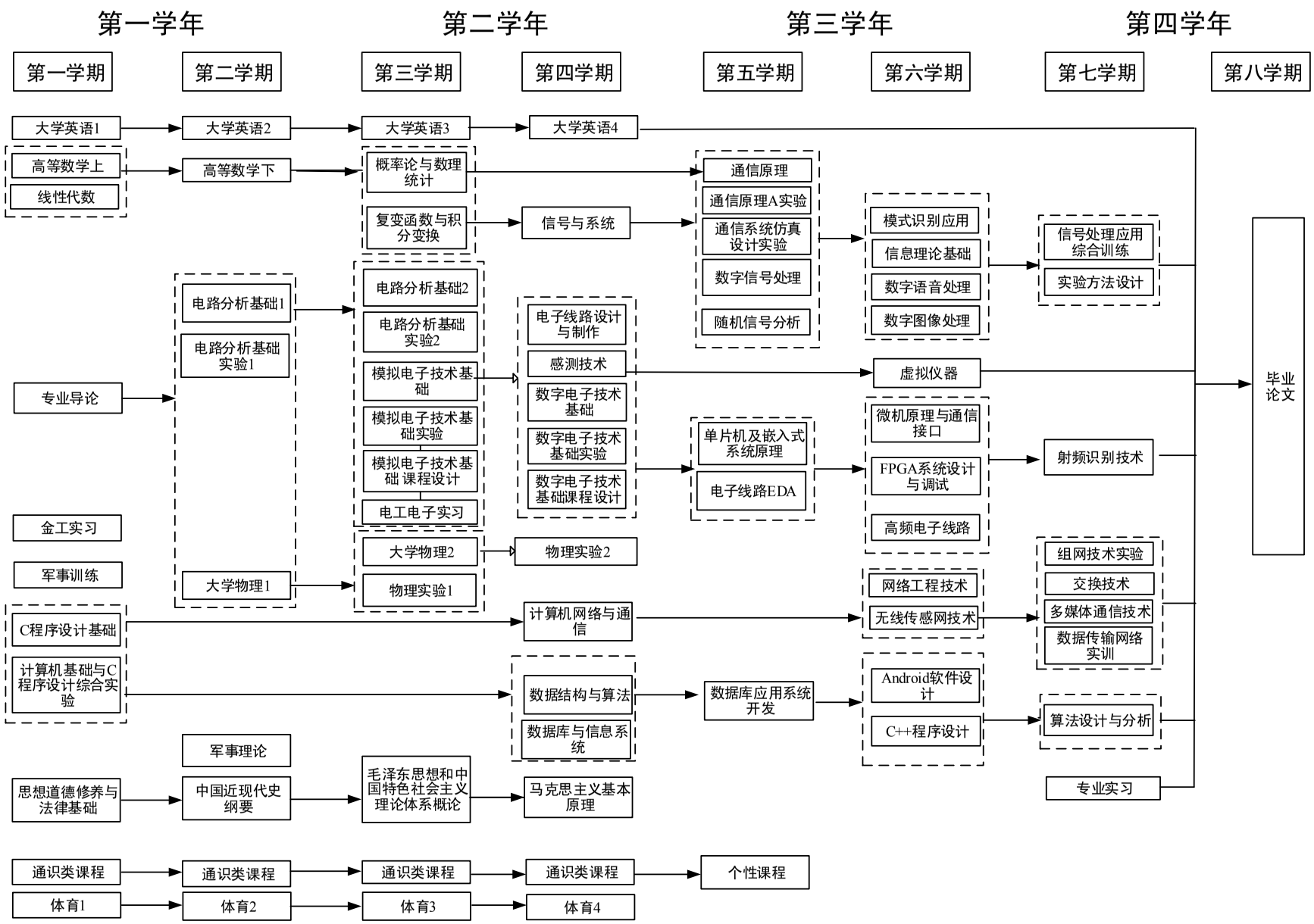
专业核心课程	专业特色课程	课程名称	信息工程专业毕业要求														
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
		思想道德修养与法律基础	√		√												
		中国近现代史纲要	√		√												
		毛泽东思想和中国特色社会主义理论体系概论	√		√												
		马克思主义基本原理	√		√												
		军事理论	√														
		体育 1		√													
		体育 2		√													
		体育 3		√													
		体育 4		√													
		大学英语 1		√	√		√										
		大学英语 2		√	√		√										
		大学英语 3		√	√		√										
		大学英语 4		√	√		√										
		C 程序设计基础		√		√				√							
		计算机基础与 C 程序设计综合实验		√		√				√							
		专业导论		√													
		高等数学上		√	√												
		高等数学下		√	√												
		线性代数		√	√												
		概率论与数理统计		√	√												

专业核心课程	专业特色课程	课程名称	信息工程专业毕业要求														
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
		大学物理上		√	√												
		物理实验上		√													
		大学物理下		√	√												
		物理实验下		√													
√		电路分析基础上		√									√				
√		电路分析基础下		√									√				
		电路分析基础实验上		√									√				
		电路分析基础实验下		√									√				
√		模拟电子技术基础		√		√							√				
		模拟电子技术基础实验		√			√	√	√				√				
√		数字电子技术基础		√		√							√				
		数字电子技术基础实验		√			√	√	√				√				
√		信号与系统		√						√						√	
		复变函数与积分变换		√	√												
		数据结构与算法		√						√	√						
		数据库与信息系统		√						√	√						
		高频电子线路			√								√	√			
√		感测技术			√	√								√			
	√	电子线路设计与制作			√	√							√				
	√	单片机及嵌入式系统原理			√	√				√				√	√		
√		通信原理			√					√							√
		通信原理实验			√	√	√	√	√								
√		数字信号处理			√					√						√	√
√		计算机网络与通信			√							√					
		组网技术实验			√	√	√	√	√			√					
		微机原理与通信接口			√										√		
	√	数字图像处理			√					√						√	√
√		信息理论基础			√											√	
		信号处理应用综合实验			√	√	√	√	√								
		电子线路 EDA			√		√	√	√	√				√			
		通信系统仿真设计实验			√	√	√	√	√								

专业核心课程	专业特色课程	课程名称	信息工程专业毕业要求													
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
		随机信号分析			√											√	
		模式识别应用			√												√
		FPGA 系统设计与调试			√	√	√	√	√	√							
		网络工程技术			√							√					
		数字语音处理			√												√
		C++程序设计			√					√	√						
	√	无线传感网技术			√							√					
	√	虚拟仪器			√				√								
		交换技术			√							√					
		多媒体通信技术			√					√							
		算法设计与分析			√											√	
		实验方法设计			√	√			√								
		Android 软件设计			√	√				√							
		射频通信技术							√				√	√			
		大数据及云存储技术				√					√	√					
		军事训练	√	√													
		机械制造工程实训	√	√	√												
		电工电子实习				√		√	√								
		模拟电子技术基础课程设计				√		√	√								
		数字电子技术基础课程设计				√		√	√								
		数据库应用系统开发				√	√	√	√								√
		单片机系统设计与调试			√	√	√	√	√					√	√		
		数据传输网络实训				√	√	√	√								√
		专业实习	√			√	√	√									√
		毕业论文				√	√	√	√	√	√	√	√	√	√	√	√

三、课程教学进程图

Ⅲ Teaching Process Map


第一学年
第二学年
第三学年
第四学年
第一学期
第二学期
第三学期
第四学期
第五学期
第六学期
第七学期
第八学期
大学英语1
大学英语2
大学英语3
大学英语4
高等数学上
高等数学下
线性代数
概率论与数理统计
复变函数与积分变换
信号与系统
通信原理
通信原理A实验
通信系统仿真设计实验
数字信号处理
随机信号分析
模式识别应用
信息理论基础
数字语音处理
数字图像处理
信号处理应用综合训练
实验方法设计
电路分析基础1
电路分析基础实验1
电路分析基础2
电路分析基础实验2
模拟电子技术基础
模拟电子技术基础实验
模拟电子技术基础 课程设计
电工电子实习
电子线路设计与制作
感测技术
数字电子技术基础
数字电子技术基础实验
数字电子技术基础课程设计
虚拟仪器
专业导论
金工实习
军事训练
大学物理1
大学物理2
物理实验1
物理实验2
单片机及嵌入式系统原理
电子线路EDA
微机原理与通信接口
FPGA系统设计与调试
高频电子线路
射频识别技术
网络工程技术
无线传感网技术
组网技术实验
交换技术
多媒体通信技术
数据传输网络实训
C程序设计基础
计算机基础与C程序设计综合实验
计算机网络与通信
数据结构与算法
数据库与信息系统
数据库应用系统开发
Android软件设计
C++程序设计
算法设计与分析
专业实习
毕业论文
军事理论
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
通识类课程
体育1
体育2
体育3
体育4
个性课程

四、 理论教学建议进程表

Ⅳ Theory Course Schedule

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

课程编号 Course Number	课 程 名 称 Course Title	学分 Crs	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course
			总学时 Tot hrs.	实验 Exp.	上机 Ope-ration	实践 Prac-tice	课外 Extra-cur		
（二）通识教育选修课程 General Education Elective Courses									
创新创业类 Innovation and Entrepreneurship Courses	要求至少取得 9 个学分，且必须选修艺术体育类课程中的艺术类相关课程并取得至少 2 个学分，在创新创业类课程中至少选修一门课程，在人文社科类或经济管理类课程中至少选修一门。 Students are required to abtain at least 9 credits，which must cotain art courses of 2 credits from the category of Art and Physical Education Courses,at least one course from the category of Innovation and Entrepreneurship Courses, and at least one course from the category of Arts and Social Science Courses or the category of Economy and Management Courses.								
人文社科类 Arts and Social Science Courses									
经济管理类 Economy and Management Courses									
科学技术类 Science and Technology Courses									
艺术体育类 Art and Physical Education Courses									
（三）专业教育必修课程 Basic Disciplinary RequiredCourses									
4110144110	专业导论 Introduction to Speciality	1	16					1	
4050229110	线性代数 Linear Algebra	2.5	40					1	
4050063110	高等数学 A 上 Advanced Mathematics Ⅰ	5	80					1	
4050064110	高等数学 A 下 Advanced Mathematics Ⅱ	5	80					2	
4050021110	大学物理 A 上 Physics AⅠ	3.5	56					2	
4050022110	大学物理 A 下 Physics AⅡ	3.5	56					3	
4050466130	物理实验 A 上 Physics Lab. AⅠ	1	32	32				3	
4050467130	物理实验 A 下 Physics Lab. AⅡ	1	32	32				4	
4110309170	电路分析基础 B 上 Fundamentals of Circuit Analysis Ⅰ	2	32					2	
4100028110	电路分析基础实验上 Experiments of Circuit AnalysisⅠ	0.5	16	16				2	电路分析基础 B 上
4110017110	电路分析基础 B 下 Fundamentals of Circuit Analysis Ⅱ	3	48					3	电路分析基础 B 上
4100029110	电路分析基础实验下 Experiments of Circuit AnalysisⅡ	0.5	16	16				3	电路分析基础 B 下
4050469130	复变函数与积分变换 D Complex Function and Integral Transform	2.5	40					3	

课程编号 Course Number	课 程 名 称 Course Title	学分 Crs	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course
			总学时 Tot hrs.	实验 Exp.	上机 Ope-ration	实践 Prac-tice	课外 Extra-cur		
4050058110	概率论与数理统计 B Probability and Mathematical Statistics	3	48					3	
4110048110	模拟电子技术基础 A Fundamentals of Analog Electronic Circuit	4	64					3	电路分析基础 B 上
4110051110	模拟电子技术基础实验 Experiments of Analog Electronics Circuit	0.5	16	16				3	模拟电子技术基础
4110066110	数字电子技术基础 C Fundamentals of Digital Electronic Circuit	4	64					4	模拟电子技术基础
4110068110	数字电子技术基础实验 Experiments of Digital Electronics Circuit	0.5	16	16				4	数字电子技术基础
4110093110	信号与系统 A Signal and System	4	64	8				4	复变函数与积分变换
4110024110	电子线路设计与制作 Electronic Circuit Design and Practice	1	32	32				4	
4110270140	数据结构与算法 F Data Structure and Algorithm	2.5	40		8			4	
4110357170	感测技术 C Sensor and Detection Technology	2.5	40	8				4	模拟电子技术基础
4110355170	数据库与信息系统 A Database and Information Systems	2.5	40	8				4	数据结构与算法
4110358170	单片机及嵌入式系统原理 B Principle of MCU and Embedded System	3.5	56	12				5	数字电子技术基础
4110356170	计算机网络与通信 C Computer Networks and Communication	2	32					5	电路分析基础下
4110314170	通信原理 D Communication Principles	3	48					5	信号与系统
4110379170	通信原理实验 Experiments of Communication Principles	0.5	16	16				5	
4110313170	数字信号处理 B Digital Signal Processing	3.5	56	8				5	信号与系统
4110359170	通信系统仿真设计实验 Communication Systems Simulation Training	1	32	32				5	
4110374170	数据库应用系统开发 A Development of Database Application System	1	32	32				5	

课程编号 Course Number	课 程 名 称 Course Title	学分 Crs	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course
			总学时 Tot hrs.	实验 Exp.	上机 Ope-ration	实践 Prac-tice	课外 Extra-cur		
4110360170	信息理论基础 Fundamentals of Information Theory	2.5	40					6	通信原理
4110361170	信号处理应用综合实验 Signal Processing Integrated Application Training	1	32	32				7	
4110362170	组网技术实验 Training of Networking Technology	1	32	32				7	
小 计 Subtotal		74.5	1344	348	8	0	0		
（四）专业教育选修课程 Specialized Elective Courses									
4110023110	电子线路 EDA(B) Electronic Design Automation of Electronic Circuit	2	32	10				5	数字电子技术基础
4110075110	随机信号分析 Random Signal Analysis	2	32					5	概率论与数理统计
4110156120	C++程序设计 The C++ Programming	2.5	40		8			6	
4110363170	网络工程技术 Technology of Network Engineering	2.5	40	4				6	计算机网络与通信
4110211130	Android 软件设计 Android Software Design	2	32					6	
4110158120	FPGA 系统设计与调试 Design and Debug of FPGA based System	1	32	32				6	电子线路 EDA
4110365170	高频电子线路 E High-frequency Electronic Circuits	2	32	4				6	模拟电子技术基础
4110366170	虚拟仪器 B Virtual Instruments	2	32	16				6	
4110367170	微机原理与通信接口 A Principles of Microcomputer and Communication Interface	2.5	40	8				6	单片机及嵌入式系统原理
4110175120	模式识别应用 Application of Pattern Recognition	2	32					6	
4110318170	数字图像处理 E Digital Image Processing	2	32	8				6	信号与系统
4110074110	数字语音处理 B Digital Speech Processing	2	32	8				6	数字信号处理

课程编号 Course Number	课 程 名 称 Course Title	学分 Crs	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course
			总学时 Tot hrs.	实验 Exp.	上机 Ope-ration	实践 Prac-tice	课外 Extra-cur		
4110368170	无线传感网技术 B Wireless Sensing Network Technology	2	32	8				6	通信原理
4110369170	交换技术 B Switching Technology	2	32	8				7	通信原理
4110025110	多媒体通信技术 Multimedia Communications Technology	2	32	8				7	数字信号处理
4110227130	算法设计与分析 Design and Analysis of Algorithms	2	32					7	
4110225130	实验方法设计 Experimental Design Methodology	2	32					7	
4110370170	射频识别技术 Radio Frequency Identification Technology	2	32	8				7	
小 计 Subtotal		36.5	600	122	8	0	0		
修读说明：要求至少选修 20 学分。 NOTE：Minimum subtotal credits:20.									
（五）个性课程 Personalized Electice Courses									
4110371170	JAVA 语言程序设计 C Java Language Program Design	3	48		16			5	
4110372170	大数据及云存储技术 The Technologies of Big Data and Cloud Storage	3	48	8				5	
4110373170	光电子技术 D Optoelectronic Technology	3	48	8				7	
小 计 Subtotal		9	144	16	16	0	0		
修读说明：学生从以上个性课程和学校发布的其它个性课程目录中选课，要求至少选修 6 学分。 NOTE: Sudents can select courses from above and the other personalized courses in catalog, and are required to obtain at least 6 credits.									

五、 集中性实践教学环节

Ⅴ Practice Schedule

课程编号 Course Number	实践环节名称 Practice Courses Name	学分 Crs	周数 Weeks	建议修读学期 Suggested Term
1060002110	军事训练 Military Training	1.5	3	1
4080152110	机械制造工程实训 D Metalworking Practice	1	1	2
4100068110	电工电子实习 A Practice in Electrical Engineering & Electronics	2	2	3

课程编号 Course Number	实践环节名称 Practice Courses Name	学分 Crs	周数 Weeks	建议修读学期 Suggested Term
4110128110	模拟电子技术基础课程设计 Course Design on Fundamentals of Analog Electronics Circuit	1	1	3
4110129110	数字电子技术基础课程设计 Course Design on Fundamentals of Digital Electronic Circuit	1	1	4
4110375170	数据传输网络实训 B Practical Training of Network Data Transmission	1	1	7
4110376170	信息工程专业实习 Speciality Practice	3	3	7
4110377170	毕业论文 Graduation Thesis	11	17	8
小　　计　Subtotal		21.5	29	

六、其它要求

Ⅵ Recommendations on Course Studies

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

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

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

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

学院教学责任人： 艾青松

专业培养方案责任人：汪　阳

通信工程专业（试点班）2017 版本科培养方案
Undergraduate Education Plan for Specialty in Communication Engineering (2017)

专业名称	**通信工程**	主干学科	**信息与通信工程**
Major	Communication Engineering	Major Disciplines	Information and Communication Engineering
计划学制	**四年**	授予学位	**工学学士**
Duration	4 Years	Degree Granted	Bachelor of Engineering
所属大类	**电子信息类（工学）**	大类培养年限	**1 年**
Disciplinary	Electronic Information	Duration	1 year

最低毕业学分规定

Graduation Credit Criteria

课程分类 Course Classification / 课程性质 Course Nature	通识教育课程 General Education Courses	专业教育课程 Specialized Courses	个性课程 Personalized Course	集中性实践教学环节 Practice Courses	课外学分 Extracurricular Credits	总学分 Total Credits
必修课 Required Courses	29	68	\	28	\	170
选修课 Elective Courses	9	20	6	\	10	

一、培养目标与毕业要求

I Educational Objectives &Requirement

（一）培养目标

Educational Objectives

培养适应社会主义现代化建设和信息产业发展需要，在通信工程领域具备扎实的理论基础、工程知识、专业技术、实践能力和创新创业能力，能够在通信工程及相关领域从事系统、设备和器件的研究、设计、开发、制造、应用、维护、管理等工作，并具备一定人文社会科学素养与国际化视野的高素质专门人才。学生毕业五年左右能达到工程师等中级技术职称任职条件，具体应达到的目标如下：

（1）具有健全的人格和良好科学文化素养，具有职业道德和社会责任感。

（2）具有国际化视野和跨文化交流与合作能力，具有团队分工协作、交流沟通的能力，能胜任技术负责、经营与管理等工作。

（3）理解科学技术的发展与伦理道德问题，并能够根据国家法律、行业法规及相关技术标准，合理运用所学专业知识来分析、解决通信工程及相关行业领域内遇到的工程实践问题。

（4）能够独立承担通信工程及相关领域中通信器件、通信系统的设计、应用研究和科技开发工作，成为所在单位技术骨干。

（5）具有终身学习的能力，能够通过继续教育或其它学习渠道更新知识，实现能力和技术水平的提高，具备不断适应社会发展和行业竞争的能力。

Cultivate high-quality professionals that adapt to the needs of socialist modernization and information industry development; have solid theoretical foundation, engineering knowledge, professional technology and practical ability, as well as innovation and entrepreneurial abilities; can conduct research, design, development, manufacture, application, maintenance, and management of

systems, equipment, and devices in communication engineering and related fields; and are equipped with humanities and social science literacy, as well as international vision. A graduate should be able to achieve qualifications for intermediate technical titles such as Engineers about five years after graduation. The specific objectives are as follows:

(1) The graduate should have a sound personality, good scientific and cultural literacy, professional ethics and a sense of social responsibility.

(2) The graduate should possess international vision and the capabilities of cross-cultural communication and cooperation; be able to communicate and work in a team; and be competent to work as a technical leader, operator and manager.

(3) The graduate should understand the development of scientific and technology, as well as the related ethical issues; and be able to analyze and solve practical engineering problems in communication engineering and related fields using professional knowledge, while abiding the national law, complying with the industry regulations, and meeting related technical standards.

(4) The graduate should be able to undertake individually the design, application research and technology development of devices and systems in communication engineering and related fields; and become the technical backbone of the unit.

(5) The graduate should have the ability of lifelong learning; improve one's capability and technical level by updating the knowledge base through continuous learning or other channels; and be able to constantly adapt to social development and industry competition.

（二） 毕业要求

Requirement for graduation

1. 工程知识：能够将数学、自然科学、工程基础和专业知识用于解决通信工程领域的复杂工程问题。

1-1 掌握高等数学、工程数学、物理等数学与自然科学的知识，能将其用于通信工程相关问题的描述、建模和求解；

1-2 掌握从事通信行业工作所需的专业基础知识，能用于通信工程问题的建模、推理和分析、计算；

1-3 掌握从事通信行业工作所需的分析、设计和应用等专业知识，能用于解决通信工程领域的复杂工程问题。

2. 问题分析：能够将数学、自然科学和工程科学的基本原理综合运用于通信工程专业复杂工程问题的分析、识别、表达、处理，并通过查阅、检索、分析文献研究分析通信工程领域的复杂工程问题，以获得有效结论。

2-1 能够应用数学、自然科学和工程科学的基本原理分析、识别通信工程领域复杂工程问题中的关键环节和参数；

2-2 能够应用数学、自然科学和工程科学的基本原理对通信工程领域复杂工程问题进行合理的表达与处理；

2-3 能够通过查阅文献寻求解决方案并分析通信工程领域复杂工程问题的影响因素，获得有效结论。

3. 设计（开发）解决方案：能够设计（开发）满足通信工程特定需求的体系、结构、构件（节点）或者解决方案，并在设计环节中考虑社会、健康、安全、法律、文化以及环境等因素，在提出通信工程复杂工程问题的解决方案时具有创新意识。

3-1 能够运用通信工程专业所讲授的工程设计方法和特定系统设计方法，设计通信工程专业复杂工程问题的解决方案，并具有一定的创新意识；

3-2 能够在 3-1 的解决方案框架中，设计满足特定需求的电路、系统或算法；

3-3 能够从系统的角度权衡解决方案所涉及的社会、健康、安全、法律、文化以及环境等因素。

4. 研究：能够基于科学原理、采用科学方法对通信工程领域复杂工程问题进行研究，包括设计实验、收集、处理、分析与解释数据，通过信息综合得到合理有效的结论并应用于工程实践。

4-1 掌握通信系统性能和指标的获取方法，具备通信系统测试与调试的基本技能，能综合利用所学科学原理及方法，对电子元件、模块、系统等相关的各类特性，设计可行的实验方案；

4-2 掌握通信系统的一般结构组成、性能指标和技术参数，能够根据实验方案构建实验系统进行实验，合理规范安全地进行实验，并能正确观察、采集实验数据；

4-3 能够参照科学的理论模型解释和分析实验数据结果，并能够通过分析工具或图表对数据结果进行综合分析，得出科学合理的结论。

5. 使用现代工具：能够针对通信工程领域的复杂工程问题，开发、选择与使用恰当的技术、资源、现代工程工具和信息技术工具，包括对通信工程领域复杂工程问题的预测与模拟，并能够理解其局限性。

5-1 具备使用计算机、网络等现代信息技术的能力，掌握常用电子仪器设备、EDA 仿真等软硬件开发工具的使用技能；

5-2 能够针对通信工程领域的复杂工程问题，选用恰当的技术手段、现代工程工具或开发相应辅助工具，进行建模、仿真、预测，并能够在实践过程中领会相关现代工具在模拟和预测复杂工程问题中存在的局限性。

6. 工程与社会：能够基于通信工程领域相关的背景知识和标准，评价通信工程项目的设计、施工和运行的方案，以及复杂工程问题的解决方案，包括其对社会、健康、安全、法律以及文化的影响，并理解因方案实施可能会产生的后果及应承担的责任。

6-1 了解通信工程领域相关的历史文化背景、技术标准体系、知识产权、产业政策和法律法规，并能正确认识通信工程和客观世界的相互作用关系；

6-2 能够客观评价通信工程实践中复杂问题解决方案对社会、健康、安全、法律以及文化的影响，并理解应承担的责任。

7. 环境和可持续发展：能够理解和评价针对通信工程领域复杂工程问题的工程实践对环境、社会可持续发展的影响。

7-1 树立科学发展观，理解环境保护和可持续发展的理念与内涵；

7-2 理解并合理评价通信工程生产实践对环境、社会可持续发展的负面影响。

8. 职业规范：了解中国国情、具有人文社会科学素养、社会责任感，能够在通信工程实践中理解并遵守工程职业道德和行为规范，做到责任担当、贡献国家、服务社会。

8-1 具有正确的世界观、人生观和价值观，具有一定的文学、艺术、经济等人文社会科学素养，理解中国可持续发展的科学道路以及个人的社会责任；

8-2 能够理解工程师的职业性质和责任、具有法律意识，理解并能够在工程实践中自觉遵守工程师基本职业道德和行为规范。

9. 个人和团队：在解决通信工程领域复杂工程问题时，能够在多学科组成的团队中承担个体、团队成员或负责人的角色。

9-1 能够理解通信工程领域复杂工程问题的多学科技术背景和特点，具有跨学科的适应能力和合作意识，能够在团队合作中与其他人员进行分工协作，在团队中做好自己承担的角色，完成相应任务；

9-2 具备一定的组织管理能力，能够制订工作计划，根据团队成员能力与特长合理分配工作任务，能够综合团队成员的意见，进行合理决策，协调进度，并完成任务。

10. 沟通：能够就通信工程领域复杂工程问题与业界同行及社会公众进行有效沟通和交流，包括撰写报告和设计文稿、陈述发言、表达或回应指令；具备一定的国际视野，能够在跨文化背景下进行沟通和交流。

10-1 能够通过撰写报告、设计文档、陈述发言等多种沟通手段清晰表达通信工程领域相关问题，实现与不同专业知识水平的对象人群进行有效回应、沟通和交流；

10-2 具备一定的国际视野，具有英语听说读写的基本能力，了解通信工程领域的国际发展动态，能够阅读国内外相关领域科技文献，并能够在跨文化背景下进行有效的沟通和交流。

11. 项目管理：能够在与通信工程领域相关的多学科环境中理解、掌握、应用工程管理原理与经济决策方法，具有一定的组织、管理和领导能力。

11-1 了解通信工程领域生产实践的周期和过程，理解并掌握与通信工程领域相关的工程管理原理与经济决策方法；

11-2 能够在多学科环境中（包括模拟环境），在设计开发复杂工程问题的解决方案过程中，应用管理和经济决策知识，具有一定的组织、管理和领导能力。

12. 终身学习：具有自主学习和终身学习的意识，具有提高自主学习和适应通信工程新发展的能力。

12-1 理解通信工程领域技术发展迅速、多学科交叉的特点，对于自我探索和终身学习的必要性有正确的认识；

12-2 具有自主学习的能力，能够适应社会及行业发展变化。

1. Engineering knowledge: the graduate should be able to apply mathematics, natural science, engineering fundamentals and professional knowledge to solve complex engineering problems in communication engineering.

1-1 The graduate should master the knowledge of mathematics and natural science such as advanced mathematics, engineering mathematics, physics, etc., and use it to describe, model and solve problems related to communication engineering.

1-2 The graduate should master the basic professional knowledge required to work in the communications industry, which can be used for modeling and reasoning, as well as analysis and calculation of communication engineering problems.

1-3 The graduate should master the profession knowledge in analysis, design and application, which are required by the communications industry; be able to compare and integrate solutions to the engineering problems in the field of communication engineering, and solve complex engineering problems in the field.

2. Problem analysis: the graduate should be able to apply the basic principles of mathematics, natural science and engineering science to the analysis, identification, expression and processing of complex engineering problems in communication engineering; analyze the complex engineering problems in the field of communication engineering by consulting, retrieving and analyzing literature; and obtain valid conclusions.

2-1 The graduate should be able to analyze and identify the key components and parameters in complex engineering problems in communication engineering, by applying the basic principles of mathematics, natural science and engineering science.

2-2 The graduate should be able to rationally express and process complex engineering problems in communication engineering by applying the basic principles of mathematics, natural science and engineering science.

2-3 The graduate should be able to find a variety of solutions to complex engineering problems in communication engineering through literature research; and analyze the influencing factors of complex engineering problems in communication engineering with the assistance of the basic principles and literature research, which eventually leads to valid conclusions.

3. Design (development) solution: the graduate should be able to design (develop) systems, structures, components (nodes) or solutions that meet the specific needs of communication engineering, while considering social, health, safety, legal, cultural and environmental factors in the design (developing) process; and propose innovative solutions to complex engineering problems in communication engineering.

3-1 The graduate should be able to conduct system or process design by applying the engineering design methods and design methods for specific systems, taught in the communication engineering profession; and provide solutions to complex engineering problems in communication engineering, with a sense of innovation.

3-2 The graduate should be able to design circuits, systems or algorithms that meet the specific needs, under the solution framework given by 3-1.

3-3 The graduate should be able to weigh the social, health, safety, legal, cultural and environmental factors involved in the design solutions from a systematic perspective.

4. Research: the graduate should be able to conduct research on complex engineering problems in communication engineering based on scientific principles and methods, including the experiment design, as well as the collection, processing, analysis and explanation of experimental data; and obtain valid conclusions for engineering practice through integration of information.

4-1 The graduate should master the acquisition methods of communication system performance and indicators; be able to perform basic testing and debugging of communication systems; and be able to analyze and design feasible experimental solutions considering the characteristics of electronics components, modules, systems, etc., based on the scientific principles and methods, as well as literature research.

4-2 The graduate should master the general structural composition, performance indicators and technical parameters of the communication systems; be able to build experimental systems in accordance with the experimental schemes, carry out experiments reasonably and safely, and correctly observe and collect the experimental data.

4-3 The graduate should be able to interpret and analyze the experimental data with reference to theoretical models;

comprehensively analyze the data using analytical tools or charts; and obtain scientific and reasonable conclusions.

5. Using modern tools: the graduate should be able to develop, select and use the appropriate technologies, resources, modern engineering tools and information technology tools for the complex engineering problems in communication engineering, including the predictions and simulations of complex engineering problems in communication engineering; and understand the limitations of the modern tools.

5-1 The graduate should be able to use computers, network and other information technology; master the use of common electronic equipment, EDA simulation tools, and other software and hardware developing tools; and understand the limitations.

5-2 The graduate should be able to develop or select the modern tools that meet the specific needs, according to the specific complex engineering problems in communication engineering; simulate and predict complex engineering problems; and understand the limitations of related modern tools in the simulation and prediction of complex engineering problems in practice.

6. Engineering and society: the graduate should be able to evaluate the design, construction and operation of communication engineering projects, as well as solutions to complex engineering problems, including their influence to society, health, safety, law and culture, based on relevant background knowledge and standards in communication engineering; ad understand the consequences and responsibilities that may result from the implementation of the projects/solutions.

6-1 The graduate should know the historical and cultural background, technical standard system, intellectual property rights, industrial policies and laws and regulations related to communication engineering; and understand correctly the interaction between communication engineering and the objective world.

6-2 The graduate should be able to objectively evaluate the impact of complex problem solutions on society, health, safety, law and culture, as well as the influence of these constraints on the project implementation; and understand the responsibilities that should be assumed.

7. Environment and sustainable development: the graduate should be able to understand and evaluate the influence of the engineering practices on complex engineering problems in communication engineering to environmental and social sustainability.

7-1 The graduate should establish the scientific concept of development and understand the concept and connotation of environmental protection and sustainable development.

7-2 The graduate should understand and reasonably evaluate the negative impact of engineering practices on complex engineering problems in communication engineering on environmental and social sustainable development.

8. Professional norms: the graduate should understand China's national conditions; be equipped with humanities and social science literacy, and a sense of social responsibility; understand and abide by the engineering professional ethics and behavior norms in communication engineering practice; and fulfill one's responsibility, contribute to the country and serve the society.

8-1 The graduate should have a correct outlook on the world, life and values; have humanities and social science literacy including literature, art, economics, etc.; understand China's sustainable development and related social responsibility of individuals; and be clarified about the responsibility and mission of individuals as socialist builders and successors.

8-2 The graduate should understand the professional nature and responsibility of engineers; have a legal awareness; understand the social responsibility of engineers to the safety, health and well-being of the public; and be able to consciously fulfill his/her responsibility during engineering practice.

9. Individual and team: the graduate should be able to take the role of an individual, a team member, or a team leader in a multidisciplinary team, when solving complex engineering problems in communication engineering.

9-1 The graduate should understand the multidisciplinary technical background and characteristics of complex engineering problems in communication engineering; adapt to the multidisciplinary nature of complex engineering problems in communication engineering and have a sense of cooperation; be able to communicate effectively with other team members, carry out division of labor and cooperate, take the responsibility defined by one's role, and complete tasks individually or cooperatively.

9-2 The graduate should be equipped with organizational management capabilities; be able to formulate work plans, assign tasks to team members according to their abilities and strengths, integrate TEM members' opinions, make reasonable decisions, coordinate progress, and complete tasks.

10. Communication: the graduate should be able to communicate effective with industry peers and the public on complex engineering problems in communication engineering, by means of writing reports and planning portfolios, presenting statement, expressing or responding to instructions; have an international vision and can communication in a cross-cultural context.

10-1 The graduate should be able to clearly express relevant issues in communication engineering by writing reports, planning portfolios and presenting statements; and realize effective responding to and communication with target groups of different professional knowledge levels.

10-2 The graduate should have an international vision; have the basic ability of listening, speaking, reading and writing in English; understand the international development of communication engineering; be able to read relevant domes and foreign scientific and technological literature; and communicate effectively in a cross-cultural context.

11. Project management: the graduate should be able to understand, master and apply engineering mana principles and economic decision-making methods related to communication engineering in a multidisciplinary environment.

11-1 The graduate should understand the cycle and process of production practice in the field of communication engineering, understand and master the engineering management principles and economic decision-making methods related to communication engineering.

11-2 The graduate should be able to apply management and economic decision-making knowledge in a multidisciplinary environment (including simulation environment), in the process of designing and developing the solutions to complex engineering problems; and be equipped with organizational, management and leadership skills.

12. Lifelong learning: The graduate should have the awareness of independent learning and lifelong learning; and improve one's capability of self-learning and adapt to the new development of communication engineering.

12-1 The graduate should understand the rapid technology development and multidisciplinary nature of communication engineering in the context of social development; and understand the necessity of self-exploration and lifelong learning.

12-2 The graduate should have the ability of independent learning, including the ability to understand technical issues in communication engineering, as well as summarize and question; and adapt to the evolution of society and industry.

附：培养目标实现矩阵

The Matrix for Educational Objectives

	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					√

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：

信号与系统、电路分析基础、数字电子技术基础、模拟电子技术基础、单片计算机原理与通信接口、通信原理、数字信号处理、信息理论与编码、高频电子线路。

Core Courses: Signal and System, Fundamentals of Circuit Analysis, Fundamentals of Digital Electronic Circuit, Fundamentals of Analog Electronic Circuit, Principle of Single Chip Computer and Communication Interface, Principle of Communication, Digital Signal Processing, Information Theory and Coding, High-Frequency Electronic Circuit.

（二）专业特色课程：

信号与系统、高频电子线路、通信原理、电磁场与电磁波、移动通信、光纤通信、现代交换技术、信息理论与编码、计算机网络与通信。

Characteristic Courses: Signal and System, High-frequency Electronic Circuit, Communication Principles, Electromagnet Field and Electromagnetic Wave, Mobile Communication, Optic Fiber Communication, Modern Switching Technology, Information Theory and Coding, Computer Network and Communication.

附：毕业要求实现矩阵：

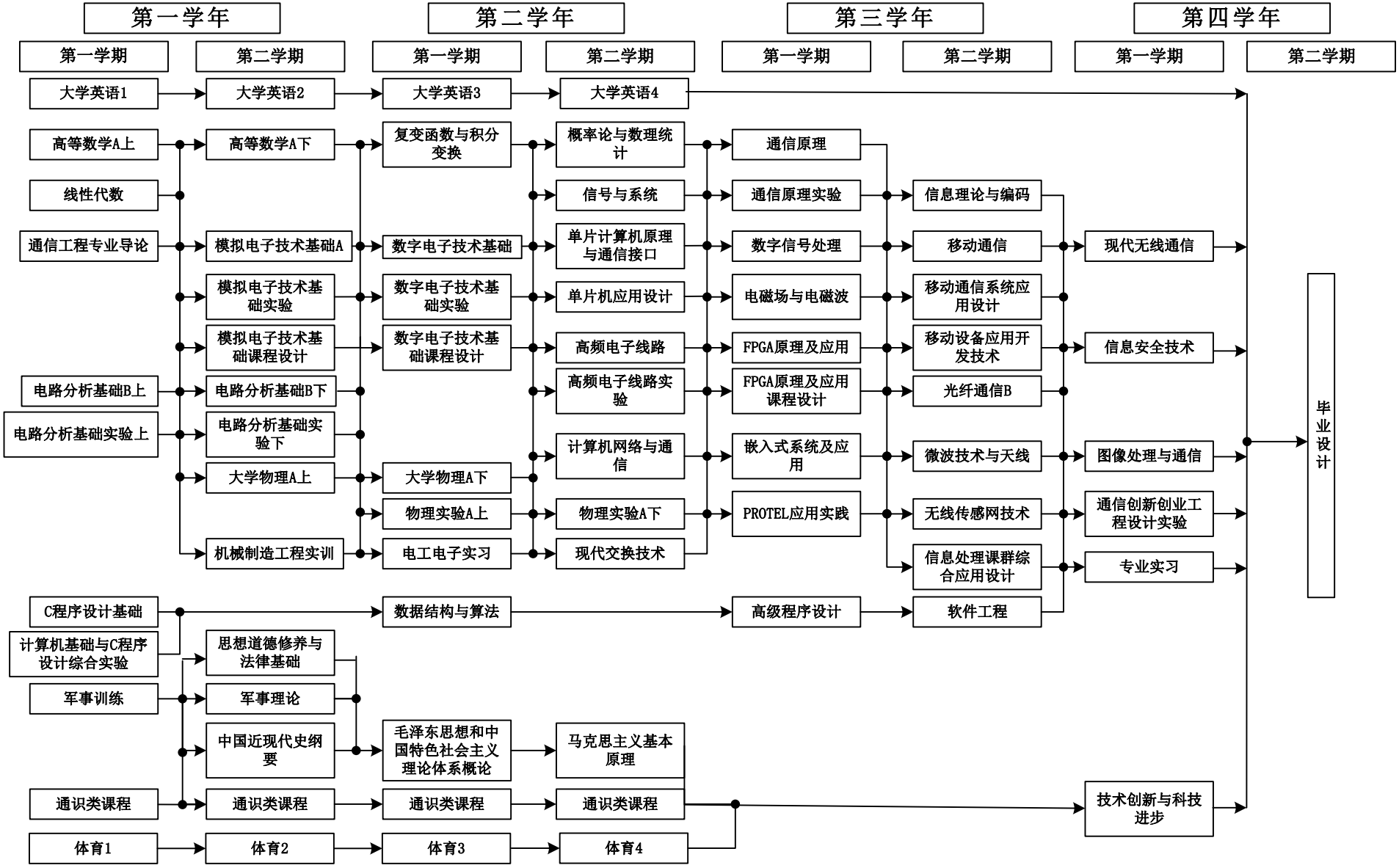
专业核心课程	专业特色课程	课程名称	通信工程专业毕业要求											
			1	2	3	4	5	6	7	8	9	10	11	12
		思想道德修养与法律基础						√	√	√				
		中国近现代史纲要								√				√
		毛泽东思想和中国特色社会主义理论体系概论							√	√				√
		马克思主义基本原理								√				√
		军事理论								√	√			
		体育									√			
		大学英语										√		

专业核心课程	专业特色课程	课程名称	通信工程专业毕业要求											
			1	2	3	4	5	6	7	8	9	10	11	12
		C 程序设计基础					√							
		计算机基础与 C 程序设计综合实验					√							
		专业导论						√	√			√		√
		高等数学	√											
		线性代数	√											
		复变函数与积分变换	√											
		概率论与数理统计	√											
		大学物理	√											
		物理实验				√								
√		电路分析基础	√	√			√							
		电路分析基础实验		√		√	√							
√		模拟电子技术基础	√	√	√									
		模拟电子技术基础实验				√						√		
√		数字电子技术基础	√	√	√									
		数字电子技术基础实验				√						√		
√	√	信号与系统	√	√		√								
√	√	高频电子线路	√	√										
√		单片计算机原理与通信接口			√	√	√							
	√	电磁场与电磁波	√	√			√							
√	√	通信原理	√	√		√		√						
√		数字信号处理	√	√		√								
√	√	信息理论与编码	√	√	√									
		通信创新创业工程设计实验			√	√		√			√		√	
		数据结构与算法	√	√	√									
		高频电子线路实验	√			√	√							
		通信原理实验	√			√	√							
	√	现代交换技术	√		√	√		√						√

专业核心课程	专业特色课程	课程名称	通信工程专业毕业要求											
			1	2	3	4	5	6	7	8	9	10	11	12
		嵌入式系统及其应用	√	√	√									
	√	光纤通信	√	√		√								
	√	移动通信	√	√		√								
	√	计算机网络与通信	√		√									
		高级程序设计	√	√	√									
		FPGA 原理及应用	√	√	√									
		微波技术与天线	√	√			√							
		软件工程			√						√	√		
		图像处理与通信		√	√					√				√
		现代无线通信		√			√			√				
		信息安全技术	√	√	√					√				
		军事训练									√			
		机械制造工程实训			√			√		√				
		电工电子实习		√	√					√	√			
		模拟电子技术基础课程设计	√		√		√					√		
		数字电子技术基础课程设计	√		√		√					√		
		移动通信系统应用设计		√	√	√	√					√		
		PROTEL 应用实践		√	√		√					√		
		FPGA 原理与应用课程设计		√	√		√					√		
		信息处理课群综合应用设计		√	√	√	√					√		
		单片机应用设计	√		√		√					√		
		专业实习			√	√		√	√	√	√	√	√	
		毕业设计		√	√	√	√					√		

三、课程教学进程图

III Teaching Process Map


第一学年
第二学年
第三学年
第四学年
第一学期
第二学期
第一学期
第二学期
第一学期
第二学期
第一学期
第二学期
大学英语1
大学英语2
大学英语3
大学英语4
高等数学A上
高等数学A下
复变函数与积分变换
概率论与数理统计
通信原理
线性代数
信号与系统
通信原理实验
信息理论与编码
通信工程专业导论
模拟电子技术基础A
数字电子技术基础
单片计算机原理与通信接口
数字信号处理
移动通信
现代无线通信
模拟电子技术基础实验
数字电子技术基础实验
单片机应用设计
电磁场与电磁波
移动通信系统应用设计
模拟电子技术基础课程设计
数字电子技术基础课程设计
高频电子线路
FPGA原理及应用
移动设备应用开发技术
信息安全技术
电路分析基础B上
电路分析基础B下
高频电子线路实验
FPGA原理及应用课程设计
光纤通信B
电路分析基础实验上
电路分析基础实验下
计算机网络与通信
嵌入式系统及应用
微波技术与天线
图像处理与通信
大学物理A上
大学物理A下
物理实验A上
物理实验A下
PROTEL应用实践
无线传感网技术
通信创新创业工程设计实验
机械制造工程实训
电工电子实习
现代交换技术
信息处理课群综合应用设计
专业实习
毕业设计
C程序设计基础
数据结构与算法
高级程序设计
软件工程
计算机基础与C程序设计综合实验
思想道德修养与法律基础
军事训练
军事理论
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
通识类课程
通识类课程
通识类课程
通识类课程
技术创新与科技进步
体育1
体育2
体育3
体育4

四、 理论教学建议进程表

IV Theory Course Schedule

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

课程编号 Course Number	课 程 名 称 Course Title	学分 Crs	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course
			总学时 Tot hrs.	实验 Exp.	上机 Ope-ration	实践 Prac-tice	课外 Extra-cur		
（二）通识教育选修课程 General Education Elective Courses									
创新创业类 Innovation and Entrepreneurship Courses 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	要求至少取得 9 个学分，且必须选修艺术体育类课程中的艺术类相关课程并取得至少 2 个学分，在创新创业类课程中至少选修一门课程，在人文社科类或经济管理类课程中至少选修一门。 Students are required to obtain at least 9 credits，which must contain art courses of 2 credits from the category of Art and Physical Education Courses, at least one course from the category of Innovation and Entrepreneurship Courses, and at least one course from the category of Arts and Social Science Courses or the category of Economy and Management Courses.								
（三）专业教育必修课程 Basic Disciplinary Required Courses									
4110306170	通信工程专业导论 Introduction to Specialty	1	16					1	
4050229110	线性代数 Linear Algebra	2.5	40					1	
4050063110	高等数学 A 上 Advanced Mathematics I	5	80					1	
4050064110	高等数学 A 下 Advanced Mathematics II	5	80					2	
4110309170	电路分析基础 B 上 Fundamentals of Circuit Analysis I	2	32					1	高等数学下
4110017110	电路分析基础 B 下 Fundamentals of Circuit Analysis II	3	48					2	电路分析基础上
4100028110	电路分析基础实验上 Experiments of Circuit Analysis I	0.5	16	16				1	电路分析基础上
4100029110	电路分析基础实验下 Experiments of Circuit Analysis II	0.5	16	16				2	电路分析基础下
4110048110	模拟电子技术基础 A Fundamentals of Analog Electronic Circuit	4	64					2	电路分析基础
4110051110	模拟电子技术基础实验 Experiments of Analog Electronics Circuit	0.5	16	16				2	
4050021110	大学物理 A 上 Physics I	3.5	56					2	
4050022110	大学物理 A 下 Physics II	3.5	56					3	
4050466130	物理实验 A 上 Physics Lab. I	1	32	32				3	

课程编号 Course Number	课 程 名 称 Course Title	学分 Crs	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course
			总学时 Tot hrs.	实验 Exp.	上机 Ope-ration	实践 Prac-tice	课外 Extra-cur		
4050467130	物理实验 A 下 Physics Lab. II	1	32	32				4	
4050469130	复变函数与积分变换 D Complex Function and Integral Transform	2.5	40					3	
4110066110	数字电子技术基础 C Fundamentals of Digital Electronic Circuit	4	64					3	模拟电子技术基础
4110068110	数字电子技术基础实验 Experiments of Digital Electronics Circuit	0.5	16	16				3	
4050058110	概率论与数理统计 B Probability and Mathematical Statistics	3	48					4	
4110093110	信号与系统 A Signal and System	4	64	8				4	复变函数与积分变换
4110310170	高频电子线路 D High-Frequency Electronic Circuit	3	48					4	
4110378170	高频电子线路实验 Experiments of High-Frequency Electronic Circuit	0.5	16	16				4	
4110345170	单片计算机原理与通信接口 B Principle of Single Chip Computer and Communication Interface	3	48	8				4	
4110011110	电磁场与电磁波 A Electromagnetic Field and Electromagnetic Wave	3	48					5	
4110314170	通信原理 D Principle of Communication	3	48					5	
4110379170	通信原理实验 Experiments of Principle of Communication	0.5	16	16				5	
4110313170	数字信号处理 B Digital Signal Processing	3.5	56	8				5	
4110315170	信息理论与编码 C Information Theory and Coding	2.5	40	8				6	
4110346170	通信创新创业工程设计实验 Experiment of Innovative and Entrepreneurial Communication Engineering Design	2	64	64				7	
小 计 Subtotal		68	1200	256	0	0	0		
（四）专业教育选修课程 Specialized Elective Courses									
4110270140	数据结构与算法 F Data Structure and Algorithm	2.5	40		8			3	

课程编号 Course Number	课 程 名 称 Course Title	学分 Crs	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course
			总学时 Tot hrs.	实验 Exp.	上机 Ope-ration	实践 Prac-tice	课外 Extra-cur		
4110170120	计算机网络与通信 D Computer Network and Communication	2.5	40	8				4	
4110089110	现代交换技术 A Modern Switching Technology	2.5	40	12				4	
4110223130	嵌入式系统及其应用 B Embedded System and Application	3	48	8				5	
4110304150	高级程序设计 A Advanced Programming	3	48	8				5	
4110348170	FPGA 原理及应用 B Principle and Application of FPGA	3	48	32				5	
4110036110	光纤通信 B Optical Fiber Communication	2.5	40	12				6	
4110098110	移动通信 A Mobile Communication	2.5	40	8				6	
4110347170	微波技术与天线 A Microwave Technology and Antenna Theory	3	48	8				6	
4110224130	软件工程 D Software Engineering	2	32					6	
4110349170	图像处理与通信 B Image Processing and Communication	2.5	40	8				7	
4110385170	现代无线通信 Modern Wireless Communication	2.5	40					7	
4110095110	信息安全技术 Information Security Technology	2	32					7	
小 计 Subtotal		33.5	536	104	8	0	0		
修读说明：要求至少选修 20 学分。 NOTE：Minimum subtotal credits:20.									
（五）个性课程 Personalized Elective Courses									
4110350170	移动设备应用开发技术 B Mobile Device Application Development Technology	2.5	40	8				6	
4110185120	无线传感网技术 Wireless Sensing Network Technology	2.5	40	8				6	
4110268140	技术创新与科技进步 Technology Innovation and Scientific and Technological Progress	1	16					7	
小 计 Subtotal		6	96	16	0	0	0		
修读说明：学生从以上个性课程和学校发布的其它个性课程目录中选课，要求至少选修 6 学分。 NOTE: Sudents can select courses from above and the other personalized courses in catalog, and are required to obtain at least 6 credits.									

五、 集中性实践教学环节
V Practice Schedule

课程编号 Course Number	实践环节名称 Practice Courses Name	学分 Crs	周数 Weeks	建议修读学期 Suggested Term
1060002110	军事训练 Military Training	1.5	3	1
4080152110	机械制造工程实训 D Training on Mechanical Manufacturing Engineering	1	1	2
4100068110	电工电子实习 A Practice in Electrical Engineering and Electronics	2	2	3
4110128110	模拟电子技术基础课程设计 Course Design on Fundamentals of Analog Electronics Circuit	1	1	2
4110129110	数字电子技术基础课程设计 Course Design on Fundamentals of Digital Electronic Circuit	1	1	3
4110214130	单片机应用设计 Application Practice on Single Chip Computer	2	2	4
4110351170	PROTEL 应用实践 B Courses Design on PROTEL Application	1	1	5
4110353170	FPGA 原理与应用课程设计 Course Design on FPGA Principle and Application	2	2	5
4110236130	信息处理课群综合应用设计 Comprehensive Training and Design on Signal Processing	2	2	6
4110352170	移动通信系统应用设计 Application Design on Mobile Communication Systems	2	2	6
4110152110	专业实习 Specialty Practice	3	3	7
4110354170	毕业设计 Graduation Design	9.5	17	8
小　　计　Subtotal		28	37	

六、其它要求
VI Recommendations on Course Studies

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

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

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

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

学院教学责任人：艾青松

专业培养方案责任人：王原丽

通信工程专业（卓越工程师班）2017 版本科培养方案
Undergraduate Education Plan for Specialty in Communication Engineering (2017)

专业名称	**通信工程**	主干学科	**信息与通信工程**
Major	Communication Engineering	Major Disciplines	Information and Communication Engineering
计划学制	**四年**	授予学位	**工学学士**
Duration	4 Years	Degree Granted	Bachelor of Engineering
所属大类	**电子信息类（工学）**	大类培养年限	**1 年**
Disciplinary	Electronic Information	Duration	1 year

最低毕业学分规定

Graduation Credit Criteria

课程分类 Course Classification / 课程性质 Course Nature	通识教育课程 General Education Courses	专业教育课程 Specialized Courses	个性课程 Personalized Course	集中性实践教学环节 Practice Courses	课外学分 Extracurricular Credits	总学分 Total Credits
必修课 Required Courses	29	68	\	28	\	170
选修课 Elective Courses	9	20	6	\	10	

一、培养目标与毕业要求

I Educational Objectives &Requirement

（一）培养目标

Educational Objectives

培养适应社会主义现代化建设和信息产业发展需要，在通信工程领域具备扎实的理论基础、工程知识、专业技术、实践能力和创新创业能力，能够在通信工程及相关领域从事系统、设备和器件的研究、设计、开发、制造、应用、维护、管理等工作，并具备一定人文社会科学素养与国际化视野的高素质专门人才。学生毕业五年左右能达到工程师等中级技术职称任职条件，具体应达到的目标如下：

（1）具有健全的人格和良好科学文化素养，具有职业道德和社会责任感。

（2）具有国际化视野和跨文化交流与合作能力，具有团队分工协作、交流沟通的能力，能胜任技术负责、经营与管理等工作。

（3）理解科学技术的发展与伦理道德问题，并能够根据国家法律、行业法规及相关技术标准，合理运用所学专业知识来分析、解决通信工程及相关行业领域内遇到的工程实践问题。

（4）能够独立承担通信工程及相关领域中通信器件、通信系统的设计、应用研究和科技开发工作，成为所在单位技术骨干。

（5）具有终身学习的能力，能够通过继续教育或其它学习渠道更新知识，实现能力和技术水平的提高，具备不断适应社会发展和行业竞争的能力。

Cultivate high-quality professionals that adapt to the needs of socialist modernization and information industry development; have solid theoretical foundation, engineering knowledge, professional technology and practical ability, as well as innovation and entrepreneurial abilities; can conduct research, design, development, manufacture, application, maintenance, and management of

systems, equipment, and devices in communication engineering and related fields; and are equipped with humanities and social science literacy, as well as international vision. A graduate should be able to achieve qualifications for intermediate technical titles such as Engineers about five years after graduation. The specific objectives are as follows:

(1) The graduate should have a sound personality, good scientific and cultural literacy, professional ethics and a sense of social responsibility.

(2) The graduate should possess international vision and the capabilities of cross-cultural communication and cooperation; be able to communicate and work in a team; and be competent to work as a technical leader, operator and manager.

(3) The graduate should understand the development of scientific and technology, as well as the related ethical issues; and be able to analyze and solve practical engineering problems in communication engineering and related fields using professional knowledge, while abiding the national law, complying with the industry regulations, and meeting related technical standards.

(4) The graduate should be able to undertake individually the design, application research and technology development of devices and systems in communication engineering and related fields; and become the technical backbone of the unit.

(5) The graduate should have the ability of lifelong learning; improve one's capability and technical level by updating the knowledge base through continuous learning or other channels; and be able to constantly adapt to social development and industry competition.

（二） 毕业要求

Requirement for graduation

1. 工程知识：能够将数学、自然科学、工程基础和专业知识用于解决通信工程领域的复杂工程问题。

1-1 掌握高等数学、工程数学、物理等数学与自然科学的知识，能将其用于通信工程相关问题的描述、建模和求解；

1-2 掌握从事通信行业工作所需的专业基础知识，能用于通信工程问题的建模、推理和分析、计算；

1-3 掌握从事通信行业工作所需的分析、设计和应用等专业知识，能用于解决通信工程领域的复杂工程问题。

2. 问题分析：能够将数学、自然科学和工程科学的基本原理综合运用于通信工程专业复杂工程问题的分析、识别、表达、处理，并通过查阅、检索、分析文献研究分析通信工程领域的复杂工程问题，以获得有效结论。

2-1 能够应用数学、自然科学和工程科学的基本原理分析、识别通信工程领域复杂工程问题中的关键环节和参数；

2-2 能够应用数学、自然科学和工程科学的基本原理对通信工程领域复杂工程问题进行合理的表达与处理；

2-3 能够通过查阅文献寻求解决方案并分析通信工程领域复杂工程问题的影响因素，获得有效结论。

3. 设计（开发）解决方案：能够设计（开发）满足通信工程特定需求的体系、结构、构件（节点）或者解决方案，并在设计环节中考虑社会、健康、安全、法律、文化以及环境等因素，在提出通信工程复杂工程问题的解决方案时具有创新意识。

3-1 能够运用通信工程专业所讲授的工程设计方法和特定系统设计方法，设计通信工程专业复杂工程问题的解决方案，并具有一定的创新意识；

3-2 能够在 3-1 的解决方案框架中，设计满足特定需求的电路、系统或算法；

3-3 能够从系统的角度权衡解决方案所涉及的社会、健康、安全、法律、文化以及环境等因素。

4. 研究：能够基于科学原理、采用科学方法对通信工程领域复杂工程问题进行研究，包括设计实验、收集、处理、分析与解释数据，通过信息综合得到合理有效的结论并应用于工程实践。

4-1 掌握通信系统性能和指标的获取方法，具备通信系统测试与调试的基本技能，能综合利用所学科学原理及方法，对电子元件、模块、系统等相关的各类特性，设计可行的实验方案；

4-2 掌握通信系统的一般结构组成、性能指标和技术参数，能够根据实验方案构建实验系统进行实验，合理规范安全地进行实验，并能正确观察、采集实验数据；

4-3 能够参照科学的理论模型解释和分析实验数据结果，并能够通过分析工具或图表对数据结果进行综合分析，得出科学合理的结论。

5. 使用现代工具：能够针对通信工程领域的复杂工程问题，开发、选择与使用恰当的技术、资源、现代工程工具和信息技术工具，包括对通信工程领域复杂工程问题的预测与模拟，并能够理解其局限性。

5-1 具备使用计算机、网络等现代信息技术的能力，掌握常用电子仪器设备、EDA 仿真等软硬件开发工具的使用技能；

5-2 能够针对通信工程领域的复杂工程问题，选用恰当的技术手段、现代工程工具或开发相应辅助工具，进行建模、仿真、预测，并能够在实践过程中领会相关现代工具在模拟和预测复杂工程问题中存在的局限性。

6. 工程与社会：能够基于通信工程领域相关的背景知识和标准，评价通信工程项目的设计、施工和运行的方案，以及复杂工程问题的解决方案，包括其对社会、健康、安全、法律以及文化的影响，并理解因方案实施可能会产生的后果及应承担的责任。

6-1 了解通信工程领域相关的历史文化背景、技术标准体系、知识产权、产业政策和法律法规，并能正确认识通信工程和客观世界的相互作用关系；

6-2 能够客观评价通信工程实践中复杂问题解决方案对社会、健康、安全、法律以及文化的影响，并理解应承担的责任。

7. 环境和可持续发展：能够理解和评价针对通信工程领域复杂工程问题的工程实践对环境、社会可持续发展的影响。

7-1 树立科学发展观，理解环境保护和可持续发展的理念与内涵；

7-2 理解并合理评价通信工程生产实践对环境、社会可持续发展的负面影响。

8. 职业规范：了解中国国情、具有人文社会科学素养、社会责任感，能够在通信工程实践中理解并遵守工程职业道德和行为规范，做到责任担当、贡献国家、服务社会。

8-1 具有正确的世界观、人生观和价值观，具有一定的文学、艺术、经济等人文社会科学素养，理解中国可持续发展的科学道路以及个人的社会责任；

8-2 能够理解工程师的职业性质和责任、具有法律意识，理解并能够在工程实践中自觉遵守工程师基本职业道德和行为规范。

9. 个人和团队：在解决通信工程领域复杂工程问题时，能够在多学科组成的团队中承担个体、团队成员或负责人的角色。

9-1 能够理解通信工程领域复杂工程问题的多学科技术背景和特点，具有跨学科的适应能力和合作意识，能够在团队合作中与其他人员进行分工协作，在团队中做好自己承担的角色，完成相应任务；

9-2 具备一定的组织管理能力，能够制订工作计划，根据团队成员能力与特长合理分配工作任务，能够综合团队成员的意见，进行合理决策，协调进度，并完成任务。

10. 沟通：能够就通信工程领域复杂工程问题与业界同行及社会公众进行有效沟通和交流，包括撰写报告和设计文稿、陈述发言、表达或回应指令；具备一定的国际视野，能够在跨文化背景下进行沟通和交流。

10-1 能够通过撰写报告、设计文档、陈述发言等多种沟通手段清晰表达通信工程领域相关问题，实现与不同专业知识水平的对象人群进行有效回应、沟通和交流；

10-2 具备一定的国际视野，具有英语听说读写的基本能力，了解通信工程领域的国际发展动态，能够阅读国内外相关领域科技文献，并能够在跨文化背景下进行有效的沟通和交流。

11. 项目管理：能够在与通信工程领域相关的多学科环境中理解、掌握、应用工程管理原理与经济决策方法，具有一定的组织、管理和领导能力。

11-1 了解通信工程领域生产实践的周期和过程，理解并掌握与通信工程领域相关的工程管理原理与经济决策方法；

11-2 能够在多学科环境中（包括模拟环境），在设计开发复杂工程问题的解决方案过程中，应用管理和经济决策知识，具有一定的组织、管理和领导能力。

12. 终身学习：具有自主学习和终身学习的意识，具有提高自主学习和适应通信工程新发展的能力。

12-1 理解通信工程领域技术发展迅速、多学科交叉的特点，对于自我探索和终身学习的必要性有正确的认识；

12-2 具有自主学习的能力，能够适应社会及行业发展变化。

1. Engineering knowledge: the graduate should be able to apply mathematics, natural science, engineering fundamentals and professional knowledge to solve complex engineering problems in communication engineering.

1-1 The graduate should master the knowledge of mathematics and natural science such as advanced mathematics, engineering mathematics, physics, etc., and use it to describe, model and solve problems related to communication engineering.

1-2 The graduate should master the basic professional knowledge required to work in the communications industry, which can be used for modeling and reasoning, as well as analysis and calculation of communication engineering problems.

1-3 The graduate should master the profession knowledge in analysis, design and application, which are required by the communications industry; be able to compare and integrate solutions to the engineering problems in the field of communication engineering, and solve complex engineering problems in the field.

2. Problem analysis: the graduate should be able to apply the basic principles of mathematics, natural science and engineering science to the analysis, identification, expression and processing of complex engineering problems in communication engineering; analyze the complex engineering problems in the field of communication engineering by consulting, retrieving and analyzing literature; and obtain valid conclusions.

2-1 The graduate should be able to analyze and identify the key components and parameters in complex engineering problems in communication engineering, by applying the basic principles of mathematics, natural science and engineering science.

2-2 The graduate should be able to rationally express and process complex engineering problems in communication engineering by applying the basic principles of mathematics, natural science and engineering science.

2-3 The graduate should be able to find a variety of solutions to complex engineering problems in communication engineering through literature research; and analyze the influencing factors of complex engineering problems in communication engineering with the assistance of the basic principles and literature research, which eventually leads to valid conclusions.

3. Design (development) solution: the graduate should be able to design (develop) systems, structures, components (nodes) or solutions that meet the specific needs of communication engineering, while considering social, health, safety, legal, cultural and environmental factors in the design (developing) process; and propose innovative solutions to complex engineering problems in communication engineering.

3-1 The graduate should be able to conduct system or process design by applying the engineering design methods and design methods for specific systems, taught in the communication engineering profession; and provide solutions to complex engineering problems in communication engineering, with a sense of innovation.

3-2 The graduate should be able to design circuits, systems or algorithms that meet the specific needs, under the solution framework given by 3-1.

3-3 The graduate should be able to weigh the social, health, safety, legal, cultural and environmental factors involved in the design solutions from a systematic perspective.

4. Research: the graduate should be able to conduct research on complex engineering problems in communication engineering based on scientific principles and methods, including the experiment design, as well as the collection, processing, analysis and explanation of experimental data; and obtain valid conclusions for engineering practice through integration of information.

4-1 The graduate should master the acquisition methods of communication system performance and indicators; be able to perform basic testing and debugging of communication systems; and be able to analyze and design feasible experimental solutions considering the characteristics of electronics components, modules, systems, etc., based on the scientific principles and methods, as well as literature research.

4-2 The graduate should master the general structural composition, performance indicators and technical parameters of the communication systems; be able to build experimental systems in accordance with the experimental schemes, carry out experiments reasonably and safely, and correctly observe and collect the experimental data.

4-3 The graduate should be able to interpret and analyze the experimental data with reference to theoretical models;

comprehensively analyze the data using analytical tools or charts; and obtain scientific and reasonable conclusions.

5. Using modern tools: the graduate should be able to develop, select and use the appropriate technologies, resources, modern engineering tools and information technology tools for the complex engineering problems in communication engineering, including the predictions and simulations of complex engineering problems in communication engineering; and understand the limitations of the modern tools.

5-1 The graduate should be able to use computers, network and other information technology; master the use of common electronic equipment, EDA simulation tools, and other software and hardware developing tools; and understand the limitations.

5-2 The graduate should be able to develop or select the modern tools that meet the specific needs, according to the specific complex engineering problems in communication engineering; simulate and predict complex engineering problems; and understand the limitations of related modern tools in the simulation and prediction of complex engineering problems in practice.

6. Engineering and society: the graduate should be able to evaluate the design, construction and operation of communication engineering projects, as well as solutions to complex engineering problems, including their influence to society, health, safety, law and culture, based on relevant background knowledge and standards in communication engineering; ad understand the consequences and responsibilities that may result from the implementation of the projects/solutions.

6-1 The graduate should know the historical and cultural background, technical standard system, intellectual property rights, industrial policies and laws and regulations related to communication engineering; and understand correctly the interaction between communication engineering and the objective world.

6-2 The graduate should be able to objectively evaluate the impact of complex problem solutions on society, health, safety, law and culture, as well as the influence of these constraints on the project implementation; and understand the responsibilities that should be assumed.

7. Environment and sustainable development: the graduate should be able to understand and evaluate the influence of the engineering practices on complex engineering problems in communication engineering to environmental and social sustainability.

7-1 The graduate should establish the scientific concept of development and understand the concept and connotation of environmental protection and sustainable development.

7-2 The graduate should understand and reasonably evaluate the negative impact of engineering practices on complex engineering problems in communication engineering on environmental and social sustainable development.

8. Professional norms: the graduate should understand China's national conditions; be equipped with humanities and social science literacy, and a sense of social responsibility; understand and abide by the engineering professional ethics and behavior norms in communication engineering practice; and fulfill one's responsibility, contribute to the country and serve the society.

8-1 The graduate should have a correct outlook on the world, life and values; have humanities and social science literacy including literature, art, economics, etc.; understand China's sustainable development and related social responsibility of individuals; and be clarified about the responsibility and mission of individuals as socialist builders and successors.

8-2 The graduate should understand the professional nature and responsibility of engineers; have a legal awareness; understand the social responsibility of engineers to the safety, health and well-being of the public; and be able to consciously fulfill his/her responsibility during engineering practice.

9. Individual and team: the graduate should be able to take the role of an individual, a team member, or a team leader in a multidisciplinary team, when solving complex engineering problems in communication engineering.

9-1 The graduate should understand the multidisciplinary technical background and characteristics of complex engineering problems in communication engineering; adapt to the multidisciplinary nature of complex engineering problems in communication engineering and have a sense of cooperation; be able to communicate effectively with other team members, carry out division of labor and cooperate, take the responsibility defined by one's role, and complete tasks individually or cooperatively.

9-2 The graduate should be equipped with organizational management capabilities; be able to formulate work plans, assign tasks to team members according to their abilities and strengths, integrate TEM members' opinions, make reasonable decisions, coordinate progress, and complete tasks.

10. Communication: the graduate should be able to communicate effective with industry peers and the public on complex engineering problems in communication engineering, by means of writing reports and planning portfolios, presenting statement, expressing or responding to instructions; have an international vision and can communication in a cross-cultural context.

10-1 The graduate should be able to clearly express relevant issues in communication engineering by writing reports, planning portfolios and presenting statements; and realize effective responding to and communication with target groups of different professional knowledge levels.

10-2 The graduate should have an international vision; have the basic ability of listening, speaking, reading and writing in English; understand the international development of communication engineering; be able to read relevant domes and foreign scientific and technological literature; and communicate effectively in a cross-cultural context.

11. Project management: the graduate should be able to understand, master and apply engineering mana principles and economic decision-making methods related to communication engineering in a multidisciplinary environment.

11-1 The graduate should understand the cycle and process of production practice in the field of communication engineering, understand and master the engineering management principles and economic decision-making methods related to communication engineering.

11-2 The graduate should be able to apply management and economic decision-making knowledge in a multidisciplinary environment (including simulation environment), in the process of designing and developing the solutions to complex engineering problems; and be equipped with organizational, management and leadership skills.

12. Lifelong learning: The graduate should have the awareness of independent learning and lifelong learning; and improve one's capability of self-learning and adapt to the new development of communication engineering.

12-1 The graduate should understand the rapid technology development and multidisciplinary nature of communication engineering in the context of social development; and understand the necessity of self-exploration and lifelong learning.

12-2 The graduate should have the ability of independent learning, including the ability to understand technical issues in communication engineering, as well as summarize and question; and adapt to the evolution of society and industry.

附：培养目标实现矩阵

The Matrix for Educational Objectives

	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					√

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：

信号与系统、电路分析基础、数字电子技术基础、模拟电子技术基础、单片计算机原理与通信接口、通信原理、数字信号处理、信息理论与编码、高频电子线路。

Core Courses: Signal and System, Fundamentals of Circuit Analysis, Fundamentals of Digital Electronic Circuit, Fundamentals of Analog Electronic Circuit, Principle of Single Chip Computer and Communication Interface, Principle of Communication, Digital Signal Processing, Information Theory and Coding, High-Frequency Electronic Circuit.

（二）专业特色课程：

信号与系统、高频电子线路、通信原理、电磁场与电磁波、移动通信、光纤通信、现代交换技术、信息理论与编码、计算机网络与通信。

Characteristic Courses: Signal and System, High-frequency Electronic Circuit, Communication Principles, Electromagnet Field and Electromagnetic Wave, Mobile Communication, Optic Fiber Communication, Modern Switching Technology, Information Theory and Coding, Computer Network and Communication.

附：毕业要求实现矩阵：

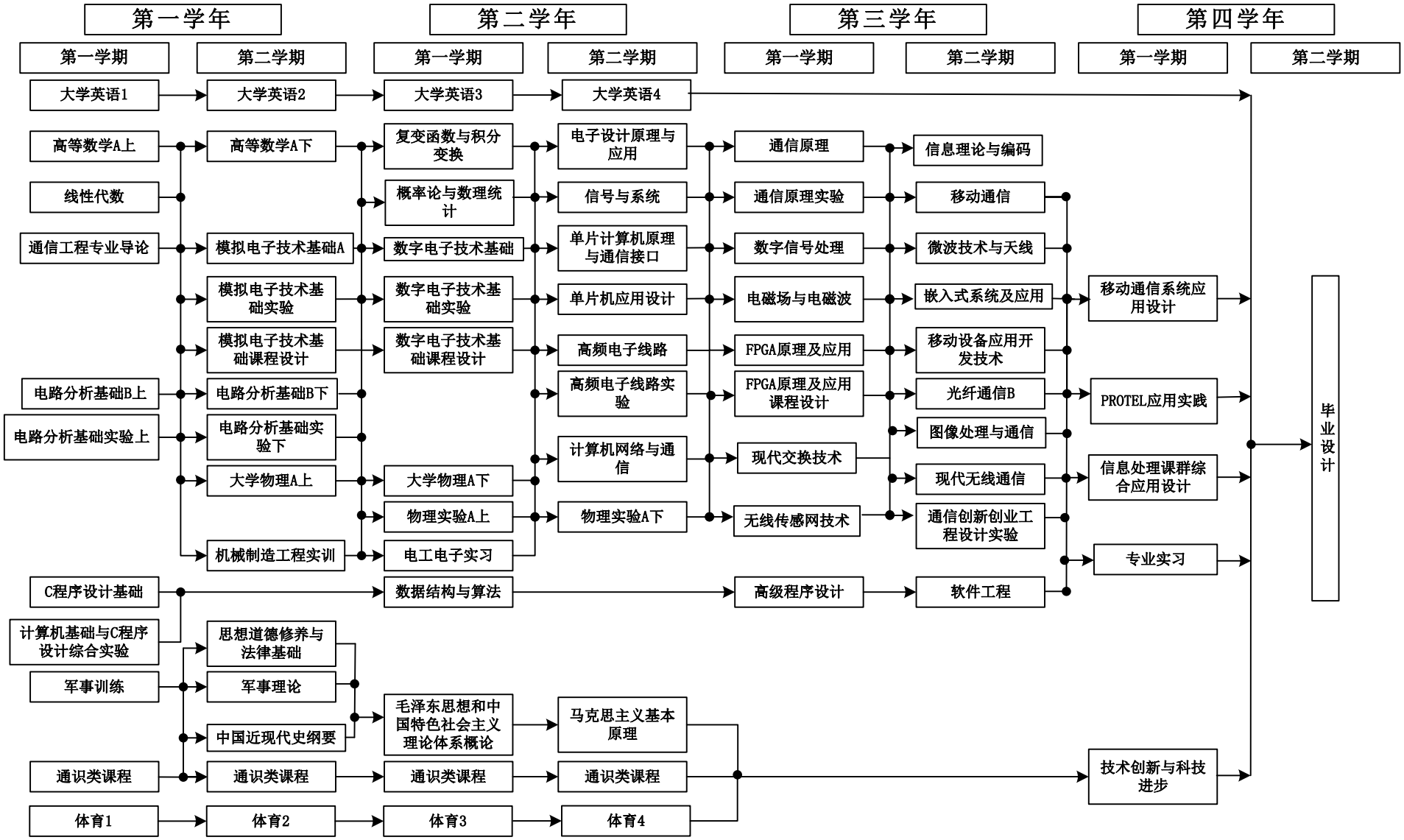
专业核心课程	专业特色课程	课程名称	通信工程专业毕业要求											
			1	2	3	4	5	6	7	8	9	10	11	12
		思想道德修养与法律基础						√	√	√				
		中国近现代史纲要								√				√
		毛泽东思想和中国特色社会主义理论体系概论							√	√				√
		马克思主义基本原理								√				√
		军事理论								√	√			
		体育									√			
		大学英语										√		

专业核心课程	专业特色课程	课程名称	通信工程专业毕业要求											
			1	2	3	4	5	6	7	8	9	10	11	12
		C 程序设计基础					√							
		计算机基础与 C 程序设计综合实验					√							
		专业导论						√	√			√		√
		高等数学	√											
		线性代数	√											
		复变函数与积分变换	√											
		概率论与数理统计	√											
		大学物理	√											
		物理实验				√								
√		电路分析基础	√	√			√							
		电路分析基础实验		√		√	√							
√		模拟电子技术基础	√	√	√									
		模拟电子技术基础实验				√						√		
√		数字电子技术基础	√	√	√									
		数字电子技术基础实验				√						√		
√	√	信号与系统	√	√		√								
√	√	高频电子线路	√	√										
√		单片计算机原理与通信接口			√	√	√							
	√	电磁场与电磁波	√	√			√							
√	√	通信原理	√	√		√		√						
√		数字信号处理	√	√		√								
√	√	信息理论与编码	√	√	√									
		通信创新创业工程设计实验			√	√		√			√		√	
		数据结构与算法	√	√	√									
		高频电子线路实验	√			√	√							
		通信原理实验	√			√	√							
	√	现代交换技术	√		√	√		√						√

专业核心课程	专业特色课程	课程名称	通信工程专业毕业要求											
			1	2	3	4	5	6	7	8	9	10	11	12
		嵌入式系统及其应用	√	√	√									
	√	光纤通信	√	√		√								
	√	移动通信	√	√		√								
	√	计算机网络与通信	√		√									
		高级程序设计	√	√	√									
		FPGA 原理及应用	√	√	√									
		微波技术与天线	√	√			√							
		软件工程			√						√	√		
		图像处理与通信		√	√					√				√
		现代无线通信		√			√			√				
		电子设计原理与应用	√	√	√		√							
		军事训练									√			
		机械制造工程实训			√			√		√				
		电工电子实习		√	√					√	√			
		模拟电子技术基础课程设计	√		√		√					√		
		数字电子技术基础课程设计	√		√		√					√		
		移动通信系统应用设计		√	√	√	√					√		
		PROTEL 应用实践		√	√		√					√		
		FPGA 原理与应用课程设计		√	√		√					√		
		信息处理课群综合应用设计		√	√	√	√					√		
		单片机应用设计	√		√		√					√		
		专业实习			√	√		√	√	√	√	√	√	
		毕业设计		√	√	√	√					√		

三、课程教学进程图

III Teaching Process Map


第一学年
第二学年
第三学年
第四学年
第一学期
第二学期
第一学期
第二学期
第一学期
第二学期
第一学期
第二学期
大学英语1
大学英语2
大学英语3
大学英语4
高等数学A上
高等数学A下
复变函数与积分变换
电子设计原理与应用
通信原理
信息理论与编码
线性代数
概率论与数理统计
信号与系统
通信原理实验
移动通信
通信工程专业导论
模拟电子技术基础A
数字电子技术基础
单片计算机原理与通信接口
数字信号处理
微波技术与天线
模拟电子技术基础实验
数字电子技术基础实验
单片机应用设计
电磁场与电磁波
嵌入式系统及应用
移动通信系统应用设计
模拟电子技术基础课程设计
数字电子技术基础课程设计
高频电子线路
FPGA原理及应用
移动设备应用开发技术
电路分析基础B上
电路分析基础B下
高频电子线路实验
FPGA原理及应用课程设计
光纤通信B
PROTEL应用实践
电路分析基础实验上
电路分析基础实验下
图像处理与通信
计算机网络与通信
现代交换技术
现代无线通信
信息处理课群综合应用设计
大学物理A上
大学物理A下
物理实验A上
物理实验A下
无线传感网技术
通信创新创业工程设计实验
专业实习
机械制造工程实训
电工电子实习
毕业设计
C程序设计基础
数据结构与算法
高级程序设计
软件工程
计算机基础与C程序设计综合实验
思想道德修养与法律基础
军事训练
军事理论
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
中国近现代史纲要
通识类课程
通识类课程
通识类课程
通识类课程
技术创新与科技进步
体育1
体育2
体育3
体育4

四、 理论教学建议进程表

IV Theory Course Schedule

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

课程编号 Course Number	课 程 名 称 Course Title	学分 Crs	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course
			总学时 Tot hrs.	实验 Exp.	上机 Ope-ration	实践 Prac-tice	课外 Extra-cur		
（二）通识教育选修课程 General Education Elective Courses									
创新创业类 Innovation and Entrepreneurship Courses 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	要求至少取得 9 个学分，且必须选修艺术体育类课程中的艺术类相关课程并取得至少 2 个学分，在创新创业类课程中至少选修一门课程，在人文社科类或经济管理类课程中至少选修一门。 Students are required to obtain at least 9 credits，which must contain art courses of 2 credits from the category of Art and Physical Education Courses, at least one course from the category of Innovation and Entrepreneurship Courses, and at least one course from the category of Arts and Social Science Courses or the category of Economy and Management Courses.								
（三）专业教育必修课程 Basic Disciplinary Required Courses									
4110306170	通信工程专业导论 Introduction to Specialty	1	16					1	
4050229110	线性代数 Linear Algebra	2.5	40					1	
4050063110	高等数学 A 上 Advanced Mathematics I	5	80					1	
4050064110	高等数学 A 下 Advanced Mathematics II	5	80					2	
4110309170	电路分析基础 B 上 Fundamentals of Circuit Analysis I	2	32					1	高等数学下
4110017110	电路分析基础 B 下 Fundamentals of Circuit Analysis II	3	48					2	电路分析基础上
4100028110	电路分析基础实验上 Experiments of Circuit Analysis I	0.5	16	16				1	电路分析基础上
4100029110	电路分析基础实验下 Experiments of Circuit Analysis II	0.5	16	16				2	电路分析基础下
4110048110	模拟电子技术基础 A Fundamentals of Analog Electronic Circuit	4	64					2	电路分析基础
4110051110	模拟电子技术基础实验 Experiments of Analog Electronics Circuit	0.5	16	16				2	
4050021110	大学物理 A 上 Physics I	3.5	56					2	
4050022110	大学物理 A 下 Physics II	3.5	56					3	
4050466130	物理实验 A 上 Physics Lab. I	1	32	32				3	

课程编号 Course Number	课 程 名 称 Course Title	学分 Crs	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course
			总学时 Tot hrs.	实验 Exp.	上机 Ope-ration	实践 Prac-tice	课外 Extra-cur		
4050467130	物理实验 A 下 Physics Lab. II	1	32	32				4	
4050469130	复变函数与积分变换 D Complex Function and Integral Transform	2.5	40					3	
4050058110	概率论与数理统计 B Probability and Mathematical Statistics	3	48					3	
4110066110	数字电子技术基础 C Fundamentals of Digital Electronic Circuit	4	64					3	模拟电子技术基础
4110068110	数字电子技术基础实验 Experiments of Digital Electronics Circuit	0.5	16	16				3	
4110093110	信号与系统 A Signal and System	4	64	8				4	复变函数与积分变换
4110310170	高频电子线路 D High-Frequency Electronic Circuit	3	48					4	
4110378170	高频电子线路实验 Experiments of High-Frequency Electronic Circuit	0.5	16	16				4	
4110345170	单片计算机原理与通信接口 B Principle of Single Chip Computer and Communication Interface	3	48	8				4	
4110011110	电磁场与电磁波 A Electromagnetic Field and Electromagnetic Wave	3	48					5	
4110314170	通信原理 D Principle of Communication	3	48					5	
4110379170	通信原理实验 Experiments of Principle of Communication	0.5	16	16				5	
4110313170	数字信号处理 B Digital Signal Processing	3.5	56	8				5	
4110315170	信息理论与编码 C Information Theory and Coding	2.5	40	8				6	
4110346170	通信创新创业工程设计实验 Experiment of Innovative and Entrepreneurial Communication Engineering Design	2	64	64				6	
小 计 Subtotal		68	1200	256	0	0	0		
（四）专业教育选修课程 Specialized Elective Courses									
4110270140	数据结构与算法 F Data Structure and Algorithm	2.5	40		8			3	

课程编号 Course Number	课 程 名 称 Course Title	学分 Crs	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course
			总学时 Tot hrs.	实验 Exp.	上机 Ope-ration	实践 Prac-tice	课外 Extra-cur		
4110218130	电子设计原理与应用 Principle and Application of Electronic Design	2	32					4	
4110170120	计算机网络与通信 D Computer Network and Communication	2.5	40	8				4	
4110304150	高级程序设计 A Advanced Programming	3	48	8				5	
4110089110	现代交换技术 A Modern Switching Technology	2.5	40	12				5	
4110348170	FPGA 原理及应用 B Principle and Application of FPGA	3	48	32				5	
4110347170	微波技术与天线 A Microwave Technology and Antenna Theory	3	48	8				6	
4110224130	软件工程 D Software Engineering	2	32					6	
4110223130	嵌入式系统及其应用 B Embedded System and Application	3	48	8				6	
4110036110	光纤通信 B Optical Fiber Communication	2.5	40	12				6	
4110098110	移动通信 A Mobile Communication	2.5	40	8				6	
4110349170	图像处理与通信 B Image Processing and Communication	2.5	40	8				6	
4110385170	现代无线通信 Modern Wireless Communication	2.5	40					6	
小 计 Subtotal		33.5	536	104	8	0	0		
修读说明：要求至少选修 20 学分。 NOTE：Minimum subtotal credits:20.									
（五）个性课程 Personalized Elective Courses									
4110350170	移动设备应用开发技术 B Mobile Device Application Development Technology	2.5	40	8				6	
4110185120	无线传感网技术 Wireless Sensing Network Technology	2.5	40	8				5	
4110268140	技术创新与科技进步 Technology Innovation and Scientific and Technological Progress	1	16					7	
小 计 Subtotal		6	96	16	0	0	0		
修读说明：学生从以上个性课程和学校发布的其它个性课程目录中选课，要求至少选修 6 学分。 NOTE: Sudents can select courses from above and the other personalized courses in catalog, and are required to obtain at least 6 credits.									

五、 集中性实践教学环节
V Practice Schedule

课程编号 Course Number	实践环节名称 Practice Courses Name	学分 Crs	周数 Weeks	建议修读学期 Suggested Term
1060002110	军事训练 Military Training	1.5	3	1
4080152110	机械制造工程实训 D Training on Mechanical Manufacturing Engineering	1	1	2
4100068110	电工电子实习 A Practice in Electrical Engineering and Electronics	2	2	3
4110128110	模拟电子技术基础课程设计 Course Design on Fundamentals of Analog Electronics Circuit	1	1	2
4110129110	数字电子技术基础课程设计 Course Design on Fundamentals of Digital Electronic Circuit	1	1	3
4110214130	单片机应用设计 Application Practice on Single Chip Computer	2	2	4
4110353170	FPGA 原理与应用课程设计 Course Design on FPGA Principle and Application	2	2	5
4110351170	PROTEL 应用实践 B Courses Design on PROTEL Application	1	1	7
4110236130	信息处理课群综合应用设计 Comprehensive Training and Design on Signal Processing	2	2	7
4110352170	移动通信系统应用设计 Application Design on Mobile Communication Systems	2	2	7
4110152110	专业实习 Specialty Practice	3	3	7
4110354170	毕业设计 Graduation Design	9.5	17	8
小　　计　Subtotal		28	37	

六、其它要求
VI Recommendations on Course Studies

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

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

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

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

学院教学责任人：艾青松

专业培养方案责任人：王原丽