电子类 2021 版本科培养方案
Undergraduate Education Plan for Specialty in Electronics (2021)

大类名称 **电子类** 大类培养年限 **1 年**

Disciplinary **Electronics** Duration **1 Year**

（一）公共基础必修课程

1 Public Basic Compulsory Courses

开课单位 Course college	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.	理论 Theory	实验 Exp.	上机 Ope-ration	实践 Prac-tice	课外 Extra-cur		
马克思主义学院	4220002180	中国近现代史纲要 Outline of Contemporary and Modern Chinese History	2.5	42	42					1	
马克思主义学院	4220001210	思想道德与法治 Morality and the rule of law	2.5	42	42					2	
学工部	1050001210	军事技能训练 Military Training	2	136				136		1	
学工部	1050002210	军事理论 Military Theory	2	32	32					2	
外语学院	4030002180	大学英语1 College English I	2	48	32				16	1	
外语学院	4030003180	大学英语2 College English Ⅱ	2	48	32				16	2	大学英语1
体育部	4210001170	体育1 Physical Education Ⅰ	1	32	32					1	
体育部	4210002170	体育2 Physical Education Ⅱ	1	32	32					2	
计算机智能学院	4120001210	C程序设计基础A Fundamentals of Computer Program Design(C) A	2	32	32					1	
计算机智能学院	4120005210	计算机基础与C程序设计综合实验A Computer Foundation and C Programming Comprehensive Experiment A	1	32		32				1	
小 计 Subtotal			31	476	276	32	0	136	32		

（二）通识教育选修课程

2 General Education Elective Courses

核心选修 Core elective courses	文明与传统类Civilization and Tradition Courses	通识课程应修满至少9学分。自主选修课程中，至少在艺术与审美、创新与创业两个领域各选修1门课程。 Minimum subtotal credits: 9. Self-selected courses， at least 1 course in art and aesthetics and 1 course in innovation and entrepreneurship.
	社会与发展类Society and Development Courses	
	艺术与人文类Art and Humanities Courses	
	自然与方法类Nature and methods Courses	
自主选修 Self-selected courses	数学与自然科学、哲学与心理学、法学与社会科学、经济与管理、历史与文化、语言与文学、艺术与审美、创新与创业 Mathematics and Natural Sciences, Philosophy and Psychology, Law and Social Science, Economics and Management, History and Culture, Language and Literature, Art and Aesthetics, Innovation and Entrepreneurship	

（三）大类必修课程

3 Basic Discipline Required Courses

开课单位 Course college	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.	理论 Theory	实验 Exp.	上机 Ope-ration	实践 Prac-tice	课外 Extra-cur		
理学院	4050001210	高等数学A上 Advanced Mathematics Ⅰ	4.5	72	72					1	
理学院	4050229110	线性代数 Linear Algebra	2.5	40	40					1	
信息学院	4110144110	专业导论 Introduction to Speciality	1	16	16					1	
理学院	4050002210	高等数学A下 Advanced Mathematics Ⅱ	5.5	88	88					2	
理学院	4050021110	大学物理A上 College Physics Ⅰ	3.5	56	56					2	
信息学院	4100001210	电路原理B上 Circuit Principle B	2	32	32					2	高等数学A下
信息学院	4100002210	电路原理B实验上 Electric Circuits B Exp Ⅰ	0.5	16		16				2	电路原理B上
小 计 Subtotal			19.5	320	304	16	0	0	0		

电子信息工程专业 2021 版本科培养方案
Undergraduate Education Plan for Specialty in Electronic Information Technology （2021）

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	**电子类**	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 Course Classification / 课程性质 Course Nature	公共基础课程 Public Basic Courses	通识教育课程 Public Courses	大类课程 Basic Courses in General Discipline	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	31	\	42.5	26	\	20	10	180
选修课 Elective Courses	\	9	\	25.5	6	\	10	

一、培养目标与毕业要求

I. Educational Objectives &Requirement

（一） 培养目标

Educational Objectives

“培养适应社会与经济发展需要，具有道德文化素养、社会责任感、创新精神和创业意识，掌握必备的数学、自然科学基础知识和相应专业知识，具备良好的学习能力、实践能力、专业能力和一定的创新创业能力，身心健康，可从事电子信息及相关领域中系统、设备和器件的研究、设计、开发、制造、应用、维护、管理等工作的高素质专门人才。”

The major trains students to meet the needs of social and economic development with moral and cultural literacy, social responsibility, innovative spirit, and entrepreneurial awareness. Students should master the necessary basic knowledge of mathematics and natural science and corresponding professional knowledge and have good learning ability, practical ability, professional ability, and innovation and entrepreneurship abilities. In addition, students also need to become high-quality professionals who are physically and mentally healthy and can engage in research, design, development, manufacture, application, maintenance, and management of systems, equipment, and devices in electronic information and related fields.

本专业培养目标要求学生在毕业五年后应达到以下目标：

（1） 身心健康，具备良好的敬业精神、社会责任感和工程职业道德，关注当代全球和社会问题，具有质量意识、环境意识和安全意识。

Graduates should be physical and mental health, have good professional dedication and sense of social responsibility and engineering ethics, focus on the contemporary global and social issues, quality consciousness, environmental awareness and safety awareness.

（2） 具有从事电子信息工程领域科学研究、工程设计和技术服务等工作所需的数理知识和其它相关自然科学知识，并能将数学和科学工具运用于解决研究、设计及管理问题。

Graduates should be engaged in scientific research, engineering design of electronic information engineering and technical services and other related mathematical knowledge needed for the work and other natural science knowledge, and be able to apply mathematical and scientific tools to solve research，design, and management problems.

（3） 具有综合运用科学理论和工程技术分析、设计、开发、测试和应用电子系统、信息处理系统和通信系统的能力。

Graduates should have a comprehensive analysis on the basis of the theory of science and engineering, design, development, test and application of electronic systems, the ability of information processing system and communication system.

（4） 能够主动了解并结合社会需求和企业需求，克服技术与管理实践中面临的问题，能够持续性强化自身技术水平与管理能力。

Graduates should be able to actively understand social and enterprise needs, addressing challenges faced in technology and management practices, and continuously strengthening their own technical skills and management capabilities.

（5） 良好的口头和书面表达和交流沟通能力、良好的团队意识和合作精神，具有科学创新精神和终身学习的能力。

Graduates should have good oral, writing, and communication abilities. In addition, they should have team consciousness, cooperation spirits, scientific innovation, and the ability of lifelong learning.

（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，能将其用于电子信息工程相关问题的描述、建模和求解；

1.2 掌握从事电子信息行业工作所需的专业基础知识，能用于电子信息工程问题的建模、推理和分析、计算；

1.3 掌握从事电子信息行业工作所需的分析、设计和应用等专业知识，能用于解决电子信息工程领域的复杂工程问题。

（2） 问题分析：能够应用数学、自然科学和工程科学的基本原理，识别、表达、并通过文献研究分析电子信息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、识别电子信息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电子信息工程复杂工程问题进行合理的表达与处理；

2.3 能够通过查阅文献辅助分析电子信息工程领域的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 能够运用电子信息工程专业所讲授的工程设计方法和特定系统设计方法，设计电子信息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 能够针对电子信息工程领域的复杂工程问题，选用恰当的技术手段和现代工程工具进行建模、预测与仿真，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，并能正确认识电子信息工程和客观世界的相互作用关系；

6.2 能够客观评价电子信息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：了解与本专业相关的规范、环境与可持续发展政策、法律和法规，能够理解和评价针对电子信息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 理解环境保护和可持续发展的理念与内涵，并能理解电子信息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；

7.2 能够树立绿色制造的理念，并理解用技术手段降低电子信息工程生产实践负面影响的作用与其局限性。

（8） 职业规范：了解中国国情、具有人文社会科学素养、社会责任感和良好的心理素质，能够在电子信息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：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 能够理解电子信息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：能够就电子信息工程相关领域的基本科学问题和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电子信息工程领域相关问题，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，了解电子信息工程领域的国际发展动态，能够阅读相关国内外科技文献，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：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 能够理解并掌握与电子信息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：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 理解电子信息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: Ability to master mathematics, natural sciences, engineering foundations, and expertise required for electronic information engineering and to use the knowledge and skills learned to solve complex engineering problems in electronic information engineering.

1.1 Graduates should master the knowledge of mathematics and natural science, such as advanced mathematics, engineering mathematics, and physics, and use it to describe, model, and solve problems related to electronic information engineering.

1.2 Graduates should master the basic professional knowledge required to work in electronic information industry, which can be used for modeling and reasoning, as well as analysis and calculation of electronic information engineering problems.

1.3 Graduates should master the profession knowledge in analysis, design and application, which are required by the electronic information industry; be able to compare and integrate solutions to the engineering problems in the field of electronic information engineering, and solve complex engineering problems in the field.

(2) Problem analysis: Ability to apply the basic principles of mathematics, natural science and engineering science, identify, express, and analyze complex engineering problems in the field of electronic information engineering through literature research in order to obtain effective conclusions.

2.1 Graduates should be able to analyze and identify the key components and parameters in complex engineering problems in electronic information engineering, by applying the basic principles of mathematics, natural science and engineering science.

2.2 Graduates should be able to rationally express and process complex engineering problems in electronic information engineering by applying the basic principles of mathematics, natural science and engineering science.

2.3 Graduates should be able to find a variety of solutions to complex engineering problems in electronic information engineering through literature research; and analyze the influencing factors of complex engineering problems in electronic information engineering with the assistance of the basic principles and literature research, which eventually leads to valid conclusions.

(3) Design/development of solutions: Be able to design electronic information system solutions that meet actual engineering needs from the perspective of signals and systems, aiming at complex engineering problems in the field of electronic information engineering, considering legal, cultural and environmental factors.

3.1 Graduates can use the engineering and specific system design methods taught by the electronic information engineering to design solutions to complex engineering problems in electronic information engineering, and have a certain sense of innovation.

3.2 Graduates can design circuits, systems or algorithms that satisfy specifical needs in the solution framework from 3.1.

3.3 Graduates can evaluate the effects of solutions in society, health, security, legislation, culture, and environments from a systematic perspective.

(4) Research: Be 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: Be able to use appropriate technologies, resources, professional equipments 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 develop or select modern tools to simulate and predict complex engineering problems and analyze their limitations according to specifical needs.

(6) Engineering and society: Ability to conduct reasonable analysis based on background knowledge related to electronic information engineering, evaluate the social, health, safety, legal and cultural impacts of electronic information engineering practices and solutions to complex engineering problems, and understand responsibilities.

6.1 Graduates should know the historical and cultural background, technical standard system, intellectual property rights, industrial policies and laws and regulations related to electronic information engineering; and understand correctly the interaction between electronic information engineering and the objective world.

6.2 Graduates 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: Ability to understand the norms, environmental and

sustainable development policies, laws and regulations related to this major, and be able to evaluate the impact on environmental and socially sustainable development of engineering practices on solving complex problems in electronic information engineering.

7.1 Graduates should know and understand the concept and connotation of environmental protection and sustainable development; and understand the impact of engineering practices on complex engineering problems in electronic information engineering on environmental and social sustainable development.

7.2 Graduates should have established the concept of green manufacturing and understand the role and limitations of using technical means to reduce the negative impact of produce practices in electronic information engineering.

(8) Professional norms: Understand the national conditions, have humanities and social science literacy, a sense of social responsibility, and good psychological quality, be able to abide by engineering professional ethics and code of conduct in the practice of electronic information engineering, and fulfill responsibility, contribute to the country, and serve the society.

8.1 Graduates 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.

8.3 Graduates 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) Individuals and teams: Ability to assume individual, team member, and responsible roles in teams in a multidisciplinary context related to electronic information engineering.

9.1 Graduates should understand the multidisciplinary technical background and characteristics of complex engineering problems in electronic information engineering; adapt to the multidisciplinary nature of complex engineering problems in electronic information 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 rule, and complete tasks individually or cooperatively.

9.2 Graduates 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 team members' opinions, make reasonable decisions, coordinate progress, and complete tasks.

(10) Communication: Be able to effectively communicate with industry peers and the public on basic scientific issues and complex engineering issues related to electronic information engineering, including writing reports, making presentations, expressing or responding to instructions; with a certain international perspective, able to communicate in cross-cultural contexts.

10.1 Graduates should be able to clearly express relevant issues in electronic information 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 Graduates should have an international vision; have the basic ability of listening, speaking, reading and writing in English; understand the international development of electronic information engineering; be able to read relevant domes and foreign scientific literature; and communicate effectively in a cross-cultural context.

(11) Project management: Understand and master engineering management principles and economic decision-making methods, and can be applied in a multidisciplinary environment related to electronic information.

11.1 Graduates should understand and master the engineering management principles and economic decision-making methods related to electronic information engineering.

11.2 Graduates 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: Ability to recognize the continuous evolution and development of the field of electronic information engineering, the ability to learn independently and through lifelong learning, and the ability to continuously learn and adapt to the development of the field of electronic information.

12.1 Graduates should understand the rapid technology development and multidisciplinary nature of electronic information engineering in the context of social development; and understand the necessity of self-exploration and lifelong learning.

12.2 Graduates should have the ability of independent learning, including the ability to understand technical issues in electronic information 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

	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：

模拟电子技术基础、数字电子技术基础、高频电子线路、单片机及嵌入式系统原理、信号与系统、通信原理、现代检测技术

Fundamentals of Analog Electronic Circuit, Fundamentals of Digital Electronic Circuit, High-frequency Electronic Circuits, Principles of Single-chip and Embedded Systems, Signals and Systems, Communication Principles, Modern Sense Technique

（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、信息安全技术、智能信号处理与应用、工业互联网及其应用、微波信号处理与应用

Principle and Application of DSP, Digital Image Processing, Digital Speech Processing, Data Collection and Intelligent Instrumentation, FPGA Technique Application, Information Security Technology, Intelligent Signal Processing and Application, Industrial Internet and Application, Microwave Signal Processing and Application

附：毕业要求实现矩阵：

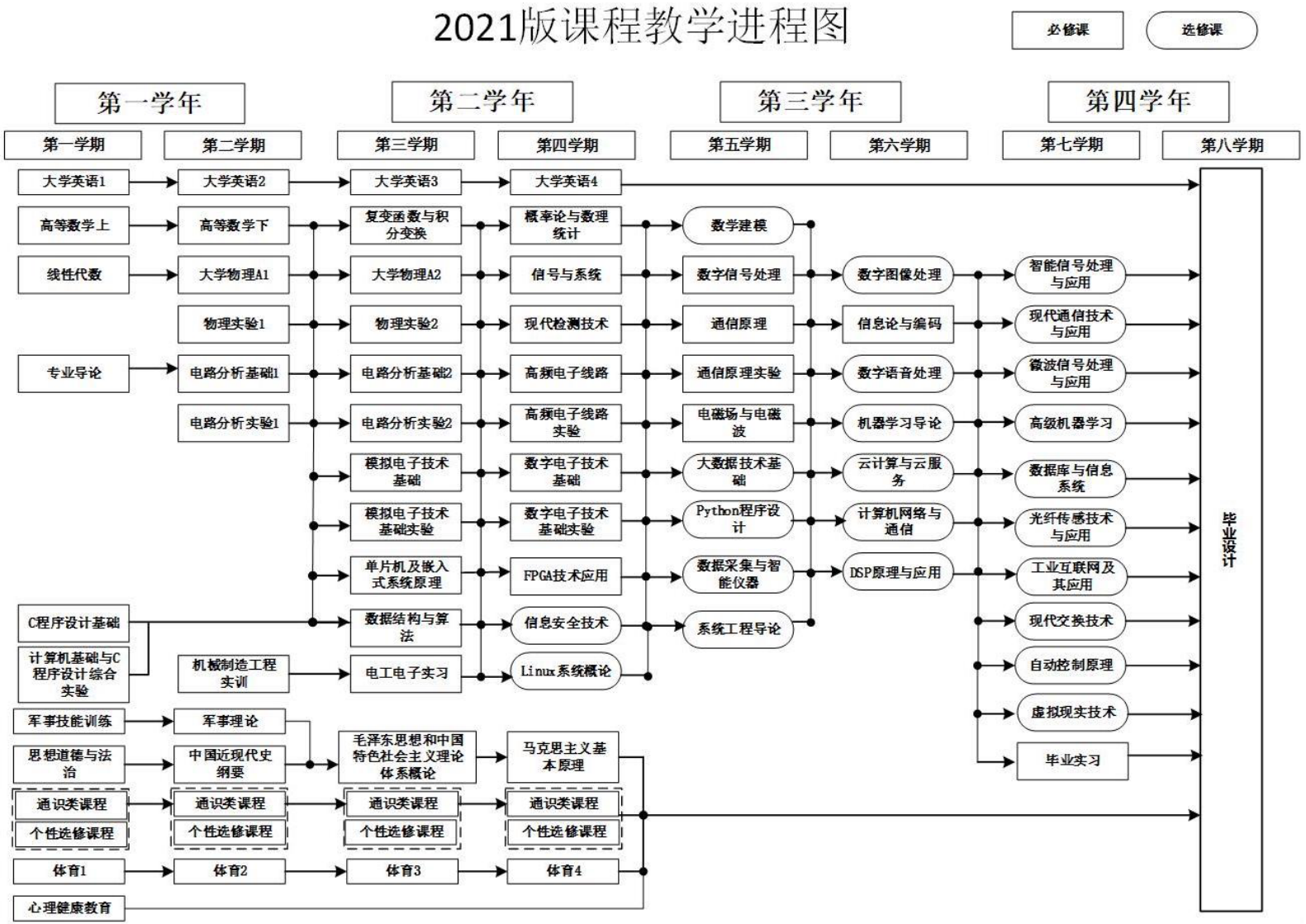
课程名称	2021版电子信息工程专业毕业要求																											
	1			2			3			4			5		6		7		8		9		10		11		12	
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
思想道德与法治																			H									
中国近现代史纲要																			M									
毛泽东思想和中国特色社会主义理论体系概论																	H											
马克思主义基本原理																												M
军事理论																							M					
体育																						L						
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																								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		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					
单片机及嵌入式系统原理							H			M				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															
数字信号处理		M			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																	

	1			2			3			4			5		6		7		8		9		10		11		12	
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
现代检测技术				M									H			H												
信息理论与编码			H			M		M																				
系统工程导论									H													H						
FPGA 技术应用A			L		H			M																				
Linux系统概论						H	M								M											L		
数据采集与智能仪器								M			M			M				L										
信息安全技术				H																M								
计算机网络与通信						M	H												L									
大数据技术基础			H					M			H																L	
云计算与云服务												L						M							M			
机器学习导论					M							H																
数字图像处理						M		M									M								L			
数字语音处理					M							H		M														
DSP 原理及应用								M				M			L			L										
Python 程序设计		M					M					M		L														
现代通信技术与应用		H						M																			M	
高级机器学习					M							H																
智能信号处理与应用		H						M					M					L										
数据库与信息系统					L		M																					
光纤传感技术与应用			H		L							L																
工业互联网及其应用					L					M													M				L	
微波信号处理与应用		M			M									H													L	
自动控制原理						M								L			M											
现代交换技术			M			M																						
虚拟现实技术					L													L		M								
军事技能训练																					M							
机械制造工程实训																		M										
电工电子实习															H													
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		
单片机及嵌入式系统原理课程设计							M				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

	1			2			3			4			5		6		7		8		9		10		11		12	
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
专业综合实践								H		H																		
毕业实习																				H	H		H			H		
毕业设计									H															H	H			H

三、课程教学进程图

III. Teaching Process Map



四、教学建议进程表
Ⅳ Course Schedule

（一）公共基础必修课程
1 Public Basic Compulsory Courses

开课单位 Course college	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.	理论 Theory	实验 Exp.	上机 Ope-ration	实践 Prac-tice	课外 Extra-cur		
马克思主义学院	4220001210	思想道德与法治 Morality and the rule of law	2.5	42	42					2	
马克思主义学院	4220002180	中国近现代史纲要 Outline of Contemporary and Modern Chinese History	2.5	42	42					1	
马克思主义学院	4220003180	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	4.5	66	66					4	
马克思主义学院	4220005180	马克思主义基本原理 Marxism Philosophy	2.5	42	42					3	
学工部	1050001210	军事技能训练 Military Training	2	136				136		1	
学工部	1050002210	军事理论 Military Theory	2	32	32					2	
体育部	4210001170	体育 1 Physical Education Ⅰ	1	32	32					1	
体育部	4210002170	体育 2 Physical Education Ⅱ	1	32	32					2	
体育部	4210003170	体育 3 Physical Education Ⅲ	1	32	32					3	
体育部	4210004170	体育 4 Physical Education Ⅳ	1	32	32					4	
外语学院	4030001210	大学英语 1 College English Ⅰ	2	48	32				16	1	
外语学院	4030002210	大学英语 2 College English Ⅱ	2	48	32				16	2	大学英语 1
外语学院	4030003210	大学英语 3 College English Ⅲ	2	48	32				16	3	大学英语2
外语学院	4030004210	大学英语 4 College English IV	2	48	32				16	4	大学英语 3
计算机智能学院	4120001210	C程序设计基础A Foundation of C Programming A	2	32	32					1	
计算机智能学院	4120005210	计算机基础与C程序设计综合实验A Computer Foundation and C ProgrammingComprehensive Experiment A	1	32		32				1	
小 计 Subtotal			31	744	512	32	0	136	64		

（二）通识教育选修课程
2 General Education Elective Courses

核心选修 Core elective courses	文明与传统类Civilization and Tradition Courses 社会与发展类Society and Development Courses 艺术与人文类Art and Humanities Courses 自然与方法类Nature and methods Courses	通识课程应修满至少9学分。核心选修不少于2学分；自主选修课程中，至少在艺术与审美、创新与创业两个领域各选修1门课程。 Minimum subtotal credits: 9. Core elective courses ≥2 credits. Self-selected courses， at least 1 course in art and aesthetics and 1 course in innovation and entrepreneurship.
自主选修 Self-selected courses	数学与自然科学、哲学与心理学、法学与社会科学、经济与管理、历史与文化、语言与文学、艺术与审美、创新与创业 Mathematics and Natural Sciences, Philosophy and Psychology, Science and Social Sciences, Economics and Management, History and Culture, Language and Literature, Art and Aesthetics, Innovation and Entrepreneurship	

开课单位 Course college	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.	理论 Theory	实验 Exp.	上机 Ope-ration	实践 Prac-tice	课外 Extra-cur		
（三）大类必修课程 3 Basic Discipline Required Courses											
理学院	4050229110	线性代数 Linear Algebra	2.5	40	40					1	
理学院	4050001210	高等数学A 上 Advanced Mathematics A Ⅰ	4.5	72	72					1	
理学院	4050002210	高等数学A 下 Advanced Mathematics AⅡ	5.5	88	88					2	
信息学院	4110144110	专业导论 Introduction to Speciality	1	16	16					1	
自动化学院	4100001210	电路原理B上 Circuit Principle B	2	32	32					2	高等数学上
自动化学院	4100002210	电路原理B实验上 Electric Circuits B Exp Ⅰ	0.5	16		16				2	电路原理B上
自动化学院	4100007210	电路原理B下 Circuit Principle B	3	48	48					3	电路原理B上
自动化学院	4100006210	电路原理B实验下 Electric Circuits B Exp Ⅱ	0.5	16		16				3	电路原理B下
理学院	4050021110	大学物理A 上 Physics Ⅰ	3.5	56	56					2	
理学院	4050466130	物理实验A 上 Physics Lab. Ⅰ	1	32	32					3	
理学院	4050022110	大学物理A 下 Physics Ⅱ	3.5	56	56					3	
理学院	4050467130	物理实验A 下 Physics Lab. Ⅱ	1	32	32					4	
理学院	4050052110	复变函数与积分变换 Functions of a Complex Variable and Integral Transforms	3	48	48					3	
信息学院	4110051110	模拟电子技术基础 A Fundamentals of Analog Electronic Circuit	4	64	64					3	电路原理B上
信息学院	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
理学院	4050058110	概率论与数理统计B Probability and Mathematical Statistics	3	48	48					4	
信息学院	4110001210	数字电子技术基础 A Fundamentals of Digital Electronic Circuit	4	64	64					4	模拟电子技术基础
信息学院	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
小 计 Subtotal			43.5	760	696	64	0	0	0		
（四）专业必修课程 4 Specialized Required Courses											
信息学院	4110022210	单片机及嵌入式系统原理 Principle of Singlechip and Embedded System	3	48	48					3	

开课单位 Course college	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.	理论 Theory	实验 Exp.	上机 Ope-ration	实践 Prac-tice	课外 Extra-cur		
信息学院	4110093110	信号与系统A Signal and System	4	64	56	8				4	复变函数与积分变换
信息学院	4110310170	高频电子线路 High-frequency Electronic Circuits	3	48	48					4	模拟电子技术基础
信息学院	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
信息学院	4110313170	数字信号处理B Digital Signal Processing	3.5	56	48	8				5	信号与系统
信息学院	4110314170	通信原理D Communication Principles	3	48	48					5	信号与系统
信息学院	4110379170	通信原理实验 Experiments of Communication Principles	0.5	16		16				5	通信原理
信息学院	4110315170	信息理论与编码C Information Theory and Coding	2.5	40	40					6	概率与数理统计
信息学院	4110244130	电磁场与电磁波C Electromagnetic Fields and Electromagnetic Wave	2.5	40	40					5	电路分析基础下
信息学院	4110088110	现代检测技术B Modern Sense Technique	2.5	40	32	8				4	模拟电子技术基础实
小 计 Subtotal			25	416	360	56	0	0	0		
（五）专业选修课程 5 Specialized Elective Courses											
信息学院	4110270140	数据结构与算法F Data Structure and Algorithm	2.5	40	32	8				3	C 程序设计基础
信息学院	4110316170	FPGA技术应用A FPGA Technique Application	3	48	16	32				4	数字电子技术基础
计算机智能学院	4120092210	Linux系统概论 Introduction to Linux System	2.5	40	32	8				4	
信息学院	4110095110	信息安全技术 Information Security Technology	2	32	32					4	C 程序设计基础
信息学院	4110319170	Python 程序设计 Python Programming	2	32	24	8				5	C程序设计基础
信息学院	4110493190	大数据技术基础 Introduction to Big Data	2	32	24	8				5	
信息学院	4110060110	数据采集与智能仪器A Data Collection and Intelligent Instrumentation	2	32	24	8				5	单片机及嵌入式系统原理
理学院	4050047210	数学建模 Mathematical Modeling	2	32	32					5	
信息学院		系统工程导论 Introduction to System Engineering	2	32	32					5	
信息学院	4110043110	计算机网络与通信B Computer Networks and Communication	2	32	24	8				6	通信原理
信息学院	4110318170	数字图像处理E Digital Image Processing	2	32	24	8				6	数字信号处理
信息学院	4110074110	数字语音处理B Digital Speech Processing	2	32	24	8				6	数字信号处理

开课单位 Course college	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.	理论 Theory	实验 Exp.	上机 Ope-ration	实践 Prac-tice	课外 Extra-cur		
信息学院	4110494190	云计算与云服务 Cloud Computing and Cloud Service	2	32	24	8				6	大数据技术基础
信息学院	4110495190	机器学习导论 Introduction to Machine Learning	2	32	24	8				6	数字信号处理
信息学院	4110001110	DSP 原理及应用C Principle and Application of DSP	2	32	24	8				6	单片机及嵌入式系统原理
信息学院	4110037110	现代通信技术与应用 Advanced Communication Technology and Application	2	32	32					7	通信原理
信息学院	4110063110	数据库与信息系统 Data Base and Information Systems	2	32	24	8				7	C 程序设计基础
信息学院	4110005210	高级机器学习 Advances Machine Learning	2.5	40	32	8				7	机器学习导论
信息学院	4110006210	智能信号处理与应用 Intelligent Signal Processing and Application	2	32	32					7	数字图像处理 数字语音处理
光纤中心	4110012210	光纤传感技术与应用 Optical Fiber Sensing Technology and Application	2	32	32					7	
信息学院	4110007210	工业互联网及其应用 Industrial Internet and Application	2	32	32					7	
信息学院	4110008210	现代交换技术 Modern Switching Technique	2	32	24	8				7	
自动化学院	4100041210	自动控制原理 Automatic Control Theory	2	32	24	8				7	
信息学院	4110009210	虚拟现实技术 Virtual Reality Technology	2.5	40	24		16			7	单片机及嵌入式系统原理 数字电子技术基础
信息学院	4110010210	微波信号处理与应用 Microwave Signal Processing and Application	2	32	32					7	
小 计 Subtotal			53	848	680	152	16	0	0		
修读说明：要求至少选修2 .5学分。 NOTE：Minimum subtotal credits: 2 .5.											
（六）个性课程 6 Personalized Elective Courses											
信息学院	4110245130	移动设备应用开发技术 Mobile Device Application Development Technology	2	32	24	8				5	C 程序设计基础
信息学院	4110001210	JAVA 程序设计 JAVA Programming	2	32	24	8				4	
信息学院	4110002210	信息技术导论 Introduction to Information Technology	2	32	24	8				3	
小 计 Subtotal			6	96	72	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 courses in catalog, and are required to obtain at least 6 credits.											

（七）专业教育集中性实践教学环节

7 Specialized Practice Schedule

开课单位 Course college	课程编号 Course Number	实践环节名称 Practice Courses Name	学分 Crs	总学时 Tot hrs.	周数 Weeks	建议修读学期 Suggested Term	先修课程 Prerequisite Course
机电学院	4080152110	机械制造工程实训 Metalworking Practice	1	16	1	4	
自动化学院	4100068110	电工电子实习 Practice in Electrical Engineering	2	32	2	3	
信息学院	4110129110	数字电子技术基础课程设计 Course Design on Fundamentals of Digital Electronic Circuit	1	16	1	4	
信息学院	4110026210	模拟电子技术基础课程设计 Course Design on Fundamentals of Analog Electronic Circuit	1	16	1	4	
信息学院	4110320170	信号分析与处理课程设计 Course Design on Signal Analysis and Processing	0.5	16	1	5	
信息学院	4110130110	数字通信系统课程设计 Course Design on Digital Communication System	1	16	1	5	
信息学院	4110321170	单片机及嵌入式系统原理课程设计 Practice of Principle of Singlechip and Embedded System	1	16	1	6	
信息学院	4110210120	专业综合实践 Practice of Specialty Synthesis	1	16	1	6	
信息学院	4110322170	毕业实习 Graduation Internship	3	48	3	7	
信息学院	4110020210	毕业设计 Graduation Design	8.5	272	17	8	
小　计 Subtotal			20	464	29		

五、 修读指导

V Recommendations on Course Studies

课外培养方案详见《武汉理工大学第二课堂课外学分实施办法》。

《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个课外学分。

Please refer to the cultivation plan of the Second-Class Implementation Measures for Extracurricular Credits of Wuhan University of Technology.

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

学院教学责任人: 李政颖

专业培养方案责任人：郭志强

电子科学与技术专业 2021 版本科培养方案
Undergraduate Education Plan for Specialty in Electronic Science and Technology (2021)

专业名称	**电子科学与技术**	主干学科	**电子科学与技术**
Major	Electronic Science and Technology	Major Disciplines	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 Engineering
所属大类	**电子类**	大类培养年限	**1 年**
Disciplinary	Electronics	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	公共基础课程 Public Basic Courses	通识教育课程 Public Courses	大类课程 Basic Courses in General Discipline	专业教育课程 Specialized Courses	个性课程 Personalized Course	专业教育集中性实践教学环节 Specialized Practice Schedule	课外学分 Study Credit after Class	总学分 Total Credits
必修课 Required Courses	31	\	43.5	27	\	18.5	10	180
选修课 Elective Courses	\	9	\	25	6	\	10	

一、培养目标与毕业要求

Ⅰ Educational Objectives &Requirement

（一） 培养目标

本专业将培养德、智、体、美、劳全面发展的社会主义建设者和接班人，培养具有电子科学与技术领域系统、扎实的理论基础，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，适应能力强、实干精神强、创新意识强和具有卓越追求、卓越能力的卓越专业人才。

(1) 具有良好的品德、人文素养和身体素质，熟知当代全球的突出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，能熟练运用数学和科学工具解决专业领域内的各种常见工程问题；

(3) 能卓越的承担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高度敏感性，具有较强的创新意识以及跟踪掌握本专业新理论、新知识、新技术的卓越能力。

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

Educational objectives

This program is designed to cultivate socialist builders and successors with all-round development of morality, intelligence, physical education, beauty and labor. The plan is designed to produce excellent

professionals with systematic and solid theoretical foundation in the field of electronic science and technology, competent for research, development, manufacturing and management in the field of microelectronics or optoelectronics or circuit and system, with strong adaptability, practical spirit, strong sense of innovation, excellent pursuit and excellent ability.

(1) Comply with professional ethics, cultural scientific literacy, social responsibility and physical quality, and the students shall be familiar with the prominent social issues and moral issues in the contemporary world.

(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 skillfully to solve various common engineering issues in the professional field by using mathematical and scientific tools.

(3) Be excellent in research, development, manufacture and management in microelectronics or optoelectronics or circuit and system professional.

(4) Has high sensitivity to the development trends of electronic science and technology. The students with strong innovation consciousness shall be able to excellent continuously grasp new theories, and master new knowledge and new techniques in electronics.

(5) Have excellent capacities of verbal and written communication, teamwork and cooperative. Own excellent 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 ability to 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, assess the 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, developing the 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		√	√	√	
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：

模拟电子技术基础、数字电子技术基础、量子力学、固体物理、半导体物理基础、微电子工艺原理、单片机及嵌入式系统原理。

Core Courses: Fundamentals of Analog Electronic Circuit, Fundamentals of Digital Electronic Circuit, Quantum Mechanics, Solid State Physics, Fundamentals of Semiconductor Physics, Theory of Microelectronic Manufacturing, Principle of MCU and Embedded System.

（二） 专业特色课程：

物理光学、光电子技术、电子 EDA 与数字系统设计实验、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、CMOS 模拟集成电路设计实验。

Characteristic Courses: Physical Optics, Photo-electronics Technology, Experiments of Electronic Design Automatic and Digital System Design, Measurement Techniques for IC, Photoelectric Testing Technology, Principle and Technology of Laser, Electronic Packaging and Surface Assembling, Experiment of CMOS Analog IC Design.

附：毕业要求实现矩阵：

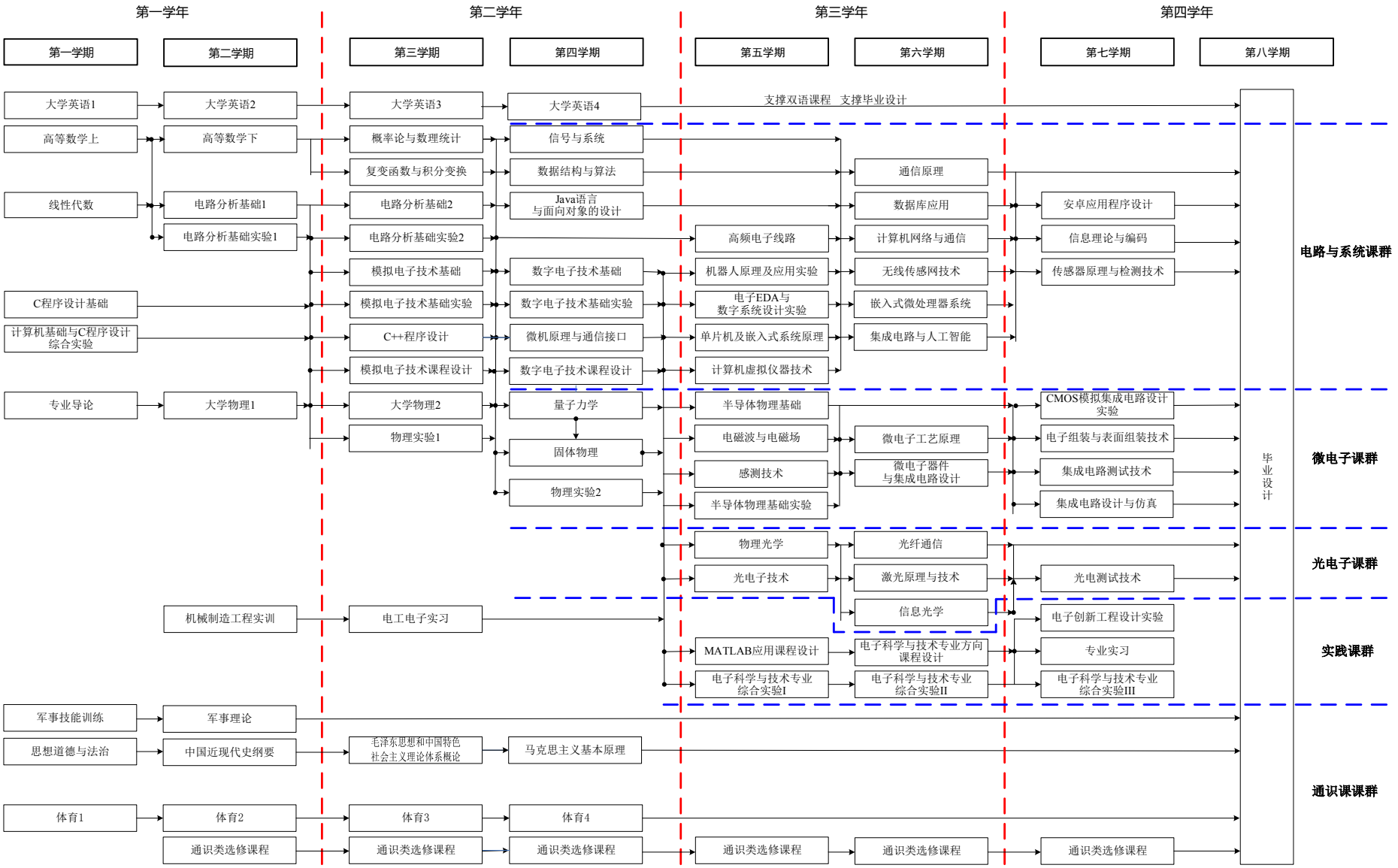
专业核心课程	专业特色课程	课程名称	电子科学与技术专业毕业要求											
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
		思想道德与法治						H	H	H			L	M
		中国近现代史纲要								H			L	M
		毛泽东思想和中国特色社会主义理论体系概论								H			L	M
		马克思主义基本原理								H			L	M
		军事技能训练								M	H			L
		军事理论								H			L	M
		体育 1								H			L	M
		体育 2								H			L	M
		体育 3								H			L	M
		体育 4								H			L	M
		大学英语 1										H	L	M
		大学英语 2										H	L	M
		大学英语 3										H	L	M
		大学英语 4										H	L	M
		C 程序设计基础 A	L	L	L	H	M							M
		计算机基础与 C 程序设计综合实验 A	L	L	L	H	M							M
		专业导论	L	L	L	L	L					M	L	H
		高等数学上	H	H										
		高等数学下	H	H										

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)
		线性代数	H	H										
		电路分析基础 B 上	L	M	H									L
		电路分析基础 B 下	L	M	H									L
		电路分析基础实验上	L		H							L		M
		电路分析基础实验下	L		H							L		M
		大学物理 A 上	H	M	L									
		大学物理 A 下	H	M	L									
		物理实验 A 上	L		H							M		
		物理实验 A 下	L		H							M		
		概率论与数理统计 B	H	M										
		复变函数与积分变换 D	H	M										
√		模拟电子技术基础 A	L	M	M		H							L
		模拟电子技术基础实验	L		M		H					M		L
√		数字电子技术基础 C	L	M	M		H							L
		数字电子技术基础实验	L		M		H					M		L
		信号与系统 A	L	M	M		H							L
√		量子力学	H	M	L									M
	√	电子 EDA 与数字系统设计实验	L	M	M		H						H	L
√		固体物理 A	H	M	L									M
√		单片机及嵌入式系统原理	L		H		M						H	M
√		半导体物理基础 A	H	M	L									M
		半导体物理基础实验	M	M	L								H	M
√		微电子工艺原理	L	M	H									L
		电子科学与技术专业综合实验	L		L	H	L	H	L		H	L	L	M
		电子创新工程设计实验	L		L	H	L	H	L		H	L	L	M
		集成电路与人工智能	L	L	L		M							H
		数据结构与算法 F	L		L		H							M
		微机原理与通信接口 C	L		L		H							M
	√	光电子技术 C	L	L	L		H							M
		电磁场与电磁波	L	L	H									M
	√	物理光学	L	L	H									M
		高频电子线路 D	L	L	L		H							M
		感测技术 C	L	L	L		H							M
		微电子器件与集成电路设计 B	L	L	L		H							M
		C++程序设计	L		L		H							M
		信息光学	L	L	M		L							H
		嵌入式微处理器系统 B	L		L		H							M
		计算机网络与通信 C	L		L		H							M

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)
		通信原理 D	L	L	H		L							M
		光纤通信 E	L	L	H									M
	√	激光原理与技术 D	L	L	H									M
	√	电子封装与表面组装技术 A	L	L	H									M
	√	集成电路测试技术 B	L	L	H									M
	√	光电测试技术 B	L	L	L		H							M
	√	CMOS 模拟集成电路设计实验	L	L	L		H							M
		信息理论与编码 C	L		H		M							L
		传感器原理与检测技术	L	L	H									M
		安卓应用程序设计	L		M		H							L
		机器人原理及应用实验	L	L	L		M							H
		计算机虚拟仪器技术 C	L	L	L		H							M
		无线传感网技术	L	L	H		L							M
		Java 语言与面向对象程序设计 B	L	L	L		H							M
		数据库应用	L	L	L		H							M
		机械制造工程实训 D1	L								H	M		
		电工电子实习 A	L					M			H	M		
		模拟电子技术基础课程设计	L	L	L	L	M	L	L			H	H	M
		数字电子技术基础课程设计	L	L	L	L	M	L	L			H	H	M
		MATLAB 应用课程设计 C	L	L	L	L	M	L	L			H		M
		专业方向课程设计	L	L	L	L	M	L	L			H	H	M
		专业实习						H	H		H	H	H	
		毕业设计	L	L	H	L	H	L	L	L	M	L	L	H

三、课程教学进程图

Ⅲ　Teaching Process Map



四、教学建议进程表

Ⅳ Course Schedule

（一）公共基础必修课程
1 Public Basic Compulsory Courses

开课单位 Course college	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.	理论 Theory	实验 Exp.	上机 Ope-ration	实践 Prac-tice	课外 Extra-cur		
马克思主义学院	4220001210	思想道德与法治 Morals, Ethics and Law	2.5	42	42					2	
马克思主义学院	4220002180	中国近现代史纲要 Outline of Contemporary and Modern Chinese History	2.5	42	42					1	
马克思主义学院	4220003180	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	4.5	66	66					4	
马克思主义学院	4220005180	马克思主义基本原理 Marxism Philosophy	2.5	42	42					3	
学工部	1050001210	军事技能训练 Military Training	2	136				136		1	
学工部	1050002210	军事理论 Military Theory	2	32	32					2	
体育部	4210001170	体育1 Physical Education Ⅰ	1	32	32					1	
体育部	4210002170	体育2 Physical Education Ⅱ	1	32	32					2	
体育部	4210003170	体育3 Physical Education Ⅲ	1	32	32					3	
体育部	4210004170	体育4 Physical Education Ⅳ	1	32	32					4	
外语学院	4030002180	大学英语1 College English Ⅰ	2	48	32				16	1	
外语学院	4030003180	大学英语2 College English Ⅱ	2	48	32				16	2	大学英语1
外语学院	4030003210	大学英语3 College English Ⅲ	2	48	32				16	3	大学英语2
外语学院	4030004210	大学英语4 College English Ⅳ	2	48	32				16	4	大学英语3
计算机智能学院	4120001210	C程序设计基础A Foundation of C Language Design A	2	32	32					1	
计算机智能学院	4120005210	计算机基础与C程序设计综合实验A Comprehensive Experiments of Foundation of Computer and C Language Programming A	1	32		32				1	
小 计 Subtotal			31	744	512	32	0	136	64		

（二）通识教育选修课程
2 General Education Elective Courses

核心选修 Core elective courses	文明与传统类Civilization and Tradition Courses	通识课程应修满至少9学分。自主选修课程中，至少在艺术与审美、创新与创业两个领域各选修1门课程。 Minimum subtotal credits: 9. Self-selected courses， at least 1 course in art and aesthetics and 1 course in innovation and entrepreneurship.
	社会与发展类Society and Development Courses	
	艺术与人文类Art and Humanities Courses	
	自然与方法类Nature and methods Courses	
自主选修 Self-selected courses	数学与自然科学、哲学与心理学、法学与社会科学、经济与管理、历史与文化、语言与文学、艺术与审美、创新与创业 Mathematics and Natural Sciences, Philosophy and Psychology, Law and Social Science, Economics and Management, History and Culture, Language and Literature, Art and Aesthetics, Innovation and Entrepreneurship	

开课单位 Course college	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.	理论 Theory	实验 Exp.	上机 Ope-ration	实践 Prac-tice	课外 Extra-cur		
（三）大类必修课程 3 Basic Discipline Required Courses											
理学院	4050229110	线性代数 Linear Algebra	2.5	40	40					1	
理学院	4050001210	高等数学A上 Advanced Mathematics AⅠ	4.5	72	72					1	
信息学院	4110144110	专业导论 Introduction to Speciality	1	16	16					1	
理学院	4050002210	高等数学A下 Advanced Mathematics AⅡ	5.5	88	88					2	
自动化学院	4100001210	电路原理B上 Circuit Principle B	2	32	32					2	高等数学上
自动化学院	4100002210	电路原理B实验上 Electric Circuits B Exp Ⅰ	0.5	16		16				2	电路原理B上
自动化学院	4100007210	电路原理B下 Circuit Principle B	3	48	48					3	电路原理B上
自动化学院	4100006210	电路原理B实验下 Electric Circuits B Exp Ⅱ	0.5	16		16				3	电路原理B下
理学院	4050021110	大学物理A上 College Physics AⅠ	3.5	56	56					2	
理学院	4050022110	大学物理A下 College Physics A Ⅱ	3.5	56	56					3	
理学院	4050466130	物理实验A上 Physics Lab. AⅠ	1	32		32				3	
理学院	4050467130	物理实验A下 Physics Lab. AⅡ	1	32		32				4	
理学院	4050058110	概率论与数理统计B Probability and Mathematical Statistics B	3	48	48					3	
理学院	4050052110	复变函数与积分变换D Complex Function and Integral Transform D	3	48	48					3	
信息学院	4110048110	模拟电子技术基础A Fundamentals of Analog Electronic Circuit A	4	64	64					3	电路原理B上
信息学院	4110051110	模拟电子技术基础实验 Experiments of Analog Electronics Circuit	0.5	16		16				3	
信息学院	4110066110	数字电子技术基础C Fundamentals of Digital Electronic Circuit C	4	64	64					4	
信息学院	4110068110	数字电子技术基础实验 Experiments of Digital Electronics Circuit	0.5	16		16				4	
小 计 Subtotal			43.5	760	632	128	0	0	0		
（四）专业必修课程 4 Specialized Required Courses											
信息学院	4110093110	信号与系统A Signal and System A	4	64	56	8				4	复变函数与积分变换
信息学院	4110047110	量子力学A Quantum Mechanics A	3	48	48					4	复变函数与积分变换

开课单位 Course college	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.	理论 Theory	实验 Exp.	上机 Ope-ration	实践 Prac-tice	课外 Extra-cur		
信息学院	4110324170	电子EDA与数字系统设计实验 Experiments of Electronic Design Automatic and Digital System Design	1.5	48		48				5	数字电子技术基础A
信息学院	4110032110	固体物理A Solid State Physics A	3	48	48					4	量子力学
信息学院	4110022210	单片机及嵌入式系统原理 Principle of MCU and Embedded System	3	48	48					5	
信息学院	4110327170	半导体物理基础A Fundamentals of Semiconductor Physics A	3	48	48					5	固体物理
信息学院	4110021210	半导体物理基础实验 Experiments of Fundamentals of Semiconductor Physics	0.5	16		16				5	固体物理
信息学院	4110083110	微电子工艺原理 Theory of Microelectronic Manufacturing	3	48	48					6	半导体物理基础
信息学院	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	
信息学院	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	
信息学院	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	
信息学院	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			27	560	296	264	0	0	0		
（五）专业选修课程 5 Specialized Elective Courses											
信息学院	4110156120	C++程序设计 The C++ Programming	2.5	40	32	8				3	
信息学院	4110270140	数据结构与算法 F Data Structure and Algorithm F	2.5	40	32	8				4	
信息学院	4110184120	微机原理与通信接口C Principles of Microcomputer and Communication Interface C	2.5	40	40					4	
信息学院	4110325170	光电子技术C Photo-electronics Technology	3	48	48					5	大学物理
信息学院	4110011110	电磁场与电磁波A Electromagnetic Fields and Waves	3	48	40					5	复变函数与积分变换
理学院	4050639170	物理光学C Physical Optics C	3	48	48					5	大学物理下
信息学院	4110310170	高频电子线路 High Frequency Electronic Circuits	3	48	48					5	模拟电子技术基础
信息学院	4110357170	感测技术 C Sensor and Detection Technology C	2.5	40	32	8				5	模拟电子技术基础
信息学院	4110332170	微电子器件与集成电路设计B Microelectronic Devices and IC Design B	1.5	24	24					6	半导体物理基础

开课单位 Course college	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.	理论 Theory	实验 Exp.	上机 Ope-ration	实践 Prac-tice	课外 Extra-cur		
信息学院	4110003210	集成电路与人工智能 Integrated Circuit and Artificial Intelligence	2.5	40	32	8				6	
信息学院	4110004210	信息光学 Information Optics	2.5	40	32	8				6	物理光学
信息学院	4110333170	嵌入式微处理器系统B Embedded Microprocessor System B	2	32	32					6	单片机原理与应用
信息学院	4110356170	计算机网络与通信C Computer Networks and Communication C	2	32	32					6	通信原理
信息学院	4110314170	通信原理D Communication Principles D	3	48	48					6	数字电子技术基础实验
信息学院	4110384170	光纤通信E Optical Fiber Communications E	2.5	40	40					6	通信原理
信息学院	4110334170	激光原理与技术D Principle and Technology of Laser D	2	32	32					6	大学物理下
信息学院	4110335170	电子封装与表面组装技术A Electronic Packaging and Surface Assembling A	1.5	24	24					7	微电子工艺原理
信息学院	4110336170	集成电路测试技术B Measurement Techniques for IC B	2	32	40					7	微电子器件与集成电路设计
信息学院	4110337170	光电测试技术B Photoelectric Testing Technology B	2	32	32					7	光电子技术
信息学院	4110338170	CMOS模拟集成电路设计实验 Experiment of CMOS Analog IC Design	1	32		32				7	
信息学院	4110315170	信息理论与编码 C Information Theory and Coding C	2.5	40	40					7	
信息学院	4110339170	传感器原理与检测技术 Sensor Principle and Detection Technology	1.5	24	24					7	
小 计 Subtotal			50.5	824	752	72	0	0	0		
修读说明：要求至少选修25学分。 NOTE：Minimum subtotal credits:25.											
（六）个性课程 6 Personalized Elective Courses											
信息学院	4110340170	安卓应用程序设计 Android application programming	2.5	40	24	16				4	
信息学院	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
信息学院	4110342170	计算机虚拟仪器技术C Computer Virtual Instrument Technology C	2.5	40	24	16				5	数字电子技术基础
信息学院	4110185120	无线传感网技术 Technology of Wireless Sensor Network	2.5	40	32	8				6	
信息学院	4110275130	数据库应用 Database Application	2.5	40	40					6	
信息学院	4110300140	Java语言与面向对象程序设计B Java language and object oriented programming B	2	32	16	16				7	C程序设计基础
小 计 Subtotal			13	224	136	88	0	0	0	224	
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.											

（七）专业教育集中性实践教学环节

7 Specialized Practice Schedule

开课单位 Course college	课程编号 Course Number	实践环节名称 Practice Courses Name	学分 Crs	总学时 Tot hrs.	周数 Weeks	建议修读学期 Suggested Term	先修课程 Prerequisite Course
机电学院	4080152110	机械制造工程实训D1 Training on Mechanical Manufacturing Engineering D1	1	16	1	4	
自动化学院	4100068110	电工电子实习A Practice in Electrical Engineering & Electronics A	2	32	2	3	
信息学院	4110128110	模拟电子技术基础课程设计 Course Design on Fundamentals of Analog Electronics Circuit	1	16	1	3	
信息学院	4110129110	数字电子技术基础课程设计 Course Design on Fundamentals of Digital Electronic Circuit	1	16	1	4	
信息学院	4110105110	MATLAB应用课程设计C Course Design of MATLAB Application	1	16	1	5（分散）	
信息学院	4110343170	电子科学与技术专业方向课程设计 Course Design on speciality	1	16	1	6（分散）	
信息学院	4110140110	电子科学与技术专业实习 Speciality practice	3	48	3	7	
信息学院	4110025210	毕业设计 Graduation Design	8.5	272	17	8	
小　计 Subtotal			18.5	432	27		

五、学时学分比例

Ⅴ Proportion of class hours and credits

分类		学分/学时	毕业总学分/学时（不含课外）	比例（%）
各类选修课程		40	160	25
实践教育课程（包括实验课）		42	160	26.3
数学与自然科学类课程		27.5	160	17.2
工程基础类课程、专业基础类课程与专业类课程		52	160	32.5
工程实践与毕业设计（论文）	通识必修和专业必修中独立设课的综合性实验课	13	160	8.1
	集中实践环节中的工程实践课	10	160	6.3
	毕业设计（论文）	8.5	160	5.3
人文社会科学类通识教育课程		31	160	19.4
选修课课程设置总学分与选修毕业要求学分比例				2:1

六、修读指导

Ⅵ Recommendations on Course Studies

课外培养方案详见《武汉理工大学第二课堂课外学分实施办法》。

《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 个课外学分。

Please refer to the cultivation plan of the second class-Implementation Measures for Extracurricular Credits of the Second Class of Wuhan University of Technology.

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

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。

学院教学责任人：李政颖

专业培养方案责任人：徐　宁

通信工程专业 2021 版本科培养方案
Undergraduate Education Plan for Specialty in Communication Engineering (2021)

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	**电子类** Electronics	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	公共基础课程 Public Basic Courses	通识教育课程 Public Courses	大类课程 Basic Courses in General Discipline	专业教育课程 Specialized Courses	个性课程 Personalized Course	专业教育集中性实践教学环节 Specialized Practice Schedule	课外学分 Study Credit after Class	总学分 Total Credits
必修课 Required Courses	31	\	43.5	23	\	21.5	10	180
选修课 Elective Courses	\	9	\	26	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。本专业学生毕业五年左右应达到的目标如下：

(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 ossessing 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 能够通过查阅文献辅助分析通信工程领域的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的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、现代工程工具等信息技术，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和现代工程工具进行建模、预测与仿真，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 理解环境保护和可持续发展的理念与内涵，并能理解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；

7-2 能够树立绿色制造的理念，并理解用技术手段降低通信工程生产实践负面影响的作用与其局限性。

（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，能够阅读相关国内外科技文献，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：在与通信工程专业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 能够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 graduation 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. 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 master the engineering design methods and the basic design/development methods and techniques in a complete cycle and process of product development, taught in the communication engineering profession; and understand the various factors affecting the design goals and technical solutions.

3.2 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.

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

3.4 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, mode engineering tools 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 select the appropriate technical means and modern engineering tools for the analysis, calculation and design according to the complex engineering problems in communication engineering.

5.3 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 know and understand the concept and connotation of environmental protection and sustainable development; and understand the impact of engineering practices on complex engineering problems in communication engineering on environmental and social sustainable development.

7.2 The graduate should have established the concept of green manufacturing and understand the role and limitations of using technical means to reduce the negative impact of produce practices in communication engineering.

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 engineering ethics and norms of honesty and integrity; and consciously abide by them during engineering practice.

8.3 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 understand the international trends and research hotspots in communication engineering; and understand and respect the differences and diversity of different cultures in the world.

10.3 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 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.

11.1The graduate should understand and master the engineering management principles and economic decision-making methods related to communication engineering.

11.2The graduate should understand the cost structure of a product related to communication engineering during its complete cycle and process; and understand the engineering management and economic decision-making issues involved.

11.3The 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.

12.1The 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.

12.2The 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

	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、通信原理、数字信号处理、信息理论与编码、高频电子线路，电磁场与电磁波。

Signal and System, Communication Principles，Digital signal processing，Information Theory and

Coding，High-frequency Electronic Circuit, Electromagnetic field and Electromagnetic waves.

（二） 通信工程专业特色课程：

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。

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：

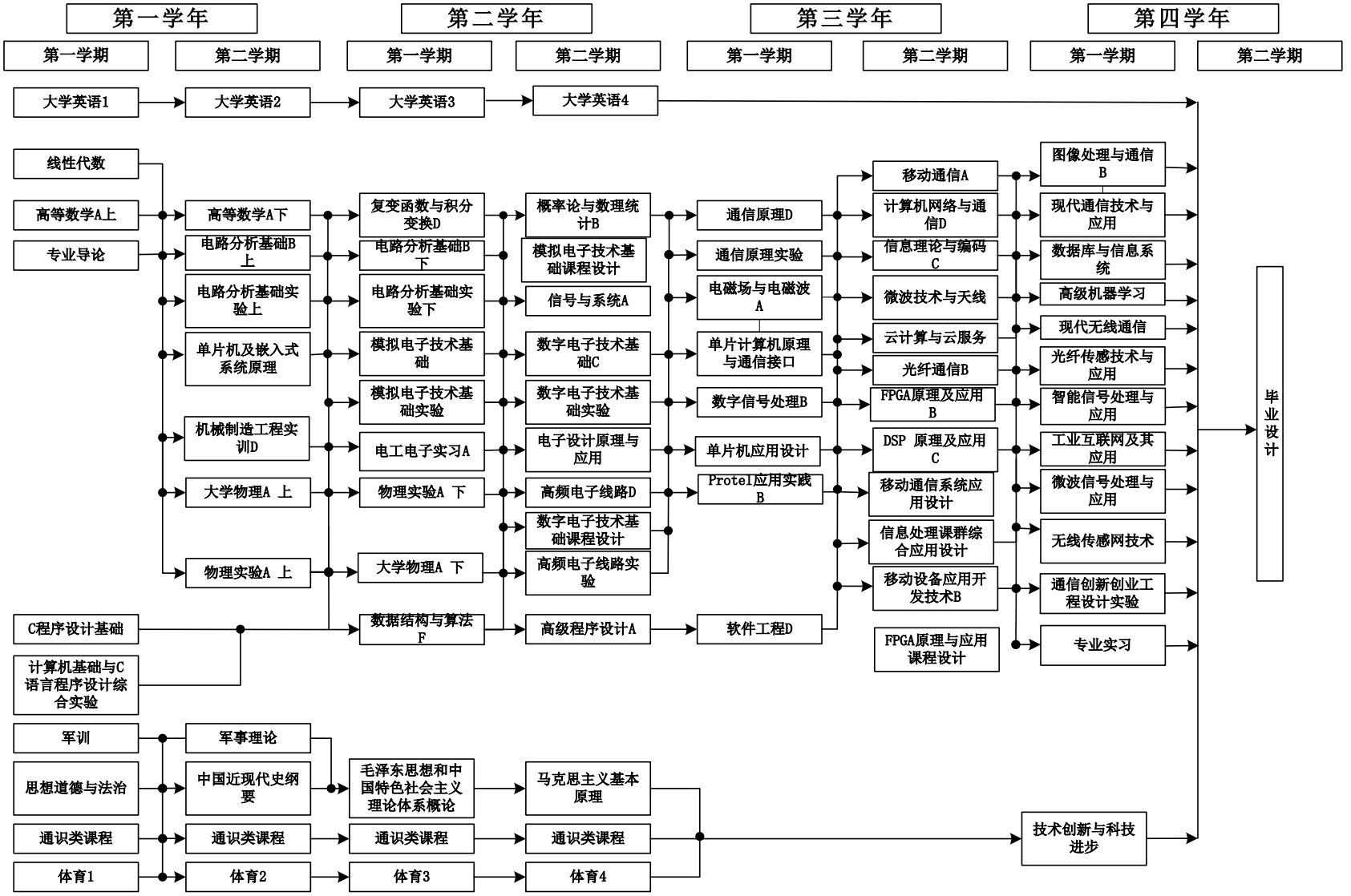
专业核心课程	专业特色课程	课程名称	通信工程专业毕业要求											
			1	2	3	4	5	6	7	8	9	10	11	12
		思想道德与法治			L			H		H				H
		中国近现代史纲要			L			H	H					
		毛泽东思想和中国特色社会主义理论体系概论			L			H	H	H	H	H		
		马克思主义基本原理			L			H	H	H				
		军事理论			H			H		H				
		体育			H			H		H				
		大学英语										H	H	H
		C 程序设计基础			H		H							
		计算机基础与 C 程序设计综合实验				H	H							
		专业导论						H	H				H	H
		高等数学	H	H										
		线性代数	H	H										
		复变函数与积分变换	H	H										
		概率论与数理统计	H	H										
		大学物理	H	H		H								
		物理实验				H								
		电路分析基础	H	H			L							
		电路分析基础实验				H	H							
		模拟电子技术基础	H	H	H	M								
		模拟电子技术基础实验				H	H							
		数字电子技术基础	H	H	H									
		数字电子技术基础实验				H	H							

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
√		信号与系统	H	H	H	H	M							
√		高频电子线路	H	H										
		单片机及嵌入式系统原理			H	H	H							
√	√	电磁场与电磁波	H	H			L							
√		通信原理	H	H		H		H						
√		数字信号处理	H		H	M								
√	√	信息理论与编码	H	H	H	M								
		通信创新创业工程设计实验				H		H	H	H	H	H	H	H
		数据结构与算法			H	M	H							
		高频电子线路实验				H	H							
		通信原理实验				H	H							
	√	现代交换技术		H	H			H						H
	√	光纤通信	H	H		H								
	√	移动通信	H	H		H								
	√	计算机网络与通信	H	M	M									
		高级程序设计		M	M	H	H							M
		电子设计原理与应用	H	H	H		H							
		FPGA 原理及应用			H	H	H							
		微波技术与天线	H	H			M							
		软件工程			H	M	M				H	H	L	
		图像处理与通信 B	H	H	M	M	M							
		现代无线通信	H	H			M							
		云计算与云服务		L		L			M					
		机器学习导论		L	M		L		L					
		DSP 原理与应用 C		L	L	L		M	L				L	L
		现代通信技术与应用			M				L					
		数据库与信息系统		M	L				L					

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
		高级机器学习		L	L		M		M					
		智能信号处理与应用		M	M		L		M					
		光纤传感技术与应用			L	M		M	M					
		工业互联网及其应用	L	M		L		L				L		L
		微波信号处理与应用	L	L			M							L
		移动设备应用开发技术			H	H	H							
		无线传感网技术	H	H			H							
		技术创新与科技进步						H	H				H	H
		机械制造工程实训						H	H	H	H			
		电工电子实习			H				H			H	H	H
		模拟电子技术基础课程设计	H		H		H							
		数字电子技术基础课程设计	H		H		H					H		
		移动通信系统应用设计		H	H	H	H					H		
		PROTEL 应用实践		H	H	H	H		H		H			
		FPGA 原理与应用课程设计	H		H		H					H		
		信息处理课群综合应用设计		H	H	H	H		H		H			
		单片机应用设计	H		H		H					H		
		专业实习	H					H			H	H	H	
		毕业设计（论文）		H	H	H	H					H	M	

三、课程教学进程图

Ⅲ　Teaching Process Map



四、教学建议进程表
Ⅳ Course Schedule

（一）公共基础必修课程
1 Public Basic Compulsory Courses

开课单位 Course college	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.	理论 Theory	实验 Exp.	上机 Ope-ration	实践 Prac-tice	课外 Extra-cur		
马克思主义学院	4220001210	思想道德与法治 Morality and the rule of law	2.5	42	42					2	
马克思主义学院	4220002180	中国近现代史纲要 Outline of Contemporary and Modern Chinese History	2.5	42	42					1	
马克思主义学院	4220003180	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	4.5	66	66					4	
马克思主义学院	4220005180	马克思主义基本原理 Marxism Philosophy	2.5	42	42					3	
学工部	1050001210	军事技能训练 Military Skills Training	2	136				136		1	
学工部	1050002210	军事理论 Military Theory	2	32	32					2	
体育部	4210001170	体育 1 Physical Education Ⅰ	1	32	32					1	
体育部	4210002170	体育 2 Physical Education Ⅱ	1	32	32					2	
体育部	4210003170	体育 3 Physical Education Ⅲ	1	32	32					3	
体育部	4210004170	体育 4 Physical Education Ⅳ	1	32	32					4	
外语学院	4030001210	大学英语 1 College English I	2	48	32				16	1	
外语学院	4030002210	大学英语 2 College English Ⅱ	2	48	32				16	2	大学英语 1
外语学院	4030003210	大学英语 3 College English Ⅲ	2	48	32				16	3	大学英语 2
外语学院	4030004210	大学英语 4 College English IV	2	48	32				16	4	大学英语 3
计算机智能学院	4120001210	C程序设计基础A Fundamentals of Computer Program Design(C) A	2	32	32					1	
计算机智能学院	4120005210	计算机基础与C程序设计综合实验A Computer Foundation and C ProgrammingComprehensive Experiment A	1	32		32				1	
小 计 Subtotal			31	744	512	32	0	136	64		

（二）通识教育选修课程
2 General Education Elective Courses

核心选修 Core elective courses	文明与传统类Civilization and Tradition Courses	通识课程应修满至少9学分。自主选修课程中，至少在艺术与审美、创新与创业两个领域各选修1门课程。 Minimum subtotal credits: 9. Self-selected courses， at least 1 course in art and aesthetics and 1 course in innovation and entrepreneurship.
	社会与发展类Society and Development Courses	
	艺术与人文类Art and Humanities Courses	
	自然与方法类Nature and methods Courses	
自主选修 Self-selected courses	数学与自然科学、哲学与心理学、法学与社会科学、经济与管理、历史与文化、语言与文学、艺术与审美、创新与创业 Mathematics and Natural Sciences, Philosophy and Psychology, Science and Social Sciences, Economics and Management, History and Culture, Language and Literature, Art and Aesthetics, Innovation and Entrepreneurship	

开课单位 Course college	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.	理论 Theory	实验 Exp.	上机 Ope-ration	实践 Prac-tice	课外 Extra-cur		
（三）大类必修课程 3 Basic Discipline Required Courses											
理学院	4050229110	线性代数 Linear Algebra	2.5	40	40					1	
理学院	4050001210	高等数学A 上 Advanced Mathematics Ⅰ	4.5	72	72					1	
理学院	4050002210	高等数学A 下 Advanced Mathematics Ⅱ	5.5	88	88					2	
自动化学院	4100001210	电路原理B上 Circuit Principle B	2	32	32					2	高等数学上
自动化学院	4100002210	电路原理B实验上 Electric Circuits B Exp Ⅰ	0.5	16		16				2	电路原理B上
自动化学院	4100007210	电路原理B下 Circuit Principle B	3	48	48					3	电路原理B上
自动化学院	4100006210	电路原理B实验下 Electric Circuits B Exp Ⅱ	0.5	16		16				3	电路原理B下
理学院	4050021110	大学物理A 上 Physics Ⅰ	3.5	56	56					2	
理学院	4050466130	物理实验A 上 Physics Lab. Ⅰ	1	32	32					3	
理学院	4050022110	大学物理A 下 Physics Ⅱ	3.5	56	56					3	
理学院	4050467130	物理实验A 下 Physics Lab. Ⅱ	1	32	32					4	
理学院	4050052110	复变函数与积分变换 Complex Function and Integral Transform	3	48	48					3	
信息学院	4110048110	模拟电子技术基础 A Fundamentals of Analog Electronic Circuit	4	64	64					3	电路原理B上 电路原理B下
信息学院	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
理学院	4050058110	概率论与数理统计B Probability and Mathematical Statistics	3	48	48					4	
信息学院	4110178120	数字电子技术基础C Fundamentals of Digital Electronic Circuit	4	64	64					4	模拟电子技术基础
信息学院	4110051110	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
信息学院	4110144110	专业导论 Introduction to Speciality	1	16	16					1	
小 计 Subtotal			43.5	760	696	64	0	0	0	1	
（四）专业必修课程 4 Specialized Required Courses											
信息学院	4110093110	信号与系统 A Signal and System	4	64	56	8				4	复变函数与积分变换
信息学院	4110310170	高频电子线路 High-frequency Electronic Circuits	3	48	48					4	模拟电子技术基础
信息学院	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
信息学院	4110313170	数字信号处理B Digital Signal Processing	3.5	56	48	8				5	信号与系统
信息学院	4110314170	通信原理D Communication Principles	3	48	48					5	信号与系统
信息学院	4110379170	通信原理实验 Experiments of Communication Principles	0.5	16		16				5	通信原理

开课单位 Course college	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.	理论Theory	实验Exp.	上机Ope-ration	实践Prac-tice	课外Extra-cur		
信息学院	4110022210	单片机及嵌入式系统原理 Principle of Singlechip and embeded system	3	48	48					2	
信息学院	4110315170	信息理论与编码C Information Theory and Coding	2.5	40	32	8				6	概率论与数理统计
信息学院	4110244130	电磁场与电磁波A Electromagnetic Fields and Electromagnetic Wave	3	48	48					5	电路原理B下
小 计 Subtotal			23	384	328	56	0	0	0		
（五）专业选修课程 5 Specialized Elective Courses											
信息学院	4110270140	数据结构与算法F Data Structure And Algorithm	2.5	40	32	8				3	C 程序设计基础
信息学院	4110304150	高级程序设计A Advanced Computer Program Design	3	48	40	8				4	
信息学院	4110316170	FPGA原理及应用B FPGA Technique Application	3	48	16	32				6	数字电子技术基础
信息学院	4110008210	现代交换技术 Modern Switching Technique	2.5	40	28	12				5	
信息学院	4110089110	微波技术与天线 Microwave Technology and Antenna Theory	3	40	32	8				6	
信息学院	4110224130	软件工程D Software Engineering	2	32	32					5	
信息学院	4110036110	光纤通信B Optic Fiber Communication	2.5	40	28	12				6	
信息学院	4110098110	移动通信A Mobile Communication	2.5	40	32	8				6	
信息学院	4110349170	图像处理与通信B Image Processing and Communication	2.5	40	32	8				7	数字信号处理
信息学院	4110170120	计算机网络与通信D Computer Newwork and Communication	2.5	40	32	8				6	
信息学院	4110385170	现代无线通信 Modern Wireless Communications	2.5	40	40					7	
信息学院	4110088110	通信创新创业工程设计实验 Modern Sense Technique	2	64		64				7	
信息学院	4110218130	电子设计原理与应用 Principle and Application of Electronic Design	2	32	32					4	
信息学院	4110494190	云计算与云服务 Cloud Computing and Cloud Service	2	32	24	8				6	大数据技术基础
信息学院	4110495190	机器学习导论 Introduction to Machine Learning	2	32	24	8				6	数字信号处理
信息学院	4110001110	DSP 原理及应用C Principle and Application of DSP	2	32	24	8				6	嵌入式技术原理与应用
信息学院	4110037110	现代通信技术与应用 Advanced Communication Technology and Application	2	32	32					7	通信原理
信息学院	4110063110	数据库与信息系统 Data Base and Information Systems	2	32	24	8				7	C 程序设计基础
信息学院	4110005210	高级机器学习 Advances Machine Learning	2.5	40	32	8				7	机器学习导论
信息学院	4110006210	智能信号处理与应用 Intelligent Signal Processing and Application	1.5	24	24					7	数字图像处理
信息学院	4110012210	光纤传感技术与应用 Optical Fiber Sensing Technology and Application	2	32	32					7	

开课单位 Course college	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.	理论 Theory	实验 Exp.	上机 Ope-ration	实践 Prac-tice	课外 Extra-cur		
信息学院	4110007210	工业互联网及其应用 Industrial Internet and Application	2	32	32					7	
信息学院	4110010210	微波信号处理与应用 Microwave Signal Processing and Application	2	32	32					7	
小 计 Subtotal			52.5	864	656	208	0	0	0		
修读说明：要求至少选修26学分。 NOTE：Minimum subtotal credits:26.											
（六）个性课程 6 Personalized Elective Courses											
信息学院	4110350170	移动设备应用开发技术B Mobile Device Application Development Technology	2.5	40	32	8				6	C 程序设计基础
信息学院	4110185120	无线传感网技术 Technology of Wireless Sensor Network	2.5	40	32	8				7	
信息学院	4110268140	技术创新与科技进步 Technology Innovation and Scientific and Technological Progress	1	16	16					7	
小 计 Subtotal			6	96	72	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.											

（七）专业教育集中性实践教学环节

7 Specialized Practice Schedule

开课单位 Course college	课程编号 Course Number	实践环节名称 Practice Courses Name	学分 Crs	总学时 Tot hrs.	周数 Weeks	建议修读学期 Suggested Term	先修课程 Prerequisite Course
机电学院	4080152110	机械制造工程实训D Metalworking Practice	1	16	1	4	
自动化学院	4100068110	电工电子实习A Practice in Electrical Engineering	2	32	2	3	
信息学院	4110128110	模拟电子技术基础课程设计 Course Design on Fundamentals of Analog Electronic Circuit	1	16	1	4	
信息学院	4110129110	数字电子技术基础课程设计 Course Design on Fundamentals of Digital Electronic Circuit	1	16	1	4	
信息学院	4110236130	信息处理课群综合应用设计 Cpmpressive Training and Design on Signal Processing	1	32	2	6	
信息学院	4110214130	单片机应用设计 Microcomputer Application Practice	1	32	2	5	
信息学院	4110351170	Protel应用实践B Course Design on Protel Application	1	16	1	5	
信息学院	4110352170	移动通信系统应用设计 Application Design on Mobile Communication System	1	32	2	6	
信息学院	4110353170	FPGA原理与应用课程设计 Course Design on FPGA Principle and Application	1	32	2	6	
信息学院	4110152110	通信工程专业实习 Speciality practice	3	48	3	7	
信息学院	4110029210	毕业设计 Graduation Thesis	8.5	272	17	8	
小 计 Subtotal			21.5	544	34		

五、学时学分比例

Ⅴ Proportion of class hours and credits

分类		学分/学时	毕业总学分/学时（不含课外）	比例（%）
各类选修课程		41	160	25.6
实践教育课程（包括实验课）		42	160	26.3
数学与自然科学类课程		25.5	160	15.9
工程基础类课程、专业基础类课程与专业类课程		70	160	43.8
工程实践与毕业设计（论文）	通识必修和专业必修中独立设课的综合性实验课	6	160	3.8
	集中实践环节中的工程实践课	19	160	11.9
	毕业设计（论文）	17	160	10.6
人文社会科学类通识教育课程		35	160	21.9
选修课课程设置总学分与选修毕业要求学分比例				2:1

六、修读指导

Ⅵ Recommendations on Course Studies

课外培养方案详见《武汉理工大学第二课堂课外学分实施办法》。

《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 个课外学分。

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。

Please refer to the cultivation plan of the second class-Implementation Measures for Extracurricular Credits of the Second Class of Wuhan University of Technology.

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

学院教学责任人：李政颖

专业培养方案责任人：杜庆国

通信工程专业（学硕班）2021 版本科培养方案
Undergraduate Education Plan for Specialty in Communication Engineering（Joint undergraduate-postgaduate class）(2021)

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	**电子类** Electronics	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	公共基础课程 Public Basic Courses	通识教育课程 Public Courses	大类课程 Basic Courses in General Discipline	专业教育课程 Specialized Courses	个性课程 Personalized Course	专业教育集中性实践教学环节 Specialized Practice Schedule	课外学分 Study Credit after Class	总学分 Total Credits
必修课 Required Courses	31	\	43.5	23	\	21.5	10	180
选修课 Elective Courses	\	9	\	26	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。本专业学生毕业五年左右应达到的目标如下：

(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 ossessing 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 能够通过查阅文献辅助分析通信工程领域的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的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、现代工程工具等信息技术，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和现代工程工具进行建模、预测与仿真，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 理解环境保护和可持续发展的理念与内涵，并能理解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；

7.2 能够树立绿色制造的理念，并理解用技术手段降低通信工程生产实践负面影响的作用与其局限性。

（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，能够阅读相关国内外科技文献，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：在与通信工程专业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 能够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 graduation 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 master the engineering design methods and the basic design/development methods and techniques in a complete cycle and process of product development, taught in the communication engineering profession; and understand the various factors affecting the design goals and technical solutions.

3.2 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.

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

3.4 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, mode engineering tools 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 select the appropriate technical means and modern engineering tools for the analysis, calculation and design according to the complex engineering problems in communication engineering.

5.3 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 know and understand the concept and connotation of environmental protection and sustainable development; and understand the impact of engineering practices on complex engineering problems in communication engineering on environmental and social sustainable development.

7.2 The graduate should have established the concept of green manufacturing and understand the role and limitations of using technical means to reduce the negative impact of produce practices in communication engineering.

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 engineering ethics and norms of honesty and integrity; and consciously abide by them during engineering practice.

8.3 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 understand the international trends and research hotspots in communication engineering; and understand and respect the differences and diversity of different cultures in the world.

10.3 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 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 and master the engineering management principles and economic decision-making methods related to communication engineering.

11.2 The graduate should understand the cost structure of a product related to communication engineering during its complete cycle and process; and understand the engineering management and economic decision-making issues involved.

11.3 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

	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、通信原理、数字信号处理、信息理论与编码、高频电子线路，电磁场与电磁波。

Signal and System, Communication Principles，Digital signal processing，Information Theory and Coding，High-frequency Electronic Circuit, Electromagnetic field and Electromagnetic waves.

（二） 通信工程专业特色课程：

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。

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：

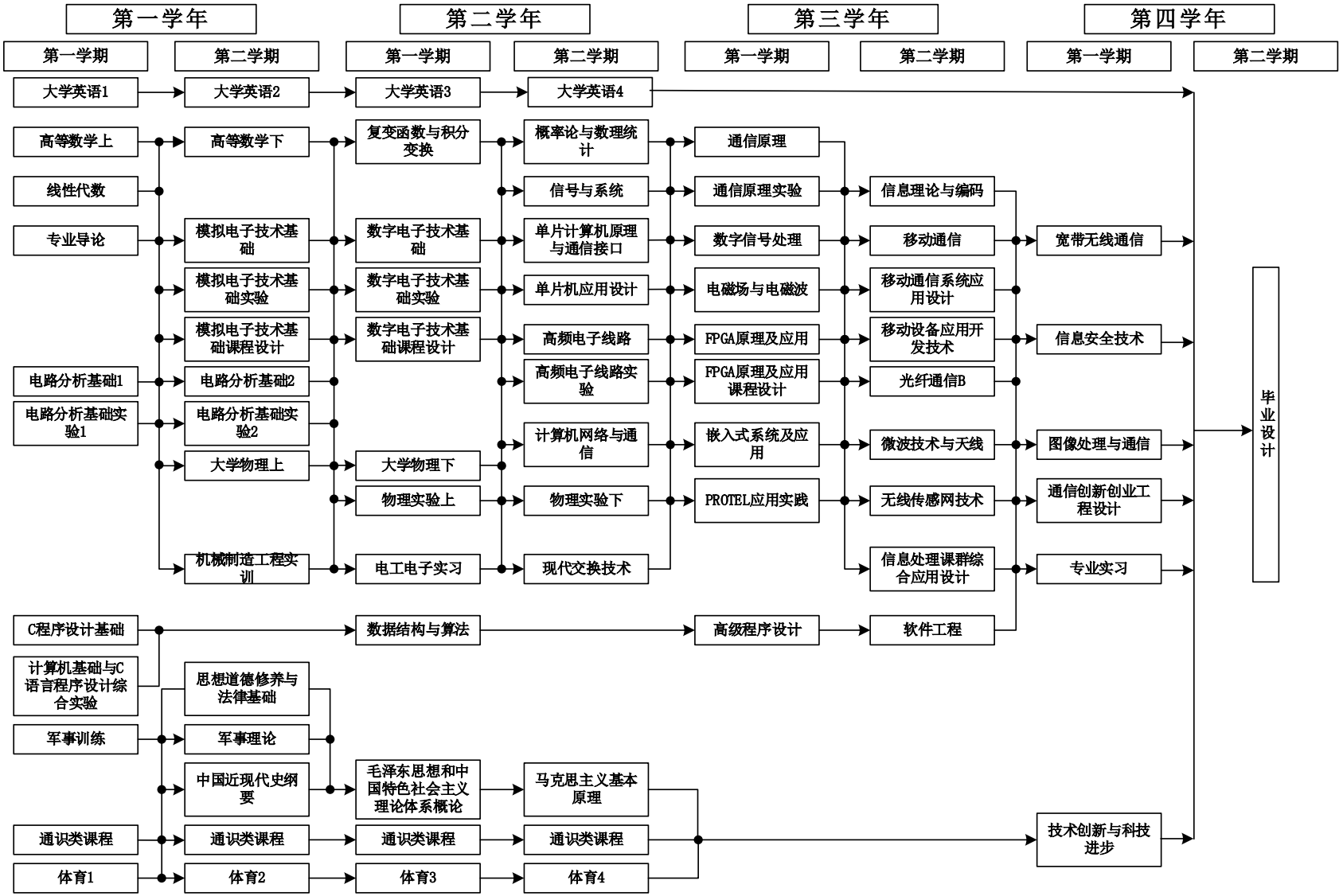
专业核心课程	专业特色课程	课程名称	通信工程专业毕业要求											
			1	2	3	4	5	6	7	8	9	10	11	12
		思想道与法治			L			H		H				H
		中国近现代史纲要			L			H	H					
		毛泽东思想和中国特色社会主义理论体系概论			L			H	H	H	H	H		
		马克思主义基本原理			L			H	H	H				
		军事理论			H			H		H				
		体育			H			H		H				
		大学英语										H	H	H
		C 程序设计基础			H		H							
		计算机基础与 C 程序设计综合实验				H	H							
		通信工程专业导论						H	H				H	H
		高等数学	H	H										
		线性代数	H	H										
		复变函数与积分变换	H	H										
		概率论与数理统计	H	H										
		大学物理	H	H		H								
		物理实验				H								
		电路分析基础	H	H			L							
		电路分析基础实验				H	H							
		模拟电子技术基础	H	H	H	M								
		模拟电子技术基础实验				H	H							
		数字电子技术基础	H	H	H									
		数字电子技术基础实验				H	H							
√		信号与系统	H	H	H	H	M							

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
√		高频电子线路	H	H										
		单片机及嵌入式系统原理			H	H	H							
√	√	电磁场与电磁波	H	H			L							
√	√	通信原理	H	H		H		H						
√		数字信号处理	H		H	M								
√	√	信息理论与编码	H	H	H	M								
		通信创新创业工程设计实验				H		H	H	H	H	H	H	H
		数据结构与算法			H	M	H							
		高频电子线路实验				H	H							
		通信原理实验				H	H							
	√	现代交换技术		H	H			H						H
	√	光纤通信	H	H		H								
	√	移动通信	H	H		H								
	√	计算机网络与通信	H	M	M									
		高级程序设计		M	M	H	H							M
		电子设计原理与应用	H	H	H		H							
		FPGA 原理及应用			H	H	H							
		微波技术与天线	H	H			M							
		软件工程			H	M	M				H	H	L	
		图像处理与通信	H	H	M	M	M							
		现代无线通信	H	H			M							
		信息安全技术						H	H	H				
		移动设备应用开发技术			H	H	H							
		云计算与云服务		L		L			M					
		机器学习导论		L	M		L		L					
		DSP 原理与应用 C		L	L	L		M	L				L	L
		现代通信技术与应用			M				L					

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
		数据库与信息系统		M	L				L					
		高级机器学习		L	L		M		M					
		智能信号处理与应用		M	M		L		M					
		光纤传感技术与应用			L	M		M	M					
		工业互联网及其应用	L	M		L		L				L		L
		微波信号处理与应用	L	L			M							L
		无线传感网技术	H	H			H							
		技术创新与科技进步						H	H				H	H
		机械制造工程实训						H	H	H	H			
		电工电子实习			H				H			H	H	H
		模拟电子技术基础课程设计	H		H		H							
		数字电子技术基础课程设计	H		H		H					H		
		移动通信系统应用设计		H	H	H	H					H		
		PROTEL 应用实践		H	H	H	H		H		H			
		FPGA 原理与应用课程设计	H		H		H					H		
		信息处理课群综合应用设计		H	H	H	H		H		H			
		单片机应用设计	H		H		H					H		
		专业实习	H					H			H	H	H	
		毕业设计（论文）		H	H	H	H					H	M	

三、课程教学进程图

Ⅲ　Teaching Process Map



四、教学建议进程表
Ⅳ Course Schedule

（一）公共基础必修课程
1 Public Basic Compulsory Courses

开课单位 Course college	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.	理论 Theory	实验 Exp.	上机 Ope-ration	实践 Prac-tice	课外 Extra-cur		
马克思主义学院	4220001210	思想道德与法治 Morality and the rule of law	2.5	42	42					2	
马克思主义学院	4220002180	中国近现代史纲要 Outline of Contemporary and Modern Chinese History	2.5	42	42					1	
马克思主义学院	4220003180	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	4.5	66	66					4	
马克思主义学院	4220005180	马克思主义基本原理 Marxism Philosophy	2.5	42	42					3	
学工部	1050001210	军事技能训练 Military Skills Training	2	136				136		1	
学工部	1050002210	军事理论 Military Theory	2	32	32					1	
体育部	4210001170	体育 1 Physical Education Ⅰ	1	32	32					1	
体育部	4210002170	体育 2 Physical Education Ⅱ	1	32	32					2	
体育部	4210003170	体育 3 Physical Education Ⅲ	1	32	32					3	
体育部	4210004170	体育 4 Physical Education Ⅳ	1	32	32					4	
外语学院	4030001210	大学英语 1 College English I	2	48	32				16	1	
外语学院	4030002210	大学英语 2 College English Ⅱ	2	48	32				16	2	大学英语 1
外语学院	4030003210	大学英语 3 College English Ⅲ	2	48	32				16	3	大学英语 2
外语学院	4030004210	大学英语 4 College English IV	2	48	32				16	4	大学英语 3
计算机智能学院	4120001210	C程序设计基础A Fundamentals of Computer Program Design(C) A	2	32	32					1	
计算机智能学院	4120005210	计算机基础与Python程序设计综合实验A A Computer Foundation and Python Programming Comprehensive Experiment A	1	32		32				1	
小 计 Subtotal			31	744	512	32	0	136	64		

（二）通识教育选修课程
2 General Education Elective Courses

核心选修 Core elective courses	文明与传统类Civilization and Tradition Courses	通识课程应修满至少9学分。自主选修课程中，至少在艺术与审美、创新与创业两个领域各选修1门课程。 Minimum subtotal credits: 9. Self-selected courses， at least 1 course in art and aesthetics and 1 course in innovation and entrepreneurship.
	社会与发展类Society and Development Courses	
	艺术与人文类Art and Humanities Courses	
	自然与方法类Nature and methods Courses	
自主选修 Self-selected courses	数学与自然科学、哲学与心理学、法学与社会科学、经济与管理、历史与文化、语言与文学、艺术与审美、创新与创业 Mathematics and Natural Sciences, Philosophy and Psychology, Science and Social Sciences, Economics and Management, History and Culture, Language and Literature, Art and Aesthetics, Innovation and Entrepreneurship	

开课单位 Course college	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.	理论 Theory	实验 Exp.	上机 Ope-ration	实践 Prac-tice	课外 Extra-cur		
（三）大类必修课程 3 Basic Discipline Required Courses											
理学院	4050229110	线性代数 Linear Algebra	2.5	40	40					1	
理学院	4050001210	高等数学A 上 Advanced Mathematics Ⅰ	4.5	72	72					1	
理学院	4050002210	高等数学A 下 Advanced Mathematics Ⅱ	5.5	88	88					2	
自动化学院	4100001210	电路原理B上 Circuit Principle B	2	32	32					1	高等数学上
自动化学院	4100002210	电路原理B实验上 Electric Circuits B Exp Ⅰ	0.5	16		16				1	电路原理B上
自动化学院	4100007210	电路原理B下 Circuit Principle B	3	48	48					2	电路原理B上
自动化学院	4100006210	电路原理B实验下 Electric Circuits B Exp Ⅱ	0.5	16		16				2	电路原理B下
理学院	4050021110	大学物理A 上 Physics Ⅰ	3.5	56	56					2	
理学院	4050466130	物理实验A 上 Physics Lab. Ⅰ	1	32	32					3	
理学院	4050022110	大学物理A 下 Physics Ⅱ	3.5	56	56					3	
理学院	4050467130	物理实验A 下 Physics Lab. Ⅱ	1	32	32					4	
理学院	4050052110	复变函数与积分变换 Complex Function and Integral Transform	3	48	48					3	
信息学院	4110048110	模拟电子技术基础 A Fundamentals of Analog Electronic Circuit	4	64	64					2	电路原理B上 电路原理B下
信息学院	4110051110	模拟电子技术基础实验 Experiments of Analog Electronics Circuit	0.5	16		16				2	模拟电子技术基础
理学院	4050058110	概率论与数理统计B Probability and Mathematical Statistics	3	48	48					4	
信息学院	4110066110	数字电子技术基础C Fundamentals of Digital Electronic Circuit	4	64	64					3	模拟电子技术基础
信息学院	4110068110	数字电子技术基础实验 Experiments of Digital Electronics Circuit	0.5	16		16				3	数字电子技术基础
信息学院	4110306170	通信工程专业导论 Introduction to Speciality	1	16	16					1	
小 计 Subtotal			43.5	760	696	64	0	0	0		
（四）专业必修课程 4 Specialized Required Courses											
信息学院	4110093110	信号与系统 A Signal and System	4	64	56	8				4	复变函数与积分变换
信息学院	4110310170	高频电子线路 High-frequency Electronic Circuits	3	48	48					4	模拟电子技术基础
信息学院	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
信息学院	4110313170	数字信号处理B Digital Signal Processing	3.5	56	48	8				5	信号与系统
信息学院	4110314170	通信原理D Communication Principles	3	48	48					5	信号与系统
信息学院	4110379170	通信原理实验 Experiments of Communication Principles	0.5	16		16				5	通信原理

开课单位 Course college	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.	理论 Theory	实验 Exp.	上机 Ope-ration	实践 Prac-tice	课外 Extra-cur		
信息学院	4110022210	单片机及嵌入式系统原理 Principle of Singlechip and embeded system	3	48	48					4	
信息学院	4110315170	信息理论与编码C Information Theory and Coding	2.5	40	32	8				6	概率论与数理统计
信息学院	4110244130	电磁场与电磁波A Electromagnetic Fields and Electromagnetic Wave	3	48	48					5	电路原理B下
		小 计 Subtotal	23	384	328	56	0	0	0		
（五）专业选修课程 5 Specialized Elective Courses											
信息学院	4110270140	数据结构与算法F Data Structure And Algorithm	2.5	40	32	8				3	C 程序设计基础
信息学院	4110304150	高级程序设计A Advanced Computer Program Design	3	48	40	8				5	
信息学院	4110316170	FPGA原理及应用B FPGA Technique Application	3	48	16	32				5	数字电子技术基础
信息学院	4110008210	现代交换技术 Modern Switching Technique	2.5	40	28	12				4	
信息学院	4110089110	微波技术与天线 Microwave Technology and Antenna Theory	3	40	32	8				6	
信息学院	4110224130	软件工程D Software Engineering	2	32	32					6	
信息学院	4110036110	光纤通信B Optic Fiber Communication	2.5	40	28	12				6	
信息学院	4110098110	移动通信A Mobile Communication	2.5	40	32	8				6	
信息学院	4110349170	图像处理与通信B Image Processing and Communication	2.5	40	32	8				7	数字信号处理
信息学院	4110170120	计算机网络与通信D Computer Newwork and Communication	2.5	40	32	8				4	
信息学院	4110385170	现代无线通信 Modern Wireless Communications	2.5	40	40					7	
信息学院	4110088110	通信创新创业工程设计实验 Modern Sense Technique	2	64		64				7	
信息学院	4110218130	电子设计原理与应用 Principle and Application of Electronic Design	2	32	32					4	
信息学院	4110095110	信息安全技术 Information Security Technology	2	32	32					7	
信息学院	4110494190	云计算与云服务 Cloud Computing and Cloud Service	2	32	24	8				6	大数据技术基础
信息学院	4110495190	机器学习导论 Introduction to Machine Learning	2	32	24	8				6	数字信号处理
信息学院	4110001110	DSP 原理及应用C Principle and Application of DSP	2	32	24	8				6	嵌入式技术原理与应用
信息学院	4110037110	现代通信技术与应用 Advanced Communication Technology and Application	2	32	32					7	通信原理
信息学院	4110063110	数据库与信息系统 Data Base and Information Systems	2	32	24	8				7	C 程序设计基础
信息学院	4110005210	高级机器学习 Advances Machine Learning	2.5	40	32	8				7	机器学习导论
信息学院	4110006210	智能信号处理与应用 Intelligent Signal Processing and Application	1.5	24	24					7	数字图像处理

开课单位 Course college	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.	理论 Theory	实验 Exp.	上机 Ope-ration	实践 Prac-tice	课外 Extra-cur		
信息学院	4110012210	光纤传感技术与应用 Optical Fiber Sensing Technology and Application	2	32	32					7	
信息学院	4110007210	工业互联网及其应用 Industrial Internet and Application	2	32	32					7	
信息学院	4110010210	微波信号处理与应用 Microwave Signal Processing and Application	2	32	32					7	
小 计 Subtotal			54.5	896	688	208	0	0	0		
修读说明：要求至少选修26学分。 NOTE：Minimum subtotal credits:26.											
（六）个性课程 6 Personalized Elective Courses											
信息学院	4110350170	移动设备应用开发技术B Mobile Device Application Development Technology	2.5	40	32	8				6	C 程序设计基础
信息学院	4110185120	无线传感网技术 Technology of Wireless Sensor Network	2.5	40	32	8				6	
信息学院	4110268140	技术创新与科技进步 Technology Innovation and Scientific and Technological Progress	1	16	16					7	
小 计 Subtotal			6	96	80	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.											

（七）专业教育集中性实践教学环节

7 Specialized Practice Schedule

开课单位 Course college	课程编号 Course Number	实践环节名称 Practice Courses Name	学分 Crs	总学时 Tot hrs.	周数 Weeks	建议修读学期 Suggested Term	先修课程 Prerequisite Course
机电学院	4080152110	机械制造工程实训D Metalworking Practice	1	16	1	2	
自动化学院	4100068110	电工电子实习A Practice in Electrical Engineering	2	32	2	3	
信息学院	4110128110	模拟电子技术基础课程设计 Course Design on Fundamentals of Analog Electronic Circuit	1	16	1	2	
信息学院	4110129110	数字电子技术基础课程设计 Course Design on Fundamentals of Digital Electronic Circuit	1	16	1	3	
信息学院	4110236130	信息处理课群综合应用设计 Cpmpressive Training and Design on Signal Processing	1	32	2	6	
信息学院	4110214130	单片机应用设计 Microcomputer Application Practice	1	32	2	4	
信息学院	4110351170	Protel应用实践B Course Design on Protel Application	1	16	1	5	
信息学院	4110352170	移动通信系统应用设计 Application Design on Mobile Communication System	1	32	2	6	
信息学院	4110353170	FPGA原理与应用课程设计 Course Design on FPGA Principle and Application	1	32	2	5	
信息学院	4110152110	通信工程专业实习 Speciality practice	3	48	3	7	
信息学院	4110029210	毕业设计 Graduation Thesis	8.5	272	17	8	
小 计 Subtotal			21.5	544	34		

五、学时学分比例

Ⅴ Proportion of class hours and credits

分类		学分/学时	毕业总学分/学时（不含课外）	比例（%）
各类选修课程		41	160	25.6
实践教育课程（包括实验课）		42	160	26.3
数学与自然科学类课程		25.5	160	15.9
工程基础类课程、专业基础类课程与专业类课程		70	160	43.8
工程实践与毕业设计（论文）	通识必修和专业必修中独立设课的综合性实验课	6	160	3.8
	集中实践环节中的工程实践课	19	160	11.9
	毕业设计（论文）	17	160	10.6
人文社会科学类通识教育课程		35	160	21.9
选修课课程设置总学分与选修毕业要求学分比例				2.1:1

六、修读指导

Ⅵ Recommendations on Course Studies

课外培养方案详见《武汉理工大学第二课堂课外学分实施办法》。

《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 个课外学分。

Please refer to the cultivation plan of the second class-Implementation Measures for Extracurricular Credits of the Second Class of Wuhan University of Technology.

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

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。

学院教学责任人：李政颖

专业培养方案责任人：杜庆国

通信工程专业（国际班）2021 版本科培养方案
Undergraduate Education Plan for Specialty in Communication Engineering（International Class）(2021)

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	**电子类** Electronics	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	公共基础课程 Public Basic Courses	通识教育课程 Public Courses	大类课程 Basic Courses in General Discipline	专业教育课程 Specialized Courses	个性课程 Personalized Course	专业教育集中性实践教学环节 Specialized Practice Schedule	课外学分 Study Credit after Class	总学分 Total Credits
必修课 Required Courses	31	\	43.5	23	\	21.5	10	180
选修课 Elective Courses	\	9	\	26	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。本专业学生毕业五年左右应达到的目标如下：

(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:

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

(7) The graduate should ossessing 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.

(8) 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.

(9) 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.

(10) 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 能够通过查阅文献辅助分析通信工程领域的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的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、现代工程工具等信息技术，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和现代工程工具进行建模、预测与仿真，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 理解环境保护和可持续发展的理念与内涵，并能理解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；

7.2 能够树立绿色制造的理念，并理解用技术手段降低通信工程生产实践负面影响的作用与其局限性。

（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，能够阅读相关国内外科技文献，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：在与通信工程专业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 能够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 graduation 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 master the engineering design methods and the basic design/development methods and techniques in a complete cycle and process of product development, taught in the communication engineering profession; and understand the various factors affecting the design goals and technical solutions.

3.2 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.

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

3.4 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, mode engineering tools 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 select the appropriate technical means and modern engineering tools for the analysis, calculation and design according to the complex engineering problems in communication engineering.

5.3 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 know and understand the concept and connotation of environmental protection and sustainable development; and understand the impact of engineering practices on complex engineering problems in communication engineering on environmental and social sustainable development.

7.2 The graduate should have established the concept of green manufacturing and understand the role and limitations of using technical means to reduce the negative impact of produce practices in communication engineering.

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 engineering ethics and norms of honesty and integrity; and consciously abide by them during engineering practice.

8.3 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 understand the international trends and research hotspots in communication engineering; and understand and respect the differences and diversity of different cultures in the world.

10.3 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 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 and master the engineering management principles and economic decision-making methods related to communication engineering.

11.2 The graduate should understand the cost structure of a product related to communication engineering during its complete cycle and process; and understand the engineering management and economic decision-making issues involved.

11.3 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

	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、通信原理、数字信号处理、信息理论与编码、高频电子线路，电磁场与电磁波。

Signal and System, Communication Principles，Digital signal processing，Information Theory and Coding，High-frequency Electronic Circuit, Electromagnetic field and Electromagnetic waves.

（二） 通信工程专业特色课程：

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。

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：

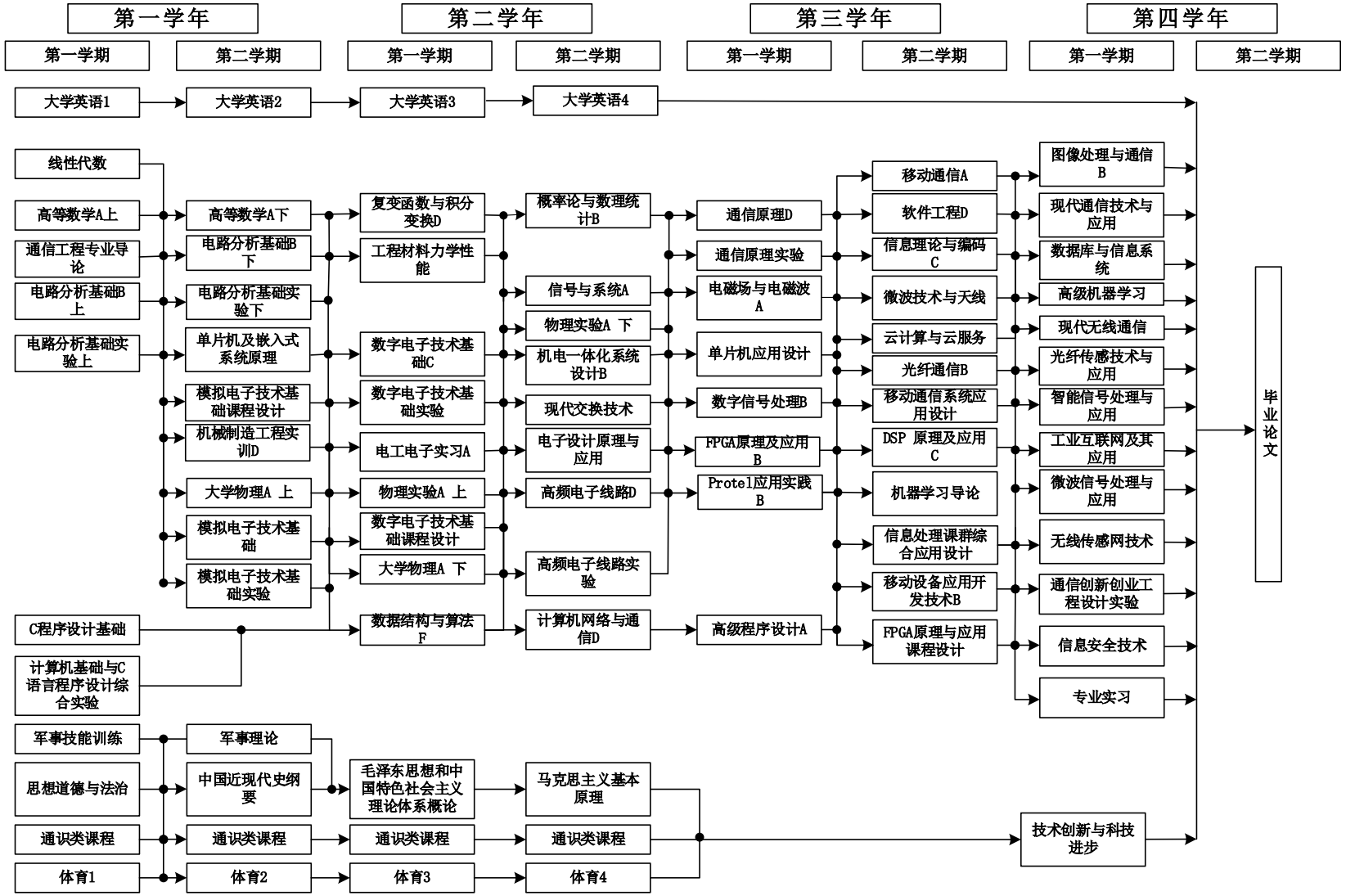
专业核心课程	专业特色课程	课程名称	通信工程专业（国际班）毕业要求											
			1	2	3	4	5	6	7	8	9	10	11	12
		思想道德与法治			L			H		H				H
		中国近现代史纲要			L			H	H					
		毛泽东思想和中国特色社会主义理论体系概论			L			H	H	H	H	H		
		马克思主义基本原理			L			H	H	H				
		军事理论			H			H		H				
		体育			H			H		H				
		大学英语										H	H	H
		C 程序设计基础			H		H							
		计算机基础与 C 程序设计综合实验				H	H							
		专业导论						H	H				H	H
		高等数学	H	H										
		线性代数	H	H										
		复变函数与积分变换	H	H										
		概率论与数理统计	H	H										
		大学物理	H	H		H								
		物理实验				H								
		电路分析基础	H	H			L							
		电路分析基础实验				H	H							
		模拟电子技术基础	H	H	H	M								
		模拟电子技术基础实验				H	H							
		数字电子技术基础	H	H	H									
		数字电子技术基础实验				H	H							
√	√	信号与系统	H	H	H	H	M							

专业核心课程	专业特色课程	课程名称	通信工程专业（国际班）毕业要求											
			1	2	3	4	5	6	7	8	9	10	11	12
	√	高频电子线路	H	H										
		单片机及嵌入式系统原理			H	H	H							
√	√	电磁场与电磁波	H	H			L							
√	√	通信原理	H	H		H		H						
√		数字信号处理	H		H	M								
√	√	信息理论与编码	H	H	H	M								
		通信创新创业工程设计实验				H		H	H	H	H	H	H	H
		数据结构与算法			H	M	H							
		高频电子线路实验				H	H							
		通信原理实验				H	H							
	√	现代交换技术		H	H			H						H
	√	光纤通信	H	H		H								
	√	移动通信	H	H		H								
	√	计算机网络与通信	H	M	M									
		高级程序设计		M	M	H	H							M
		电子设计原理与应用	H	H	H		H							
		FPGA 原理及应用			H	H	H							
		微波技术与天线	H	H			M							
		软件工程			H	M	M				H	H	L	
		图像处理与通信	H	H	M	M	M							
		现代无线通信	H	H			M							
		机电一体化系统设计						H	H	H				
		工程材料力学性能			H	H	H							
		信息安全技术	H	H			H							
		云计算与云服务		L		L			M					
		机器学习导论		L	M		L		L					
		智能信号处理与应用		M	M		L		M					

专业核心课程	专业特色课程	课程名称	通信工程专业（国际班）毕业要求											
			1	2	3	4	5	6	7	8	9	10	11	12
		光纤传感技术与应用			L	M		M	M					
		工业互联网及其应用	L	M		L		L				L		L
		微波信号处理与应用	L	L			M							L
		移动设备应用开发技术						H	H				H	H
		无线传感网技术						H	H	H	H			
		技术创新与科技进步			H				H			H	H	H
		机械制造工程实训	H		H		H							
		电工电子实习	H		H		H					H		
		模拟电子技术基础课程设计		H	H	H	H					H		
		数字电子技术基础课程设计		H	H	H	H		H		H			
		移动通信系统应用设计	H		H		H					H		
		PROTEL 应用实践		H	H	H	H		H		H			
		FPGA 原理与应用课程设计	H		H		H					H		
		信息处理课群综合应用设计	H					H			H	H	H	
		单片机应用设计		H	H	H	H					H	M	
		专业实习			L			H		H				H
		毕业设计（论文）			L			H	H					

三、课程教学进程图

Ⅲ　Teaching Process Map



四、教学建议进程表

Ⅳ Course Schedule

（一）公共基础必修课程

1 Public Basic Compulsory Courses

开课单位 Course college	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.	理论 Theory	实验 Exp.	上机 Ope-ration	实践 Prac-tice	课外 Extra-cur		
马克思主义学院	4220001210	思想道德与法治 Morality and the rule of law	2.5	42	42					2	
马克思主义学院	4220002180	中国近现代史纲要 Outline of Contemporary and Modern Chinese History	2.5	42	42					1	
马克思主义学院	4220003180	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	4.5	66	66					4	
马克思主义学院	4220005180	马克思主义基本原理 Marxism Philosophy	2.5	42	42					3	
学工部	1050001210	军事技能训练 Military Skills Training	2	136				136		1	
学工部	1050002210	军事理论 Military Theory	2	32	32					1	
体育部	4210001170	体育 1 Physical Education Ⅰ	1	32	32					1	
体育部	4210002170	体育 2 Physical Education Ⅱ	1	32	32					2	
体育部	4210003170	体育 3 Physical Education Ⅲ	1	32	32					3	
体育部	4210004170	体育 4 Physical Education Ⅳ	1	32	32					4	
外语学院	4030001210	大学英语 1 College English I	2	48	32				16	1	
外语学院	4030002210	大学英语 2 College English Ⅱ	2	48	32				16	2	大学英语 1
外语学院	4030003210	大学英语 3 College English Ⅲ	2	48	32				16	3	大学英语 2
外语学院	4030004210	大学英语 4 College English IV	2	48	32				16	4	大学英语 3
计算机智能学院	4120001210	C程序设计基础A Fundamentals of Computer Program Design(C) A	2	32	32					1	
计算机智能学院	4120005210	计算机基础与C程序设计综合实验A Computer Foundation and C ProgrammingComprehensive Experiment A	1	32		32				1	
小 计 Subtotal			31	744	512	32	0	136	64		

（二）通识教育选修课程

2 General Education Elective Courses

核心选修 Core elective courses	文明与传统类Civilization and Tradition Courses	通识课程应修满至少9学分。自主选修课程中，至少在艺术与审美、创新与创业两个领域各选修1门课程。 Minimum subtotal credits: 9. Self-selected courses， at least 1 course in art and aesthetics and 1 course in innovation and entrepreneurship.
	社会与发展类Society and Development Courses	
	艺术与人文类Art and Humanities Courses	
	自然与方法类Nature and methods Courses	
自主选修 Self-selected courses	数学与自然科学、哲学与心理学、法学与社会科学、经济与管理、历史与文化、语言与文学、艺术与审美、创新与创业 Mathematics and Natural Sciences, Philosophy and Psychology, Science and Social Sciences, Economics and Management, History and Culture, Language and Literature, Art and Aesthetics, Innovation and Entrepreneurship	

（三）大类必修课程

3 Basic Discipline Required Courses

理学院	4050229110	线性代数 Linear Algebra	2.5	40	40					1	

开课单位 Course college	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.	理论Theory	实验Exp.	上机Ope-ration	实践Prac-tice	课外Extra-cur		
理学院	4050001210	高等数学A 上 Advanced Mathematics Ⅰ	4.5	72	72					1	
理学院	4050002210	高等数学A 下 Advanced Mathematics Ⅱ	5.5	88	88					2	
自动化学院	4100001210	电路原理B上 Circuit Principle B	2	32	32					1	高等数学上
自动化学院	4100002210	电路原理B实验上 Electric Circuits B Exp Ⅰ	0.5	16		16				1	电路原理B上
自动化学院	4100007210	电路原理B下 Circuit Principle B	3	48	48					2	电路原理B上
自动化学院	4100006210	电路原理B实验下 Electric Circuits B Exp Ⅱ	0.5	16		16				2	电路原理B下
理学院	4050021110	大学物理A 上 Physics Ⅰ	3.5	56	56					2	
理学院	4050466130	物理实验A 上 Physics Lab. Ⅰ	1	32	32					3	
理学院	4050022110	大学物理A 下 Physics Ⅱ	3.5	56	56					3	
理学院	4050467130	物理实验A 下 Physics Lab. Ⅱ	1	32	32					4	
理学院	4050052110	复变函数与积分变换 Complex Function and Integral Transform	3	48	48					3	
信息学院	4110048110	模拟电子技术基础 A Fundamentals of Analog Electronic Circuit	4	64	64					2	电路原理B上 电路原理B下
信息学院	4110051110	模拟电子技术基础实验 Experiments of Analog Electronics Circuit	0.5	16		16				2	模拟电子技术基础
理学院	4050058110	概率论与数理统计B Probability and Mathematical Statistics	3	48	48					4	
信息学院	4110066110	数字电子技术基础C Fundamentals of Digital Electronic Circuit	4	64	64					3	模拟电子技术基础
信息学院	4110068110	数字电子技术基础实验 Experiments of Digital Electronics Circuit	0.5	16		16				3	数字电子技术基础
信息学院	4110306170	通信工程专业导论 Introduction to Speciality	1	16	16					1	
小 计 Subtotal			43.5	760	696	64	0	0	0		
（四）专业必修课程 4 Specialized Required Courses											
信息学院	4110093110	信号与系统 A Signal and System	4	64	56	8				4	复变函数与积分变换
信息学院	4110310170	高频电子线路D High-frequency Electronic Circuits	3	48	48					4	模拟电子技术基础
信息学院	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
信息学院	4110313170	数字信号处理B Digital Signal Processing	3.5	56	48	8				5	信号与系统
信息学院	4110314170	通信原理D Communication Principles	3	48	48					5	信号与系统
信息学院	4110379170	通信原理实验 Experiments of Communication Principles	0.5	16		16				5	通信原理
信息学院	4110022210	单片机及嵌入式系统原理 Principle of Singlechip and embeded system	3	48	48					2	

开课单位 Course college	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.	理论Theory	实验Exp.	上机Ope-ration	实践Prac-tice	课外Extra-cur		
信息学院	4110315170	信息理论与编码C Information Theory and Coding	2.5	40	32	8				6	概率论与数理统计
信息学院	4110244130	电磁场与电磁波A Electromagnetic Fields and Electromagnetic Wave	3	48	48					5	电路原理B下
小 计 Subtotal			23	384	328	56	0	0	0		
（五）专业选修课程 5 Specialized Elective Courses											
信息学院	4110270140	数据结构与算法F Data Structure And Algorithm	2.5	40	32	8				3	C 程序设计基础
信息学院	4110304150	高级程序设计A Advanced Computer Program Design	3	48	40	8				5	
信息学院	4110316170	FPGA原理及应用B FPGA Technique Application	3	48	16	32				5	数字电子技术基础
信息学院	4110008210	现代交换技术 Modern Switching Technique	2.5	40	28	12				4	
信息学院	4110089110	微波技术与天线 Microwave Technology and Antenna Theory	3	40	32	8				6	
信息学院	4110224130	软件工程D Software Engineering	2	32	32					6	
信息学院	4110036110	光纤通信B Optic Fiber Communication	2.5	40	28	12				6	
信息学院	4110098110	移动通信A Mobile Communication	2.5	40	32	8				6	
信息学院	4110349170	图像处理与通信B Image Processing and Communication	2.5	40	32	8				7	数字信号处理
信息学院	4110170120	计算机网络与通信D Computer Newwork and Communication	2.5	40	32	8				4	
信息学院	4110385170	现代无线通信 Modern Wireless Communications	2.5	40	40					7	
信息学院	4110088110	通信创新创业工程设计实验 Modern Sense Technique	2	64	64					7	
信息学院	4110218130	电子设计原理与应用 Principle and Application of Electronic Design	2	32	32					4	
信息学院	4110494190	云计算与云服务 Cloud Computing and Cloud Service	2	32	24	8				6	大数据技术基础
信息学院	4110495190	机器学习导论 Introduction to Machine Learning	2	32	24	8				6	数字信号处理
信息学院	4110001110	DSP 原理及应用C Principle and Application of DSP	2	32	24	8				6	嵌入式技术原理与应用
信息学院	4110037110	现代通信技术与应用 Advanced Communication Technology and Application	2	32	32					7	通信原理
信息学院	4110063110	数据库与信息系统 Data Base and Information Systems	2	32	24	8				7	C 程序设计基础
信息学院	4110005210	高级机器学习 Advances Machine Learning	2.5	40	32	8				7	机器学习导论
信息学院	4110006210	智能信号处理与应用 Intelligent Signal Processing and Application	1.5	24	24					7	数字图像处理
信息学院	4110012210	光纤传感技术与应用 Optical Fiber Sensing Technology and Application	2	32	32					7	
信息学院	4110095110	信息安全技术 Information Security Technology	2	32	32					7	

开课单位 Course college	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.	理论Theory	实验Exp.	上机Ope-ration	实践Prac-tice	课外Extra-cur		
信息学院	4110007210	工业互联网及其应用 Industrial Internet and Application	2	32	32					7	
信息学院	4080057110	机电一体化系统设计B Mechatronics System Design	2	32	32					4	
信息学院	4050350110	工程材料力学性能 Engineering material mechanical properties	2	32	32					3	
信息学院	4110010210	微波信号处理与应用 Microwave Signal Processing and Application	2	32	32					7	
小 计 Subtotal			58.5	960	816	144	0	0	0		
修读说明：要求至少选修26学分。 NOTE：Minimum subtotal credits:26.											
（六）个性课程 6 Personalized Elective Courses											
信息学院	4110350170	移动设备应用开发技术B Mobile Device Application Development Technology	2.5	40	32	8				6	
信息学院	4110185120	无线传感网技术 Technology of Wireless Sensor Network	2.5	40	32	8				7	
信息学院	4110268140	技术创新与科技进步 Technology Innovation and Scientific and Technological Progress	1	16	16					7	
小 计 Subtotal			6	96	72	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.											

（七）专业教育集中性实践教学环节

7 Specialized Practice Schedule

开课单位 Course college	课程编号 Course Number	实践环节名称 Practice Courses Name	学分 Crs	总学时 Tot hrs.	周数 Weeks	建议修读学期 Suggested Term	
机电学院	4080152110	机械制造工程实训D Metalworking Practice	1	16	1	2	
自动化学院	4100068110	电工电子实习A Practice in Electrical Engineering	2	32	2	3	
信息学院	4110128110	模拟电子技术基础课程设计 Course Design on Fundamentals of Analog Electronic Circuit	1	16	1	2	
信息学院	4110129110	数字电子技术基础课程设计 Course Design on Fundamentals of Digital Electronic Circuit	1	16	1	3	
信息学院	4110236130	信息处理课群综合应用设计 Cpmpressive Training and Design on Signal Processing	1	32	2	6	
信息学院	4110214130	单片机应用设计 Microcomputer Application Practice	1	32	2	5	
信息学院	4110351170	Protel应用实践B Course Design on Protel Application	1	16	1	5	
信息学院	4110352170	移动通信系统应用设计 Application Design on Mobile Communication System	1	32	2	6	
信息学院	4110353170	FPGA原理与应用课程设计 Course Design on FPGA Principle and Application	1	32	2	6	
信息学院	4110152110	通信工程专业实习 Speciality practice	3	48	3	7	
信息学院	4110029210	毕业论文 Graduation Thesis	8.5	272	17	8	
小 计 Subtotal			21.5	544	34		

五、学时学分比例

Ⅴ Proportion of class hours and credits

分类		学分/学时	毕业总学分/学时（不含课外）	比例（%）
各类选修课程		41	160	25.6
实践教育课程（包括实验课）		42	160	26.3
数学与自然科学类课程		25.5	160	15.9
工程基础类课程、专业基础类课程与专业类课程		70	160	43.8
工程实践与毕业设计（论文）	通识必修和专业必修中独立设课的综合性实验课	6	160	3.8
	集中实践环节中的工程实践课	19	160	11.9
	毕业设计（论文）	17	160	10.6
人文社会科学类通识教育课程		35	160	21.9
选修课课程设置总学分与选修毕业要求学分比例				2.3:1

六、修读指导

Ⅵ Recommendations on Course Studies

课外培养方案详见《武汉理工大学第二课堂课外学分实施办法》。

《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 个课外学分。

Please refer to the cultivation plan of the second class-Implementation Measures for Extracurricular Credits of the Second Class of Wuhan University of Technology.

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

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。

学院教学责任人：李政颖

专业培养方案责任人：杜庆国

信息工程专业 2021 版本科培养方案
Undergraduate Education Plan for Specialty in Information Engineering (2021)

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	**电子类**	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	公共基础课程 Public Basic Courses	通识教育课程 Public Courses	大类课程 Basic Courses in General Discipline	专业教育课程 Specialized Courses	个性课程 Personalized Course	专业教育集中性实践教学环节 Specialized Practice Schedule	课外学分 Study Credit after Class	总学分 Total Credits
必修课 Required Courses	31	\	43.5	27	\	18.5	10	180
选修课 Elective Courses	\	9	\	25	6	\	10	

一、培养目标与毕业要求

Ⅰ Educational Objectives & Requirement

（一） 培养目标

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) 工程知识：能够掌握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信息工程领域的复杂工程问题。

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

(3) 设计/开发解决方案：针对信息工程领域的复杂工程问题，设计满足实际工程需求的系统解决方案，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。

(4) 研究：能够基于科学原理并采用科学方法对信息工程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。

(5) 使用现代工具：能够针对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。

(6) 工程与社会：能够基于信息工程相关背景知识进行合理分析，评价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。

(7) 环境和可持续发展：能够理解和评价针对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。

(8) 职业规范：具有人文社会科学素养、社会责任感，能够在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。

(9) 个人和团队：能够在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。

(10) 沟通：能够就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。

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

(12) 终身学习：能够意识到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，有不断学习和适应信息工程领域发展的能力。

(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 lifetime. 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. Being able to understand and apply basic data structures and databases in a flexible way, and can develop some simple databases.

(9) 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. Being well equipped with the basic knowledge on electronics and circuits in order to conduct a basic analyzing.

(10) 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.

(11) 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. Mastering the fundamentals of signal and system as well as the basic methods of signal processing.

(12) 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	√			√	√

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、信息理论与编码、数据结构与算法、数据库与信息系统、通信原理、数字信号处理。

Signal and System, Information Theory and Encode, Data Structure and Algorithm, Database and Information Systems, Communication Principles, Digital Signal Processing.

（二） 专业特色课程：

感测技术、计算机网络与通信、无线传感网技术、数字图像处理、Android 软件设计。

Characteristic Courses: Sensor and Detection Technology, Computer Networks and Communication, Wireless Sensing Network Technology, Digital image processing, Android Software Design.

附：毕业要求实现矩阵：

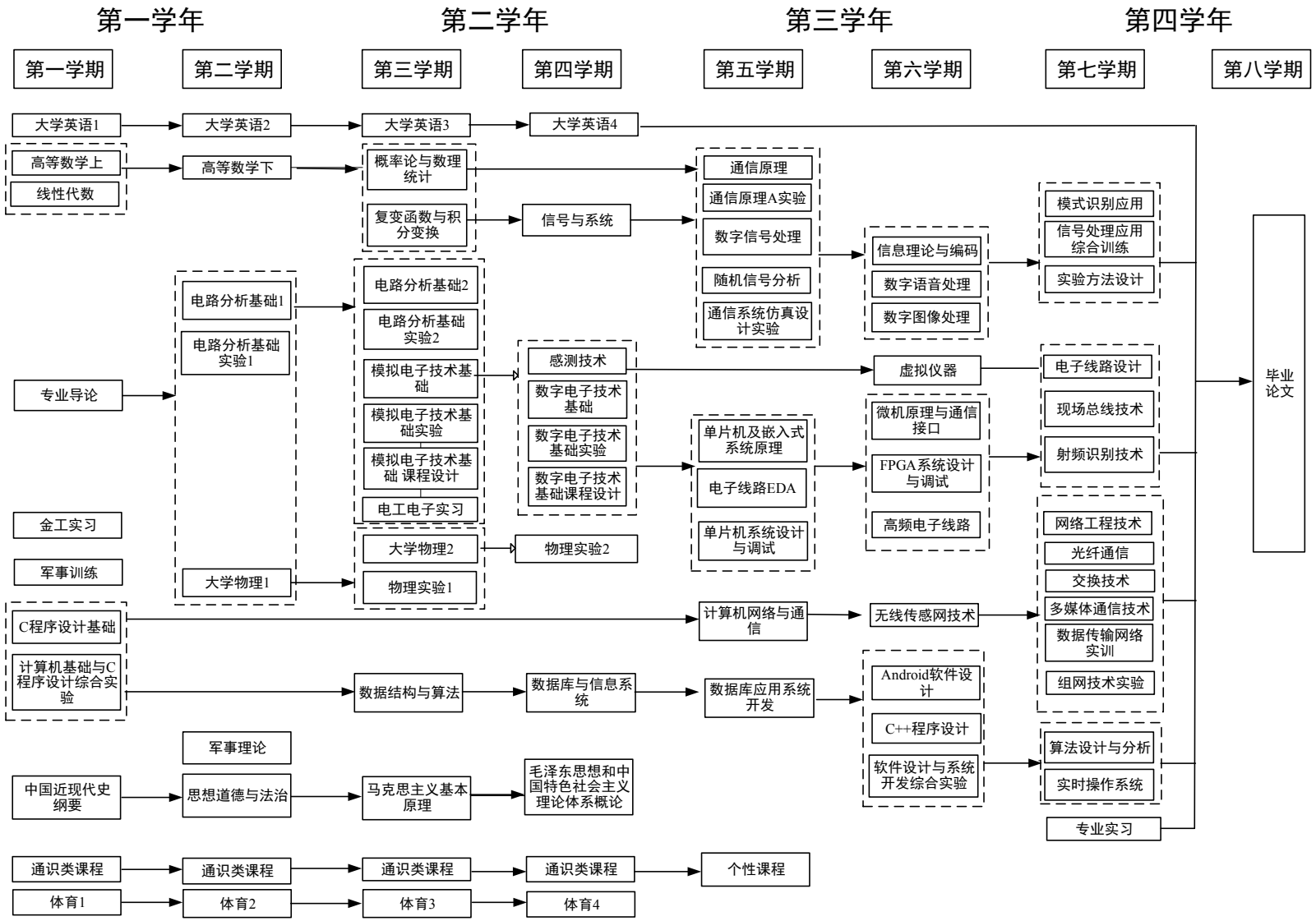
专业核心课程	专业特色课程	课程名称	信息工程专业毕业要求											
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
		思想道德修养与法律基础						H	H	H				
		中国近现代史纲要						H	H	H				
		毛泽东思想和中国特色社会主义理论体系概论						H	H	H				
		马克思主义基本原理						H	H	H				
		军事理论								H	H	M		
		体育 1								M	H	H		
		体育 2								M	H	H		
		体育 3								M	H	H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

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)
		大学英语 2		H								H	M	H
		大学英语 3		H								H	M	H
		大学英语 4		H								H	M	H
		C 程序设计基础		M		H				H				
		计算机基础与 C 程序设计综合实验	M	M	H	H	H							
		专业导论	M	H										
		高等数学上	H	H	M	H								
		高等数学下	H	H	M	H								
		线性代数	H	H	M	H								
		概率论与数理统计	H	H	M	H								
		大学物理上	H	H	M	H								
		物理实验上	H	H	M	H								
		大学物理下	H	H	M	H								
		物理实验下	H	H	M	H								
		电路分析基础上	H	M		H								M
		电路分析基础下	H	M		H								M
		电路分析基础实验上	M	H										
		电路分析基础实验下	M	H										
		模拟电子技术基础	H	M		H	H							M
		模拟电子技术基础实验	M	H										
		数字电子技术基础	H	M		H	H							M
		数字电子技术基础实验	M	H										
√		信号与系统	H	H	H	H		M						
		复变函数与积分变换	H	H	M	H								
√		数据结构与算法	H	H	H	H	H	M						
√		数据库与信息系统	H	H	H	H	H	M						
		高频电子线路	H	M		H	H							M
	√	感测技术	H	M		H	H							M
		单片机及嵌入式系统原理	H	M		H	H							M
√		通信原理	H	H	H	H		M						M
		通信原理实验	M	H		M								
√		数字信号处理	H	H	H	H		M						
	√	计算机网络与通信	H	H	H	H		M				H		
		通信系统仿真设计实验	M	H		M								
		微机原理与通信接口	H	M		H	H							M
	√	数字图像处理	H	H	H	H		M						
√		信息理论与编码	H	H	H	H		M						
		信号处理应用综合实验	H	H	H	H	H	M						

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)
		软件设计与系统开发综合实验	H	H	H	M	H	H						
		电子线路 EDA	M	H	H									
		随机信号分析	H	H	H	H		M						M
		Java 语言程序设计 B			M		H							
		模式识别应用	H	H	H	H		M						M
		FPGA 系统设计与调试	M	H										
		网络工程技术	M		H	M	H							
		数字语音处理	H	H	M	H								H
		C++程序设计			H	M	M							
	√	无线传感网技术			H	M	M							
		虚拟仪器			M		H							
		交换技术			M	M	H							
		多媒体通信技术			M		H							
		算法设计与分析			M	M								
		实验方法设计		H	M	M								
	√	Android 软件设计			M		H							
		实时操作系统			M		H							
		光纤通信 D			M		H							
		现场总线技术			M		H							
		射频通信技术			M		H							
		大数据及云存储技术			M		H							
		光电子技术					H							M
		军事训练								M	H	H		
		机械制造工程实训			M		H							
		电工电子实习			M		H							
		模拟电子技术基础课程设计	H	H	H	M	H							
		数字电子技术基础课程设计	H	H	H	M	H							
		数据库应用系统开发	H	H	H	M	H							
		单片机系统设计与调试	H	H	H	M	H							
		组网技术实验	H	H	H	M	H							
		电子线路设计	H	H	H	M	H							
		数据传输网络实训	H	H	H	M	H							
		专业实习								H	H	H	H	M
		毕业论文	H	H	H	H	H	M					M	

三、课程教学进程图

Ⅲ　Teaching Process Map



四、教学建议进程表
Ⅳ Course Schedule

（一）公共基础必修课程
1 Public Basic Compulsory Courses

开课单位 Course college	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.	理论 Theory	实验 Exp.	上机 Ope-ration	实践 Prac-tice	课外 Extra-cur		
马克思主义学院	4220002180	中国近现代史纲要 Outline of Contemporary and Modern Chinese History	2.5	42	42					1	
马克思主义学院	4220001210	思想道德与法治 Morality and the rule of law	2.5	42	42					2	
马克思主义学院	4220005180	马克思主义基本原理 Marxism Philosophy	2.5	42	42					3	
马克思主义学院	4220003180	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	4.5	66	66					4	
学工部	1050001210	军事技能训练 Military Training	2	136				136		1	
学工部	1050002210	军事理论 Military Theory	2	32	32					2	
外语学院	4030001210	大学英语1 College English I	2	48	32				16	1	
外语学院	4030003180	大学英语2 College English Ⅱ	2	48	32				16	2	大学英语1
外语学院	4030003210	大学英语3 College English Ⅲ	2	48	32				16	3	大学英语2
外语学院	4030004210	大学英语4 College English Ⅳ	2	48	32				16	4	大学英语3
体育部	4210001170	体育1 Physical Education Ⅰ	1	32	32					1	
体育部	4210002170	体育2 Physical Education Ⅱ	1	32	32					2	
体育部	4210003170	体育3 Physical Education Ⅲ	1	32	32					3	
体育部	4210004170	体育4 Physical Education Ⅳ	1	32	32					4	
计算机智能学院	4120001210	C程序设计基础A Fundamentals of Computer Program Design(C) A	2	32	32					1	
计算机智能学院	4120005210	计算机基础与C程序设计综合实验A Computer Foundation and C Programming Comprehensive Experiment A	1	32		32				1	
小 计 Subtotal			31	744	512	32	0	136	64		

（二）通识教育选修课程
2 General Education Elective Courses

核心选修 Core elective courses	文明与传统类Civilization and Tradition Courses	通识课程应修满至少9学分。自主选修课程中，至少在艺术与审美、创新与创业两个领域各选修1门课程。 Minimum subtotal credits: 9. Self-selected courses， at least 1 course in art and aesthetics and 1 course in innovation and entrepreneurship.
	社会与发展类Society and Development Courses	
	艺术与人文类Art and Humanities Courses	
	自然与方法类Nature and methods Courses	
自主选修 Self-selected courses	数学与自然科学、哲学与心理学、法学与社会科学、经济与管理、历史与文化、语言与文学、艺术与审美、创新与创业 Mathematics and Natural Sciences, Philosophy and Psychology, Law and Social Science, Economics and Management, History and Culture, Language and Literature, Art and Aesthetics, Innovation and Entrepreneurship	

开课单位 Course college	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.	理论 Theory	实验 Exp.	上机 Ope-ration	实践 Prac-tice	课外 Extra-cur		
（三）大类必修课程 3 Basic Discipline Required Courses											
理学院	4050001210	高等数学A上 Advanced Mathematics Ⅰ	4.5	72	72					1	
理学院	4050229110	线性代数 Linear Algebra	2.5	40	40					1	
信息学院	4110144110	专业导论 Introduction to Speciality	1	16	16					1	
理学院	4050002210	高等数学A下 Advanced Mathematics Ⅱ	5.5	88	88					2	
理学院	4050021110	大学物理A上 College Physics Ⅰ	3.5	56	56					2	
理学院	4050022110	大学物理A下 College Physics Ⅱ	3.5	56	56					3	
理学院	4050466130	物理实验A上 Physics Experiment Ⅰ	1	32		32				3	
理学院	4050052110	复变函数与积分变换 Complex Function and Integral Transform	3	48	48					3	
理学院	4050058110	概率论与数理统计B Probability and Mathematical Statistics B	3	48	48					4	
理学院	4050467130	物理实验A下 Physics Experiment Ⅱ	1	32		32				4	
自动化学院	4100001210	电路原理B上 Circuit Principle B	2	32	32					2	高等数学A下
自动化学院	4100002210	电路原理B实验上 Electric Circuits B Exp Ⅰ	0.5	16		16				2	电路分析基础B1
自动化学院	4100007210	电路原理B下 Circuit Principle B	3	48	48					3	电路原理B上
自动化学院	4100006210	电路原理B实验下 Electric Circuits B Exp Ⅱ	0.5	16		16				3	电路原理B上
信息学院	4110048110	模拟电子技术基础A Fundamentals of Analog Electronic CircuitA	4	64	64					3	电路原理B下
信息学院	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A
信息学院	4110001210	数字电子技术基础A Fundamentals of Digital Electronic CircuitA	4	64	64					4	模拟电子技术基础A
信息学院	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A
小 计 Subtotal			43.5	488	424	64	0	0	0		
（四）专业必修课程 4 Specialized Required Courses											
信息学院	4110061110	数据结构与算法F Data Structure and Algorithm F	2.5	40	32	8				3	
信息学院	4110093110	信号与系统A Signal and System A	4	64	56	8				4	复变函数与积分变换B
信息学院	4110026110	数据库与信息系统 Database and Information Systems	2	32	24	8				4	
信息学院	4110026110	感测技术C Sensor and Detection Technology C	2	32	24	8				4	电路原理B上
信息学院	4110022210	单片机及嵌入式系统原理 Principle of MCU and Embedded System	3	48	48					5	数字电子技术基础A
信息学院	4110077110	通信原理D Communication Principles D	3	48	48					5	信号与系统A
信息学院	4110078110	通信原理实验 Experiments of Communication Principles	0.5	16		16				5	

开课单位 Course college	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.	理论 Theory	实验 Exp.	上机 Ope-ration	实践 Prac-tice	课外 Extra-cur		
信息学院	4110071110	数字信号处理B Digital Signal Processing B	3.5	56	48	8				5	信号与系统A
信息学院	4110162120	单片机系统设计与调试 Design and Debug of MCU based System	1	32		32				5	
信息学院	4110374170	数据库应用系统开发 A Development of Database Application System	1	32		32				5	
信息学院	4110360170	信息理论与编码 Information Theory and Encode	2.5	40	40					6	通信原理A
信息学院	4110023210	软件设计与系统开发综合实验 Design and Development of Software System	1	32		32				6	
信息学院	4110190120	信号处理应用综合实验 Signal Processing Integrated Application Training	1	32		32				7	
小 计 Subtotal			27	504	320	184	0	0	0		
（五）专业选修课程 5 Specialized Elective Courses											
信息学院	4110023110	电子线路EDA B Electronic Design Automation of Electronic Circuit B	2.5	40	24	16				5	数字电子技术基础A
信息学院	4110075110	随机信号分析 Random Signal Analysis	2.5	40	40					5	概率论与数理统计B
信息学院	4110063110	计算机网络与通信 Computer Networks and Communication	2	32	32					5	电路分析基础B2
信息学院	4110228130	通信系统仿真设计实验 Communication Systems Simulation Training	1	32		32				5	通信原理
信息学院	4110156120	C++程序设计 The C++ Programming	2.5	40	32	8				6	数据结构与算法C
信息学院	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 B
信息学院	4110030110	高频电子线路B High-frequency Electronic Circuits B	3	48	48					6	模拟电子技术基础A
信息学院	4110097110	虚拟仪器 Virtual Instruments	2	32	16	16				6	
信息学院	4110247130	微机原理与通信接口 Principles of Microcomputer and Communication Interface	2.5	40	32	8				6	单片机及嵌入式系统原理
信息学院	4110069110	数字图像处理A Digital Image Processing A	2	32	24	8				6	信号与系统A
信息学院	4110073110	数字语音处理 A Digital Speech Processing A	2	32	24	8				6	数字信号处理A
信息学院	4110185120	无线传感网技术 Wireless Sensing Network Technology	2	32	24	8				6	通信原理A
信息学院	4110211130	Android软件设计 Android Software Design	2.5	40	32	8				6	
信息学院	4110175120	模式识别应用 Application of Pattern Recognition	2	32	32					7	
信息学院	4110081110	网络工程技术 Technology of Network Engineering	2	32	32					7	计算机网络与通信
信息学院	4110045110	交换技术B Switching Technology	2	32	24	8				7	
信息学院	4110025110	多媒体通信技术 Multimedia Communications Technology	2	32	32					7	
信息学院	4110227130	算法设计与分析 Design and Analysis of Algorithms	2	32	32					7	

开课单位 Course college	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.	理论 Theory	实验 Exp.	上机 Ope-ration	实践 Prac-tice	课外 Extra-cur		
信息学院	4110013210	实时操作系统 Real-time Operating System	2.5	40	32	8				7	
信息学院	4110225130	实验方法设计 Experimental Design Methodology	2	32	32					7	
信息学院	4110038110	光纤通信D Optical Fiber Communications	2	32	32					7	通信原理D
信息学院	4110014210	现场总线技术 Field Bus Technology	2	32	32					7	
信息学院	4110370170	射频识别技术 Radio Frequency Identification Technology	2	32	24	8				7	
信息学院	4110024110	电子线路设计 Electronic Circuit Design	1	32		32				7	
信息学院	4110362170	组网技术实验 Training of Networking Technology	1	32		32				7	
小 计 Subtotal			50	864	632	232	0	0	0		
修读说明：要求至少选修25学分。 NOTE：Minimum subtotal credits:25.											
（六）个性课程 6 Personalized Elective Courses											
信息学院	4110159120	Java语言程序设计B Java Language Program Design B	3	48	32	16				5	
信息学院	4110372170	大数据及云存储技术 The Technologies of Big Data and Cloud Storage	3	48	40	8				5	
信息学院	4110373170	光电子技术 Optoelectronic Technology	3	48	40	8				7	
小 计 Subtotal			9	144	112	32	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.											

（七）专业教育集中性实践教学环节

7 Specialized Practice Schedule

开课单位 Course college	课程编号 Course Number	实践环节名称 Practice Courses Name	学分 Crs	总学时 Tot hrs.	周数 Weeks	建议修读学期 Suggested Term	先修课程 Prerequisite Course
机电学院	4080152110	机械制造工程实训 D Metalworking Practice	1	16	1	4	
自动化学院	4100068110	电工电子实习A Practice in Electrical Engineering & Electronics A	2	32	2	3	
信息学院	4110128110	模拟电子技术基础课程设计 Course Design on Fundamentals of Analog Electronics Circuit	1	16	1	3	
信息学院	4110129110	数字电子技术基础课程设计 Course Design on Fundamentals of Digital Electronic Circuit	1	16	1	4	
信息学院	4110375170	数据传输网络实训 Practical Training of Network Data Transmission	2	32	2	7	
信息学院	4110376170	信息工程专业实习 Speciality Practice	3	48	3	7	
信息学院	4110020210	毕业设计 Graduation Thesis	8.5	272	17	8	
小 计 Subtotal			18.5	432	27		

五、学时学分比例

Ⅴ Proportion of class hours and credits

分类		学分/学时	毕业总学分/学时（不含课外）	比例（%）
各类选修课程		40	160	25
实践教育课程（包括实验课）		41	160	25.6
数学与自然科学类课程		25.5	160	15.9
工程基础类课程、专业基础类课程与专业类课程		60	160	37.5
工程实践与毕业设计（论文）	通识必修和专业必修中独立设课的综合性实验课	11.5	160	7.2
	集中实践环节中的工程实践课	10	160	6.3
	毕业设计（论文）	8.5	160	5.3
人文社会科学类通识教育课程		24	160	15
选修课课程设置总学分与选修毕业要求学分比例				2:1

六、修读指导

Ⅵ Recommendations on Course Studies

专业特色课程中的平台课可在本学院跨专业选修。

课外培养方案详见《武汉理工大学第二课堂课外学分实施办法》。

《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 个课外学分。

Please refer to the cultivation plan of the second class-Implementation Measures for Extracurricular Credits of the Second Class of Wuhan University of Technology.

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

学院教学责任人：李政颖

专业培养方案责任人：阮幼林