

微电子科学与工程专业培养方案

Undergraduate Program of Microelectronics

Science and Engineering

I. 专业介绍 Introduction

微电子科学与工程专业坚持立德树人，定位为在集成电路领域培养理论基础扎实、专业基础宽厚，具有创新能力和国际视野，推动我国集成电路领域未来发展的领军人才和高级专门人才。本专业 2021 年入选四川省一流本科专业建设点，建有国家级实验教学示范中心，拥有一支年龄与知识结构合理、教学经验丰富、创新意识和科研能力强的专任师资队伍，构建了完善的集成电路设计人才培养体系，且轨道交通特色鲜明。

The major of Microelectronics Science and Engineering insists on cultivating people with moral values and is positioned to cultivate leading talents and senior specialists in the field of integrated circuits with solid theoretical foundation, broad professional foundation, innovative ability and international vision to promote the future development of integrated circuits in China. The major of Microelectronics Science and Engineering insists on cultivating people with moral values and is positioned to cultivate leading talents and senior specialists in the field of integrated circuits with solid theoretical foundation, broad professional foundation, innovative ability and international vision to promote the future development of integrated circuits in China. The major was selected as a first-class undergraduate major construction site in Sichuan Province in 2021, and a national experimental teaching demonstration center has been built. The major has a full-time faculty with reasonable age and knowledge structure, rich teaching experience, strong innovation consciousness and scientific research ability. The major has built a perfect training system for IC design talents and has distinctive characteristics of rail transportation.

专业代码: 080704

Program Code: 080704

专业名称: 微电子科学与工程

Program Name: Microelectronics Science and Engineering

II. 培养目标 Objectives

本专业始终坚持以“立德树人”作为教育教学的根本任务，以学生发展为中心，以学生健康成长成才为指导思想，培养爱国进取、德智体美劳全面发展、专业知识雄厚、工程实践和创新思辨能力强，既适应我国集成电路产业的迫切需求，又具有国际一流专业水准的集成电路设计专门人才。

The major always takes fostering integrity and promoting rounded development of people as the fundamental task of education, implements learner-centred approaches, takes students' healthy growth and success as its guiding ideology. The major cultivates IC design professionals who are patriotic and enterprising, with comprehensive development of moral, intellectual, physical and aesthetic skills, strong professional knowledge, strong engineering practice and innovative thinking ability, and who not only meet the urgent needs of China's IC industry, but also have international first-class professional standards.

培养目标是使毕业生具备新型微电子器件、数字、模拟、功率等集成电路设计所需要的理论基础、专业知识和实践技能,同时又具有通信、计算机和信息处理等较宽广的系统知识、国际视野和良好的自我更新知识和创新创业的素质。

The training goal is to equip graduates with the theoretical foundation, professional knowledge and practical skills required for the design of new microelectronic devices, digital, analog, power and other integrated circuits, as well as a broader system knowledge of communications, computers and information processing, an international perspective and a good quality of self-renewal of knowledge and innovation and entrepreneurship.

本专业毕业的学生能从事集成电路的设计、制造、封装、测试、技术服务等工作,也可以在集成电路相关的信息电子系统(如计算机、通信、消费电子等)领域中从事产品研发等技术或管理工作。

Students graduating from this major can work in the design, manufacturing, packaging, testing, and technical service of integrated circuits, as well as in the technical or management work of product development in the field of information and electronic systems related to integrated circuits (such as computers, communications, consumer electronics, etc.).

本专业毕业学生经 5 年实践锻炼, 应达到以下目标:

After 5 years of practical work, students graduating from this major should achieve the following goals:

(1) 熟悉微电子职业相关的国家及行业法律法规, 具有社会伦理、环境、安全等社会意识和责任感, 遵守职业道德和规范, 适应团队工作环境。

(1) Familiar with national and industrial laws and regulations in the field of microelectronics, with social ethics, environment, safety and other social awareness and sense of responsibility, comply with professional ethics and norms, and adapt to the team work environment.

(1) 具有鲜明的爱国主义精神, 正确的社会主义核心价值观, 健康的心理和体魄; 具有高尚的职业道德、较强的创新创业意识及职业素质;

(1) Have a distinctive patriotism, correct socialist values, a healthy mind and physique; Have high professional ethics, strong sense of innovation and entrepreneurship and professional quality;

(2) 针对实际需求, 能运用自然科学、工程基础和微电子科学与工程专业知识, 对复杂电子电路和集成电路系统工程问题进行分析, 研究解决方案, 承担集成电路系统的设计、开发和应用管理任务;

(2) To be able to analyze complex electronic circuits and integrated circuit system engineering problems, research solutions, and undertake the design, development and application management of integrated circuit systems by applying natural science, engineering fundamentals and microelectronics science and engineering expertise in response to practical needs;

(3) 有多学科背景下的组织协调能力, 能与业界同行、专业客户和公众进行有效沟通。

(3) Have the ability of organization and coordination in a multidisciplinary context, and be able to communicate effectively with industry peers, professional clients and the public.

(4) 具有终身学习能力, 能适应社会、科技和职业发展的需求;

(4) With lifelong learning ability, can adapt to the needs of social, technological and professional development;

III. 专业毕业要求 Graduation Requirements

微电子科学与工程实行弹性学制, 学制 4-6 年, 允许学生在取得规定的 162 学分后提前毕业, 也允许延长学习年限, 但一般不超过六年。

The major of Microelectronics Science and Engineering implements a flexible academic system with 4-6 years. Students can graduate in advance after obtaining the required 162 credits. It is also allowed to extend the length of study, but generally does not exceed six years.

学生修完本专业培养计划规定的课程及教学实践环节, 取得规定的学分, 德、智、体考核合格, 总学分不少于 162 学分, 满足以下毕业要求, 按照《中华人民共和国学位条例》规定的条件授予工学学士学位。

In accordance with the "Degree Regulations of People's Republic of China", students will be awarded to a bachelor's degree in engineering after achieving the following goals: completing the courses and practice parts specified in the professional talent cultivation program, obtaining not less than the required 162 credits, passing the moral, intellectual and physical examinations, and meeting the following graduation requirements.

对于本专业的学生, 毕业要求包括如下 12 项基本要求:

For students in this major, the graduation requirements include the following 12 items:

1. 工程知识: 掌握从事微电子科学与工程领域工作所需要的数学、自然科学、工程基础和专业知识, 并能够运用这些知识解决复杂微电子工程问题;

1. Engineering Knowledge: Master the knowledge of mathematics, natural science, and engineering fundamentals required for work in the area of Microelectronics Science and Engineering, with expertise in microelectronics technology, and apply these knowledges to solve complex engineering problems in the area of microelectronics.

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微电子科学与工程领域复杂工程问题, 以获得有效结论;

2. Problem Analysis: Ability to apply the first principles of mathematics, natural sciences, and engineering sciences to identify, formulate, and analyze complex engineering problems in the area

of Microelectronics Science and Engineering technology; obtain relevant information through literature researches and data queries to analyze engineering problems of Microelectronics Science and Engineering technology to reach substantiated conclusions.

3. 设计/开发解决方案：能够设计针对复杂工程问题的解决方案，设计满足特定需求的芯片与元器件、硬件部件和软件，并能够在设计环节中体现创新意识，考虑社会、健康、安全、法律、文化以及环境等因素；

3. Design/development of solutions: Ability to design solutions for complex engineering problems in the area of microelectronics technology, and to design microelectronics technology modules or systems that meet specified needs with sense of innovation and with appropriate considerations for society, health, safety, law, culture, environment, etc.

4. 研究：具有基于科学原理并采用科学方法对微电子工程问题进行研究的能力，包括设计与实施实验、分析与解释数据、并通过信息综合得到合理有序的结论；

4. Investigation: Ability to conduct investigations of complex problems in microelectronics technology, based on scientific principles and methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.

5. 使用现代工具：能够选择与使用恰当的技术、资源、现代工程开发工具和信息技术工具，对微电子工程问题进行设计、模拟与实现，并能够理解其局限性；

5. Modern Tool Usage: Ability to create, select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to complex engineering problems in microelectronics, with an understanding of the limitations.

6. 工程与社会：在微电子工程问题解决方案的设计和实现过程中，能够根据具体的工程背景合理分析和评价其对社会、健康、安全、法律以及文化的影响，并理解应承担的责任；

6. The Engineer and Society: Ability to apply reasoning informed by microelectronics technology contextual knowledge to assess societal, health, safety, legal and cultural issues and the possible consequent responsibilities relevant to microelectronics engineering practice and solutions to complex engineering problems.

7. 环境和可持续发展：在微电子工程问题解决方案的设计和实现过程及系统运行中能够理解和评价其对环境、社会可持续发展的影响；

7. Environment and Sustainability: Understand the guidelines, policies, laws and regulations on environmental protection and sustainable development in the microelectronics technology, and understand and evaluate the sustainability and impact of professional engineering work in the solution of complex engineering problems in societal and environmental contexts.

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

8. Occupational norms: have humanistic and social science literacy as well as social responsibility, understand and comply with engineering professional ethics and norms in engineering practice and fulfill responsibilities.

9. 个人和团队：具有一定的组织管理能力、团队合作能力，能够在多学科背景下的团队中承担个体、团队成员以及负责人的角色；

9. Individual and Team work: Function effectively in teamwork as an individual, and as a member or leader in engineering project or technical development teams in multi-disciplinary settings.

10. 沟通：能够就复杂系统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和跨文化沟通交流能力；

10. Communication: can communicate effectively over complicated engineering problems with both industry peers and the general public, including writing reports, designing documents, giving presentations, clearly presenting or responding to instructions; can see into problems in an international perspective and communicate with people of different cultural backgrounds.

11. 项目管理：理解并掌握工程管理原理与经济决策方法，具有在 multidisciplinary 环境中应用的能力；

11. Project Management and Finance: Understand and master engineering management principles and economic decision-making methods, and be able to apply them in a multidisciplinary environment.

12. 终身学习：具有自主学习和终身学习的意识，有不断学习和适应发展的能力。

12. Lifelong learning: have the consciousness of independent learning and lifelong learning and the ability of continuous learning and adapting to development.

上述 12 条毕业要求，支撑着专业培养目标的各个部分，其支撑关系矩阵如下表所示：

The above 12 graduation requirements support the various parts of the professional training objectives. The supporting relationship matrix is shown in the following table:

毕业要求对培养目标的支撑关系

The Support Relationship of Graduation Requirements for Cultivation Objectives

毕业要求 Graduation Requirements	培养目标 Training Objectives			
	目标1 Objective 1	目标2 Objective 2	目标3 Objective 3	目标4 Objective 4
毕业要求 1: 工程知识 Graduation Requirements 1.Engineering Knowledge		√		√
毕业要求 2: 问题分析 Graduation Requirements 2. Problem Analysis		√		
毕业要求 3: 设计/开发解决方案 Graduation Requirements 3. Design/development of solutions		√		
毕业要求 4: 研究 Graduation Requirements 4. Investigation		√		√
毕业要求 5: 使用现代工具 Graduation Requirements 5. Modern Tool Usage		√		√

毕业要求 6: 工程与社会 Graduation Requirements 6. The Engineer and Society	√			
毕业要求 7: 环境和可持续发展 Graduation Requirements 7. Environment and Sustainability	√			
毕业要求 8: 职业规范 Graduation Requirements 8. Ethics	√			
毕业要求 9: 个人和团队 Graduation Requirements 9. Individual and Team work	√		√	
毕业要求 10: 沟通 Graduation Requirements 10. Communication	√		√	
毕业要求 11: 项目管理 Graduation Requirements 11. Project Management and Finance		√	√	
毕业要求 12: 终身学习 Graduation Requirements 12. Lifelong learning				√

IV. 学制与学位 Duration and Degree

学制: 四年 Duration: 4 years

学位: 工学学士 Degree: Bachelor of Engineering

V. 主干学科与专业核心课程 Main Subject and Specialized Core Course

主干学科: 电子信息

Main Subject: Electronic Information

专业核心课程: FPGA 原理与 EDA 技术、现代半导体器件、集成电路工艺、通信电路、模拟集成电路分析与设计基础、模拟集成电路分析与设计基础实验、数字集成电路分析与设计基础、数字集成电路分析与设计基础实验、功率电子与功率集成电路、智能芯片与智能计算系统、数字信号处理。

Specialized Core Course: Principle of FPGA and EDA Technology, Modern Semiconductor Devices, Integrated Circuit Process, Communication Circuits, Fundamentals of Analog Integrated Circuit Analysis and Design, Experiment of Fundamental Analog Integrated Circuits Analysis and Design, Fundamentals of Digital Integrated Circuit Analysis and Design, Experiment of Fundamentals of Digital Integrated Circuit Analysis and Design, Power Electronics and Power Integrated Circuits, Intelligent Chips and Intelligent Computing Systems, Digital Signal Processing.

VI. 毕业学分基本要求 Basic Requirements of Credits for Graduation

课程体系 Curriculum System		学分要求 Credits Requirements						小计 Subtotal
		必修 Compulsory		限修 Distributional Electives		选修 Free Electives		
		理论 Theory	实践 Practice	理论 Theory	实践 Practice	理论 Theory	实践 Practice	
公共基础课程 Public Basic Courses	思政类 Ideological Politics Courses	15	2					17
	军事类 Military Courses	2	2					4
	外语类 Foreign Language Courses	6		2				8
	体育类 Physical Education Courses		4					4
通识与多元化课程 General Education and Diversified Courses	“交通天下”通识教育课程（含跨学科课程） Core General Education Courses（Interdisciplinary Courses）					6		6
	多元化课程 Diversified Courses							
	国际课程 International Courses							
	大学生心理健康教育课程 University Student Psychological Health Courses							
	学生成长与发展规划课程 Student Growth and Development Planning Courses							
	劳动教育课程 Labor Education Courses	2					2	
	公共艺术课程 Public Art Courses	2					2	
学科与专业基础课程 Discipline and Specialty Foundational Courses	数学类 Mathematics Courses	21						21
	物理类 Physics Courses	8	2					10
	计算机基础类 Basic Computer Courses	4	1					5
专业教育课程 Specialized Courses	专业核心课 Specialized Core Course	50	13					63
	专业限选课 Specialized Restricted Courses			3.5-4	0-0.5			4

实践教学 环节 Practice Courses	集中性实践教学环节：基本技能训练、工程实践、综合课程设计、社会与文化素质和实践、毕业实习与毕业设计 Centralized Practical Teaching Process: Basic Skills Training, Practical Training, Integrated Curriculum Design, Social and Cultural Quality Practice, Graduation Internship and Graduation Design		14					14
	创新创业实践：创新创业训练计划项目、个性化实验、学科竞赛、创新讲座等 Innovation and Entrepreneurship Practice: Innovation and Entrepreneurship Training Program, Personalized Experiments, Subject Competition, Innovation Lectures, etc		2					2
必修环节 A Compulsory Part	“第二课堂”项目：思想政治与道德素养类项目、学术科技与创新创业类项目、艺术体验与审美修养类项目、文化沟通与交往能力类项目、心理素质与身体素质类项目、社会工作与领导能力类项目、社会实践与志愿服务类项目 "The Second Lesson" Project: Ideological and Political Education and Moral Literacy Projects, Academic and Technological Innovation and Entrepreneurship Projects, Art Experience and Aesthetic Education Projects, Cultural Communication and Interpersonal Skills Projects, Psychological and Physical Health Projects, Social Work and Leadership Development Projects, Social Practice and Volunteering Projects							0

	大学生综合素质提升、学生体质达标测评 Comprehensive Quality Improvement Courses for College Students, Assessment of Students' Physical Fitness							0
总 计 Total								162

VII.课程设置细化表 Course Programs Table

公共基础课程 Public Basic Courses 共 33 学分，其中必修 31 学分，限修 2 学分，选修 0 学分 A total credits of 33, including 31 for compulsory courses, 2 for distributional electives and 0 for free electives								
课程类型 Course Type	课程名称 Course Name	课程性质 Nature of Course	总学分 Credits	课内实践学分 In-class Practice Credits	开课学期 Semester	开课学院 School	支撑毕业要求指标点 Indicators which Support Graduation Requirements	备注 Notes
思政类 Ideological Politics Courses	思想道德与法治 Ideological and Moral Education and the Rule of Law	必修 Compulsory	3	0.4	第 1 学期 Semester 1	马克思主义学院 School of Marxism	6,7,8	
	中国近现代史纲要 Conspectus of Chinese Modern History	必修 Compulsory	3	0.4	第 2 学期 Semester 2	马克思主义学院 School of Marxism	7,8	
	马克思主义基本原理 The Basic Principles of Marxism	必修 Compulsory	3	0.4	第 3 学期 Semester 3	马克思主义学院 School of Marxism	8	
	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 Theoretical System of Socialism with Chinese Characteristics	必修 Compulsory	3	0.4	第 4 学期 Semester 4	马克思主义学院 School of Marxism	6,7,8	
	习近平新时代中国特色社会主义思想概论 Outline of Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era	必修 Compulsory	3	0.4	第 6 学期 Semester 6	马克思主义学院 School of Marxism	6,7,8	
	形势与政策 I Situation and Policy I	必修 Compulsory	0		第 1 学期 Semester 1	马克思主义学院 School of Marxism	6,7,8	
	形势与政策II Situation and Policy II	必修 Compulsory	0		第 2 学期 Semester 2	马克思主义学院 School of Marxism	6,7,8	
	形势与政策III Situation and Policy III	必修 Compulsory	0		第 3 学期 Semester 3	马克思主义学院 School of Marxism	6,7,8	

	形势与政策IV Situation and Policy IV	必修 Compulsory	0		第 4 学期 Semester 4	马克思主义学院 School of Marxism	6,7,8	
	形势与政策 V Situation and Policy V	必修 Compulsory	0		第 5 学期 Semester 5	马克思主义学院 School of Marxism	6,7,8	
	形势与政策VI Situation and Policy VI	必修 Compulsory	0		第 6 学期 Semester 6	马克思主义学院 School of Marxism	6,7,8	
	形势与政策VII Situation and Policy VII	必修 Compulsory	0		第 7 学期 Semester 7	马克思主义学院 School of Marxism	6,7,8	
	形势与政策VIII Situation and Policy VIII	必修 Compulsory	2		第 8 学期 Semester 8	马克思主义学院 School of Marxism	6,7,8	
军事类 Military Courses	军事理论 Military Theories	必修 Compulsory	2		第 1 学期 Semester 1	武装部 Security Office	9	
	军事技能 Military Skills	必修 Compulsory	2	2	短 1 学期 Short Semester 1	武装部 Security Office	9	
外语类 Foreign Language Courses	英语 I College English I	必修 Compulsory	2		第 1 学期 Semester 1	外国语学院 School of Foreign Languages	10	
	英语II College English II	必修 Compulsory	2		第 2 学期 Semester 2	外国语学院 School of Foreign Languages	10	
	通用学术英语 English for General Academic Purposes	必修 Compulsory	2		第 3 学期 Semester 3	外国语学院 School of Foreign Languages	10	
	职场英语 Workplace English	限修 Distributional Elective	2		第 4 学期 Semester 4	外国语学院 School of Foreign Languages	10	限修 1 门, 2 学分 Limited to 1 course, 2 credits
	交际与文化视听说 Viewing, Listening & Speaking in English -- Communication & Culture							
	语言、文化与翻译 Language, Culture and Translation							
	英语公共演讲 Public Speaking in English							
体育类 Physical Education Courses	体育 I Physical Education I	必修 Compulsory	1	1	第 1 学期 Semester 1	体育学院 School of Physical Education	9	
	体育II Physical Education II	必修 Compulsory	1	1	第 2 学期 Semester 2	体育学院 School of Physical Education	9	
	体育III Physical Education III	必修 Compulsory	0.5	0.5	第 3 学期 Semester 3	体育学院 School of Physical Education	9	
	体育IV Physical Education IV	必修 Compulsory	0.5	0.5	第 4 学期 Semester 4	体育学院 School of Physical Education	9	

	体育健康课程 I Diversified Physical Education Courses I	必修 Compulsory	0.5	0.5	第 5 学期 Semester 5	体育学院 School of Physical Education	8	
	体育健康课程 II Diversified Physical Education Courses II	必修 Compulsory	0.5	0.5	第 6 学期 Semester 6	体育学院 School of Physical Education	8	
通识与多元化课程 General Education and Diversified Courses 共 10 学分，其中必修 4 学分，限修 0 学分，选修 6 学分 A total credits of 10, including 4 for compulsory courses, 0 for distributional electives and 6 for free electives								
课程类型 Course Type	课程名称 Course Name	课程性质 Nature of Course	总学分 Credits	课内实践学分 In-class practice credits	开课学期 Semester	开课学院 School	支撑毕业要求 指标点 Indicators which Support Graduation Requirements	备注 Notes
“交通天下”通识教育课程（含跨学科课程） Core General Education Courses (Interdisciplinary Courses)	“交通天下”通识教育课程（含跨学科课程） Core General Education Courses (Interdisciplinary Courses)	选修 Free Elective	6		2-8 学期 Semester 2-8	全校 The whole school	3,8	
多元化课程 Diversified Courses	多元化课程 Diversified Courses					全校 The whole school		
国际课程 International Courses	国际课程 International Courses					全校 The whole school		
大学生心理健康教育课程 University Student Psychological Health Courses	大学生心理健康教育课程 University Student Psychological Health Courses					全校 The whole school		
学生成长与发展规划课程 Student Growth and Development Planning Courses	学生成长与发展规划课程 Student Growth and Development Planning Courses					全校 The whole school		
劳动教育课程 Labor Education Courses	劳动教育课程 Labor Education Courses	必修 Compulsory	2		2-8 学期 Semester 2-8	全校 The whole school	9,12	
公共艺术课程 Public Art Courses	公共艺术课程 Art Education Courses	必修 Compulsory	2		2-8 学期 Semester 2-8	全校 The whole school	9,12	

学科与专业基础课程 Discipline and Specialty foundational Courses 共 36 学分，其中必修 36 学分，限修 0 学分，选修 0 学分 A total credits of 36, including 36 for compulsory courses, 0 for distributional electives and 0 for free electives								
课程类型 Course Type	课程名称 Course Name	课程性质 Nature of Course	总学分 Credits	课内实践学分 In-class practice credits	开课学期 Semester	开课学院 School	支撑毕业要求 指标点 Indicators which Support Graduation Requirements	备注 Notes
数学类 Mathematics Courses	高等数学 I Advanced Mathematics I	必修 Compulsory	5		第 1 学期 Semester 1	数学学院 School of Mathematics	1	
	线性代数 B Linearity Algebra B	必修 Compulsory	3		第 1 学期 Semester 1	数学学院 School of Mathematics	1	
	高等数学 II Advanced Mathematics II	必修 Compulsory	5		第 2 学期 Semester 2	数学学院 School of Mathematics	1	
	概率与数理统计 Probability and Mathematical Statistics	必修 Compulsory	3		第 2 学期 Semester 2	数学学院 School of Mathematics	1,2	
	数理方程 B Equations of Mathematical Physics B	必修 Compulsory	2		第 3 学期 Semester 3	数学学院 School of Mathematics	1	
	复变函数与积分变换 Complex Function and Integral Transforms	必修 Compulsory	3		第 3 学期 Semester 3	数学学院 School of Mathematics	1	
物理类 Physics Courses	大学物理 AI University Physics AI	必修 Compulsory	4		第 2 学期 Semester 2	物理科学与技术学院 School of Physical Science and Technology	1	
	大学物理实验 I University Physics I	必修 Compulsory	1	1	第 2 学期 Semester 2	物理科学与技术学院 School of Physical Science and Technology	4	
	大学物理 AII Experiments of University Physics AII	必修 Compulsory	4		第 3 学期 Semester 3	物理科学与技术学院 School of Physical Science and Technology	1	
	大学物理实验 II Experiments of University Physics II	必修 Compulsory	1	1	第 3 学期 Semester 3	物理科学与技术学院 School of Physical Science and Technology	4	

计算机基础类 Basic Computer Courses	计算机程序设计 Computer Programming	必修 Compulsory	4		第 1 学期 Semester 1	信息科学与技术学院 School of Information Science and Technology	1,3,9	全院软件类专业基础课
	计算机程序设计实验 Experiments of Computer Programming	必修 Compulsory	1	1	第 1 学期 Semester 1	信息科学与技术学院 School of Information Science and Technology	5,9	全院软件类专业基础课
专业教育课程 Specialized Courses 共 67 学分，其中必修 63 学分，限修 4 学分，选修 0 学分 A total credits of 67, including 63 for compulsory courses, 4 for distributional electives and 0 for free electives								
课程类型 Course Type	课程名称 Course Name	课程性质 Nature of Course	总学分 Credits	课内实践学分 In-class practice credits	开课学期 Semester	开课学院 School	支撑毕业要求指标点 Indicators which Support Graduation Requirements	备注 Notes
专业核心课 Specialized Core Course	微电子学科前沿导论 Introduction on the Frontiers of Microelectronics	必修 Compulsory	2	1	第 1 学期 Semester 1	信息科学与技术学院 School of Information Science and Technology	2,8,9,10,11,12	
	数据结构与算法 Data Structure and Algorithm	必修 Compulsory	3	0.5	第 2 学期 Semester 2	信息科学与技术学院 School of Information Science and Technology	1,3,5	
	电路分析 B I (含实验) Circuit Analysis B I (Including Experiments)	必修 Compulsory	3	0.25	第 2 学期 Semester 2	电气工程学院 School of Electrical Engineering	1,2,4	
	电路分析 B II (含实验) Circuit Analysis B II (Including Experiments)	必修 Compulsory	2	0.25	第 3 学期 Semester 3	电气工程学院 School of Electrical Engineering	1,2,4	
	数字电子技术 B Digital Electronics Technology B	必修 Compulsory	3		第 3 学期 Semester 3	信息科学与技术学院 School of Information Science and Technology	2,4,11	
	数字电子技术实验 Experiments of Digital Electronics Technology	必修 Compulsory	1	1	第 3 学期 Semester 3	信息科学与技术学院 School of Information Science and Technology	3,4,5,10	
	模拟电子技术 Analog Electronic Technology	必修 Compulsory	4		第 4 学期 Semester 4	信息科学与技术学院 School of Information Science and Technology	1,4,5,11	
	模拟电子技术实验 Experiments of Analog Electronic Technology	必修 Compulsory	1	1	第 4 学期 Semester 4	信息科学与技术学院 School of Information Science and Technology	4,5,10	

专业核心课 Specialized Core Course	电磁场理论 Electromagnetic Field Theory	必修 Compulsory	3		第 4 学期 Semester 4	信息科学与技术学院 School of Information Science and Technology	1,2,7	
	计算机组成原理 C Principle of Computer Organization C	必修 Compulsory	2		第 4 学期 Semester 4	信息科学与技术学院 School of Information Science and Technology	2,3,5, 12	
	信号与系统 A Signal and System A	必修 Compulsory	4	0.5	第 4 学期 Semester 4	信息科学与技术学院 School of Information Science and Technology	1,2,4,5	
	半导体物理 Semiconductor Physics	必修 Compulsory	3		第 4 学期 Semester 4	物理科学与技术学院 School of Physical Science and Technology	2,4	
	通信电路 Communication Circuits	必修 Compulsory	3		第 5 学期 Semester 5	信息科学与技术学院 School of Information Science and Technology	2,3,8, 10	
	通信电路实验 Experiments of communication Circuits	必修 Compulsory	1	1	第 5 学期 Semester 5	信息科学与技术学院 School of Information Science and Technology	4,9,10, 11	
	现代半导体器件 Modern Semiconductor Devices	必修 Compulsory	3	0.5	第 5 学期 Semester 5	信息科学与技术学院 School of Information Science and Technology	1,2,4,7	
	模拟集成电路分析与设计 基础 Fundamentals of Analog Integrated Circuit Analysis and Design	必修 Compulsory	2		第 5 学期 Semester 5	信息科学与技术学院 School of Information Science and Technology	1,2,3,6	
	模拟集成电路分析与设计 基础实验 Experiment of Fundamental Analog Integrated Circuits Analysis and Design	必修 Compulsory	1	1	第 5 学期 Semester 5	信息科学与技术学院 School of Information Science and Technology	1,4,5, 10	
	数字集成电路分析与设计 基础 Fundamentals of Digital Integrated Circuit Analysis and Design	必修 Compulsory	3		第 5 学期 Semester 5	信息科学与技术学院 School of Information Science and Technology	1,3,5,6	
	数字集成电路分析与设计 基础实验 Experiments of Fundamentals of Digital Integrated Circuit Analysis and Design	必修 Compulsory	1	1	第 5 学期 Semester 5	信息科学与技术学院 School of Information Science and Technology	3,5,9, 11	

专业核心课 Specialized Core Course	FPGA 原理与 EDA 技术 Principle of FPGA and EDA Technology	必修 Compulsory	2	1	第 5 学期 Semester 5	信息科学与技术学院 School of Information Science and Technology	1,5,11	
	集成电路工艺 Integrated Circuit Process	必修 Compulsory	2		第 6 学期 Semester 6	信息科学与技术学院 School of Information Science and Technology	1,6,7	
	智能芯片与智能计算系统 (含实验) Intelligent Chips and Intelligent Computing Systems (Including Experiments)	必修 Compulsory	3	1	第 6 学期 Semester 6	信息科学与技术学院 School of Information Science and Technology	1,2,3,12	
	功率电子与功率集成电路 (含实验) Power Electronics and Power Integrated Circuits (Including Experiments)	必修 Compulsory	3	1	第 6 学期 Semester 6	信息科学与技术学院 School of Information Science and Technology	1,2,3,12	
	嵌入式系统设计与应用 Design and Application of Embedded Systems	必修 Compulsory	2		第 6 学期 Semester 6	信息科学与技术学院 School of Information Science and Technology	1,2,6	
	嵌入式系统设计与应用实验 Experiments of Design and Application of Embedded Systems	必修 Compulsory	1	1	第 6 学期 Semester 6	计算机学院 School of Information Science and Technology	1,6,9,10	
	数字信号处理 A Digital Signal Processing A	必修 Compulsory	3	0.5	第 7 学期 Semester 7	信息科学与技术学院 School of Information science and technology	1,2,4,6	
	人工智能算法基础 Fundamentals of Artificial Intelligence Algorithms	必修 Compulsory	2	0.5	第 7 学期 Semester 7	信息科学与技术学院 School of Information Science and Technology	7,8,12	
专业限选课 Specialized Restricted Courses	计算机视觉 Computer Vision	限修 Distributional Elective	2		第 6 学期 Semester 6	信息科学与技术学院 School of Information Science and Technology	2,3,5,12	限修共 4 学分 Distributional Elective 4 credits
	电子信息材料与器件 Electronic Information Materials and Devices		2	0.5	第 6 学期 Semester 6	信息科学与技术学院 School of Information Science and Technology		
	机器学习 B Machine Learning B		2		第 7 学期 Semester 7	信息科学与技术学院 School of Information Science and Technology		

实践教学环节 Practice Courses								
共 16 学分，其中必修 16 学分，限修 0 学分，选修 0 学分 A total credits of 16, including 16 for compulsory courses, 0 for distributional electives and 0 for free electives								
课程类型 Course Type	课程名称 Course Name	课程性质 Nature of Course	总学分 Credits	课内实践学分 In-class practice credits	开课学期 Semester	开课学院 School	支撑毕业要求指标点 Indicators which Support Graduation Requirements	备注 Notes
集中性实践教学环节：基本技能训练、工程实践、综合课程设计、社会与文化素质和实践、毕业实习与毕业设计 Centralized Practical Teaching Process: Basic Skills Training, Practical Training, Integrated Curriculum Design, Social and Cultural Quality Practice, Graduation Internship and Graduation Design	工程训练 A Engineering Training A	必修 Compulsory	2	2	短 1 学期 Short Semester 1	工程训练中心 Center of Engineering Training	7,8,9,10,11	
	电子工艺实习 Electronic Process Practice	必修 Compulsory	1	1	短 2 学期 Short Semester 2	信息科学与技术学院 School of Information Science and Technology	5,8,11,12	
	电子技术课程设计 Electronic Technology Curriculum Design	必修 Compulsory	1	1	短 2 学期 Short Semester 2	信息科学与技术学院 School of Information Science and Technology	3,8, 10,12	
	微电子科学与工程专业工程实习 Engineering Practice of	必修 Compulsory	2	2	短 3 学期 Short Semester 3	信息科学与技术学院 School of Information Science and Technology	5,8,9,11,12	
	毕业设计 B Graduation Project B	必修 Compulsory	8	8	第 8 学期 Semester 8	信息科学与技术学院 School of Information Science and Technology	2,3,4,5,6,7,10,11,12	
创新创业实践：创新创业训练计划项目、个性化实验、学科竞赛、创新讲座等 Innovation and Entrepreneurship Practice: Innovation and Entrepreneurship Training Program, Personalized Experiments, Subject Competition, Innovation Lectures, etc	创新创业实践 Innovation and Entrepreneurship Practice	必修 Compulsory	2	2	3-7 学期 Semester 3-7	信息科学与技术学院 School of Information Science and Technology	9,12	

必修环节 A compulsory part 共 0 学分，其中必修 0 学分，限修 0 学分，选修 0 学分 A total credits of 0, including 0 for compulsory courses, 0 for distributional electives and 0 for free electives								
课程类型 Course Type	课程名称 Course Name	课程性质 Nature of Course	总学分 Credits	课内实践学分 In-class practice credits	开课学期 Semester	开课学院 School	支撑毕业要求指标点 Indicators which Support Graduation Requirements	备注 Notes
“第二课堂”项目：思想政治与道德素养类项目、学术科技与创新创业类项目、艺术体验与审美修养类项目、文化沟通与交往能力类项目、心理素质与身体素质类项目、社会工作与领导能力类项目、社会实践与志愿服务类项目 "The Second Lesson" Project: Ideological and Political Education and Moral Literacy Projects, Academic and Technological Innovation and Entrepreneurship Projects, Art Experience and Aesthetic Education Projects, Cultural Communication and Interpersonal Skills Projects, Psychological and Physical Health Projects, Social Work and Leadership Development Projects, Social Practice and Volunteering Projects	“第二课堂”项目 "The Second Lesson" Project	必修 Compulsory	0		1-8 学期 Semester 1-8	校团委 Communist Youth League Committee	7,8	

大学生综合素质提升、学生体质达标测评 Comprehensive Quality Improvement Courses for College Students, Assessment of Students' Physical Fitness	大学生综合素质提升 Comprehensive Quality Improvement Courses for College Students	必修 Compulsory	0		1-8 学期 Semester 1-8	校团委 Communist Youth League Committee	7,8	
	学生体质达标测评 Assessment of Students' Physical Fitness	必修 Compulsory	0		秋季学期 Fall semester	体育学院 School of Physical Education	8	
学分总计 Total Credits			162					

西南交通大学培养方案变更申请表

申请单位		专业（方向）		涉及年级		涉及学生人数	
信息科学与技术学院		微电子科学与工程		2023		30	
课程名称	课程编码	课程学分	选修性质	开课学期	变更内容	变更原因	
模拟集成电路分析与设计基础		2	必修	第5学期	课程名称变更为“模拟集成电路分析与设计”	根据学校课程名称的命名要求，本课程名称与学校其他类似课程名称有冲突，需调整该课程名称。	
模拟集成电路分析与设计基础实验		1	必修	第5学期	课程名称变更为“模拟集成电路分析与设计实验”	根据学校课程名称的命名要求，本课程名称与学校其他类似课程名称有冲突，需调整该课程名称。	
本专业专家论证意见（可另附表）：							
专业负责人意见： 专业负责人签名： 年 月 日		教授委员会意见： 经 2023 年 9 月 10 日教授委员会讨论，与会委员表决情况如下： 教授委员会主任签名： 年 月 日			学院/中心 意见： 院长/主任 签名： 学院/中心（盖章）： 年 月 日		
开课学院/中心 意见：（如变更课程非本单位需要填写本栏） 开课单位教学负责人 签名： 2023 年 9 月 12 日							