

计算机科学与技术专业（计算机类）本科人才培养方案

Undergraduate Program for the Discipline of Computer Science

一、 大类专业简介（Brief Introduction to the Discipline）

计算机大类专业涵盖计算机科学与技术（代码：080901）、软件工程（代码：080902）、信息安全（080904K）、物联网工程（080905）等四个专业。本大类采用“1+3”培养模式，一年级进行通识课程和大类平台课程的学习，二年级按照政策进行专业分流。本大类人才培养坚持“育人为本、德育为先、科学理性、开放包容、彰显卓越”的办学理念，积极推进以“因材施教、个性化培养”为核心的人才培养体系改革，紧密结合国家、区域经济社会发展和中国科技城建设需求，立足四川，面向西部和国家软件产业基地，培养“基础扎实、能力突出”的计算机类专业技术人才。本专业类有一级硕士学位授权点 2 个、国防特色学科专业方向 1 个、“国家卓越工程师教育培养计划”专业 1 个、“四川省卓越工程师教育培养计划”专业 1 个、四川省特色专业 2 个、学校“8111 品牌”专业 1 个。

The discipline of Computer Science includes four majors: Computer Science and Technology (code: 080901), Software Engineering (080902), Information Security (080904K) and Internet of Things (080905). The discipline adopts "1+3" culture mode. During the first year, all students learn the basic courses in general education, discipline courses, and some elective quality courses. After that, the students will choose one majors to learn the remainder basic course in general and discipline education, professional education courses, characteristic education course, and some intensive practical training. The discipline persists in that student is first, moral is primary, scientific and reasonable, patulous and compatible, prominent and excellence, and promotes the education reformation based on the core principle of teaching follows student, and training follows individual. The discipline cultivates professional technical talent of computer science with solidified science knowledge and skilled technology ability according to the requirements of the economic and social development and the construction of the Chinese Science and Technology City. The discipline has two first level master degree majors, one special national defense major direction, one national excellence engineer plan major, one provincial excellence engineer plan major, two special majors of Sichuan province, and one 8111 Brand major.

二、 大类培养阶段教学进程计划表（Courses Schedule of Educational Stages for the Discipline）

西南科技大学本科人才培养方案（2019版）

序号 No.	课程编号 Course Code	课程名称 Course Name	学分 Credits	学时 Hours			开课 学期 Semester	学位课 Degree Course	辅修 Minor	双学位 Double Degree
				总学 时 Total	理论 学时 Theory	实践 学时 Practice				
通识教育平台（必修） Basic Courses in General Education (Required)										
1	FX160020	大学生心理健康教育 Mental health education of college students	1	16	8	8	1			
2	XG160010	入学教育 Entrance education	0.5	8		8	1			
3	MY160210	思想道德修养与法律 基础 Thought Morals Tutelage and Legal foundation	3	48	48		2			
4	MY190011	形势与政策1 Situation and Policy1	0.25	8	8		1			
5	MY190012	形势与政策2 Situation and Policy2	0.25	8	8		2			
6	MY160360	中国近现代史纲要 Conspectus of Chinese Modern History	2	32	32		1			
7	BW190010	军事技能训练 Military Skill Training	0.5	112		14天	1			
8	GF190010	军事理论 Military Theory	0.5	36	20	16	1			
9	自选项目	体育俱乐部 Sports Club	2	60		60	1-7			
10	TY190010	运动基础 Sports Fundamental	1	28		28	1			
11	自选项目	体育选项 Sports Options	限 选	1	28		28	2\3\8		
12	TY190020	游泳	2	1	28		28	2\4\6		

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				总学 时 Total	理论 学时 Theory	实践 学时 Practice				
		Swimming	学 分							
13	TY190030	团体操 Group Callisthenics		1	28	28	3\5\7			
14	WY160371	综合英语 1 Comprehensive English 1	3	48	48	1				
15	WY160372	综合英语 2 Comprehensive English 2	3	48	48	2	★			
小计 Subtotal			20	536	220	316				
学科（大类）教育平台（必修） Discipline Courses (Required)										
1	LX160081	高等数学 B1 Advanced Mathematics B1	5	80	80	1				
2	LX160082	高等数学 B2 Advanced Mathematics B2	5	80	80	2	★			
3	LX190010	线性代数 Linear Algebra	3	48	48	2				
4	LX190080	大学物理 D College Physics D	4.5	72	72	2				
5	JK190370	集合论与图论 Set theory and graph theory	2.5	40	40	2			▲	
6	JK191050	数理逻辑 Mathematical logic	2	32	32	1				
7	JK190520	计算机学科导论 Introduction to Computer Science	1	16	16	1				
8	JK190270	程序设计基础	2	32	32	1	★	◆	▲	

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				总学 时 Total	理论 学时 Theory	实践 学时 Practice				
		Programming Foundation								
9	JK190280	程序设计基础实验 Programming Experiment	1	16		16	1	◆	▲	
10	JK190970	数据结构 Data Structure	3	48	36	12	2	★	◆	▲
小计 Subtotal			29	464	436	28				
个性化培养平台（选修课） Customized Education Courses(Selective)										
1		素质选修 Quality Elective	5							
2		创新创业微学分选修 Minor Elective Courses in Innovation and Entrepreneurship	3							
小计 Subtotal			8							

注：标注★的为“学位课程”，标注◆的为“辅修课程”，标注▲的为“双学位课程”。

三、专业培养阶段方案（分专业培养方案）（Undergraduate Program for Majors under the Discipline）

3.1 计算机科学与技术专业培养方案(Undergraduate Program for the Major of Computer Science and Technology)

专业负责人：贾小林 主管院长：吴亚东 院学术委员会主任：范勇

Director of Major: Jia Xiaolin Executive Dean: Wu Yadong Academic Committee Director: Fan Yong

3.1.1 培养目标(Educational Objectives)

围绕学校“立足四川、面向西部、服务全国”的办学定位和“培养品德优良、身心健康、基础宽厚、专业扎实、视野宽广，具有强烈的社会责任感、创新精神和实践能力的高素质创新型专门人才”的人才培养目标，以国家战略新兴产业及区域经济发展为导向，培养德智体美劳全面发展的社会主义建设者和接班人，具有良好的科学素养和思想品质，具备扎实的专业基础理论和软硬件开发能力，拥有较强的工程实践意识和国际化视野，能够在计算机软件、硬件、网络、信息技术等领域从事计算机相关的系统设计、产品开发、技术研究、系统维护、管理服务等方面工作的高素质创新型计算机人才。

本专业学生毕业工作 5 年后预计达到以下目标：

(1) 能以正确的人生观、价值观、世界观引导自我，确定价值取向、追求和目标，在工作中展示出职业道德、人文素养和社会责任感，在工程实践中能综合法律、伦理、社会、环境、经济等因素进行权衡和取舍。

(2) 能够作为团队骨干成员组织或承担计算机系统和工程领域复杂软硬件系统的技术创新、产品研发、工程管理等工作。

(3) 能在复杂计算机系统问题讨论中清晰陈述自己的设计思想和解决方案，能在多学科背景下融入团队协同完成技术研究和工程实践。

(4) 能通过不同渠道自觉学习计算机及相关领域的新理论、新技术、新工具，适应专业技术和职业发展的需求。

Based on the training goals of the university, i.e., focusing on Sichuan and west of China, serving for the whole country, cultivating high-quality and innovative professionals with good moral character, physical and mental health, broad foundation knowledge, solid professional field, broad vision, strong social responsibility, innovation spirit and practical ability, and guided by the national strategic emerging industries and regional economic development, the graduated students will become cultivate socialist builders and successors who have an all-round development in morality, intelligence, health, industrious and courageous, with good scientific literacy, ideological and moral quality. They also will become high-quality innovative talents who have a solid professional basic theoretical knowledge and design abilities of computer software & hardware application system, with a strong sense of engineering practice and international vision,

and be able to engage in software & hardware-related engineering design, product development , technical management and information service for the information technology industry.

After working five years, the graduated students are expected to achieve the following objectives:

(1) Can guide themselves with a correct view of the life and the world, confirm the pursuit and the goals, show professional ethics, humanistic quality and social responsibility during the works, and integrate legal, ethics, social, environmental, economy and other factors in the engineering practice to make trade-off and choice.

(2) Can organize or undertake technical research and development, product design, and engineering management of complex software and hardware systems as a backbone member of the team.

(3) Can clearly state their design ideas and solutions in the discussion of complex computer system problems, and be able to integrate into the team to complete technical research and engineering practice in a multidisciplinary background.

(4) Can consciously learn new theories, new technologies, and new tools in computer and related fields through different channels, and adapt to the needs of professional technology and career development.

3.1.2 毕业要求(Graduation Requirements)

1、工程知识：能够应用数学、自然科学知识、工程技术方法和计算机科学技术知识，表达计算机领域复杂工程问题，比较相关技术解决方案。

2、问题分析：能够应用数学、自然科学、工程科学和计算机科学技术知识，以及相关文献资料，研究分析计算机领域复杂工程问题和技术解决方案，并获得有效结论。

3、设计/开发解决方案：能够设计针对复杂工程问题的技术解决方案，开发满足特定需求的计算机软硬件系统或模块单元，并在设计开发环节中体现创新意识，考虑社会、环境、健康、安全、法律、文化等因素。

4、研究：能够基于科学原理，采用科学方法，对计算机领域复杂工程问题进行研究，包括设计实验、分析和解释数据，通过信息综合得出合理有效的结论。

5、使用现代工具：能够针对复杂工程问题，开发、选择和使用恰当的技术和方法，设计相关的计算机软硬件系统，对计算机领域复杂工程问题进行预测和模拟，并理解其局限性。

6、工程与社会：能够基于计算机工程相关问题背景，进行合理性分析，评价专业工程实践和复杂工程问题解决方案对社会、环境、健康、安全、法律、文化的影响，并理解应当承担的责任。

7、环境和可持续发展：能够理解和评价计算机复杂工程问题的技术解决方案和工程实践对环境、社会可持续发展的影响。

8、职业规范：具有科学精神、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职业道德和职业规范、履行职业责任和社会责任。

9、个人和团队：能在多学科背景下的团队中承担个体、成员、负责人的角色，协同完成团队任务。

10、沟通：能够就复杂工程问题和科学技术热点，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、表达反馈等；并具备一定的国际视野和表达能力，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和经济决策方法，并能在多学科环境中应用相关原理和方法解决实际工程问题。

12、终身学习：具有自主学习、终身学习和自我管理的意识，能够通过不断学习，适应社会和技术发展。

1. Engineering knowledge: be able to apply knowledge of mathematical, natural science , computer science and technology, combined with engineering technical methods to express complex engineering problems in the computer field, and compare related technical solutions.

2. Problem analysis: to have abilities to apply knowledge of mathematics, natural sciences, engineering sciences, and computer science and technology, as well as relevant literature and materials, to study and analyze complex engineering problems and technical solutions in the computer field, and to obtain effective conclusions.

3. Design/development solutions: be able to design technical solutions for complex engineering problems, develop computer software and hardware systems or module unit that meet specific needs, and reflect the sense of innovation in the design and development process, considering society, environment, health, safety, law, culture factors, etc.

4. Research: be able to conduct research on complex engineering problems in the computer field based on scientific principles and using scientific methods, including designing experiments, analyzing and interpreting data, and drawing reasonable and effective conclusions through information synthesis.

5. Use new technical tools: be able to develop, select and use appropriate technologies and methods for complex engineering problems, design related computer software and hardware systems, predict and simulate complex engineering problems in the computer field, and understand their limitations.

6. Engineering and society: based on the background of computer engineering-related issues, they perform rationality analysis, evaluate the impact of professional engineering practices and

complex engineering problem solutions on society, environment, health, safety, law, and culture, and understand the responsibilities that should be undertaken.

7. Environment and sustainable development: be able to understand and evaluate the impact of technical solutions and engineering practices of complex computer engineering problems on the environment and social sustainable development.

8. Professional norms: to have a good scientific spirit, humanistic and social literacy, science literacy, and social responsibility, and be able to understand and abide by professional ethics and professional norms, perform professional and social responsibilities.

9. Individuals and teams: be able to assume the roles of individuals, members, and leaders in a multidisciplinary team, and complete team tasks collaboratively.

10. Communication: to have abilities to use the right way effectively to communicate with industry peers and the public on complex engineering issues and scientific & technological hotspots, such as writing reports and designed manuscripts, making presentations, expressing feedback, etc.; and having a certain international perspective and abilities to express communicate and exchange in a cross-cultural context.

11. Project management: to understand and master engineering management principles and economic decision-making methods, and be able to apply relevant principles and methods to solve complex engineering problems in a multi-disciplinary environment.

12. Lifelong learning: to have the consciousness of independent learning, lifelong learning and self-management, and be able to adapt to the development of society and technology through continuous learning.

3.1.3 培养目标实现矩阵（毕业要求与课程的对应矩阵） Realization Matrix of Educational Objectives (Graduation Requirements by Courses)

毕业要求 Graduation Requirements	指标点（知识与能力要求） Index Points (Knowledge and Capability Requirements)	支撑课程或培养环节 Supporting courses or training processes
1、工程知识（能够应用数学、自然科学知识、工程技术方法和计算机科学技术知识，表述计算机领域复杂工程问题，比较相关技术解决方案）。 Engineering knowledge: be able to apply knowledge of	1.1 能够运用数学、自然科学和工程科学的知识、工具与方法，表述计算机系统及工程领域相关问题，解释相关的基本原理。 Be able to use the knowledge, tools and methods of mathematics, natural sciences and engineering sciences to formulate problems related to computer systems and engineering fields, and explain relevant basic principles.	高等数学 B 概率论与数理统计 线性代数 数理逻辑 Advanced Mathematics B Probability and Mathematical Statistics Linear Algebra

mathematical, natural science , computer science and technology, combined with engineering technical methods to express complex engineering problems in the computer field, and compare related technical solutions.	1.2 能够针对计算机系统及工程领域的具体问题和需求，建立合理的数学模型。 Be able to establish reasonable mathematical models for specific problems and needs in the field of computer systems and engineering.	Mathematical Logic 大学物理 D 集合论与图论 数理逻辑 程序设计基础 College Physics D Set Theory and Graph Theory Mathematical Logic Programming Foundation
	1.3 能够基于计算机系统的设计方案和所建模型，应用相关知识和数学建模方法进行推理分析，并能够得出结论。 Be able to apply relevant knowledge and mathematical modeling methods for reasoning and analysis based on the design scheme and model of the computer system, and be able to draw conclusions.	编译原理 计算机组成原理 数据库原理及应用 数字电子技术 Fundamentals of Compiling Computer Organization Database Principles and Applications Digital Electronics Technique
	1.4 能够应用相关知识和数学建模方法，对计算机系统及工程领域的问题进行求解，并进行分析、改进。 Be able to apply relevant knowledge and mathematical modeling methods to solve, analyze and improve problems in computer systems and engineering fields.	程序设计基础 计算机操作系统原理 数据结构 算法分析与设计 Programming Foundation Computer Operating System Data Structure Algorithm Analysis and Design
2、问题分析（能够应用数学、自然科学、工程科学和计算机科学技术知识，以及相关文献资料，研究分析计算机领域复杂工程问题和技术解决方案，并获得有效结论）。 2. Problem analysis: to have abilities to	2.1 能够运用相关科学原理，识别和判断计算机软件、硬件、网络、信息系统及相应复杂工程问题的关键环节。 Be able to use relevant scientific principles to identify and judge key aspects of computer software, hardware, networks, information systems and corresponding complex engineering problems.	集合论与图论 计算机组成原理 计算机操作系统原理 计算机网络 数据库原理及应用 Set Theory and Graph Theory Computer Organization Computer Operating System Computer Network

<p>apply knowledge of mathematics, natural sciences, engineering sciences, and computer science and technology, as well as relevant literature and materials, to study and analyze complex engineering problems and technical solutions in the computer field, and to obtain effective conclusions.</p>	<p>2.2 能够运用相关科学原理和数学模型方法正确表达计算机系统及相应复杂工程的关键问题,并根据需要进行分析 and 模拟。 Be able to use relevant scientific principles and mathematical model methods to correctly express the key issues of computer systems and corresponding complex projects, and to analyze and simulate as needed.</p> <p>2.3 能够识别计算系统和复杂工程中的制约因素和多种解决方案,并通过文献研究进行方案选择或寻求可替代解决方案。 Be able to identify constraints and multiple solutions in computational systems and complex engineering, and select alternatives or seek alternative solutions through literature research.</p> <p>2.4 能够运用相关基本原理和技术方法,借助文献研究,分析方案设计、开发和应用过程中的影响因素,获得有效结论。 Be able to use relevant basic principles and technical methods, with the help of literature research, to analyze the influencing factors in the process of program design, development and application, and obtain effective conclusions.</p>	<p>Database Principles and Applications</p> <p>概率论与数理统计 高等数学 B 数据结构 算法分析与设计 线性代数 Probability and Mathematical Statistics Advanced Mathematics B Data Structure Algorithm Analysis and Design Linear Algebra</p> <p>大学物理 D 计算机操作系统综合设计 计算机体系结构 College Physics D Comprehensive Design of Computer Operating System Computer Architecture</p> <p>编译原理 计算机体系结构 计算机网络 嵌入式技术及应用 Fundamentals of Compiling Computer Architecture Computer Network Embedded Technology and Application</p>
<p>3、设计/开发解决方案(设计/开发解决方案:能够设计针对复杂工程问题的技术解决方案,开发满足特定需求的计算机系统或模块单元,</p>	<p>3.1 能够基于全周期、全流程的系统开发和设计方法,确定设计目标,选择正确的设计开发方法,并了解影响设计目标和技术方案的各种因素。 Be able to determine the design goals, select the correct design and development method, and understand the various factors</p>	<p>面向对象程序设计方法(C++) 软件工程 数据库原理及应用 Object-Oriented Programming Method (C++) Software Engineering</p>

<p>并在设计开发环节中体现创新意识，考虑社会、环境、健康、安全、法律、文化等因素）。</p>	<p>that affect the design goals and technical solutions based on the full-cycle and full-process system development and design methods.</p>	<p>Database Principles and Applications</p>
<p>3. Design/development solutions: be able to design technical solutions for complex engineering problems, develop computer software and hardware systems or module unit that meet specific needs, and reflect the sense of innovation in the design and development process, considering society, environment, health, safety, law, culture factors, etc.</p>	<p>3.2 能够针对计算机软、硬件系统开发的特定需求，完成相关功能模块或系统的设计。 Be able to complete the design of relevant functional modules or systems according to the specific requirements of computer software and hardware system development.</p>	<p>计算机操作系统综合设计 嵌入式技术及应用 算法分析与设计 微机原理与接口技术 Comprehensive Design of Computer Operating System Embedded Technology and Application Algorithm Analysis and Design Microcomputer Principle and Interface Technology</p>
	<p>3.3 能够识别系统设计与实现中的关键问题，并进行方案优化，体现创新意识。 Be able to identify key issues in system design and implementation, and optimize solutions to reflect innovation.</p>	<p>嵌入式技术及应用 计算机电路辅助设计 数字电子技术 Embedded Technology and Application Computer Aided Circuit Design Digital Electronics Technique</p>
	<p>3.4 能够在系统设计与开发中考虑社会、安全、健康、法律、文化及环境等制约因素。 Be able to consider social, safety, health, legal, cultural and environmental constraints in system design and development.</p>	<p>数字电子技术实验 微机原理与接口综合设计 计算机科学与技术专业毕业设计 Digital Electronics Technique Experiment Comprehensive Design of Microcomputer and Interface Graduation Design (Thesis) for Computer Science and Technology</p>
<p>4、研究（能够基于科学原理，采用科学方法，对计算机领域复杂工程问题进行研</p>	<p>4.1 能够基于相关科学原理和技术方法，通过文献研究或相关方法，调研和分析专业领域复杂工程问题的解决方案。 Be able to investigate and analyze complex</p>	<p>计算机网络综合设计 算法分析与设计 Comprehensive Design of Computer Network</p>

<p>究，包括设计实验、分析和解释数据，通过信息综合得出合理有效的结论）。</p>	<p>engineering problems in professional fields through literature research or related methods based on relevant scientific principles and technical methods.</p>	<p>Algorithm Analysis and Design</p>
<p>4. Research: be able to conduct research on complex engineering problems in the computer field based on scientific principles and using scientific methods, including designing experiments, analyzing and interpreting data, and drawing reasonable and effective conclusions through information synthesis.</p>	<p>4.2 能够根据具体复杂工程问题的特征和要求，选择研究技术路线，设计实验方案。 Be able to choose research technical routes and design experimental plans according to the characteristics and requirements of specific complex engineering problems.</p>	<p>编译系统综合设计 汇编语言程序设计 微机原理与接口综合设计 Comprehensive Design of Compiler System Assembly Language Programming Comprehensive Design of Microcomputer and Interface</p>
	<p>4.3 能够根据技术路线和实验方案，构建实验或仿真系统，安全地开展实验，正确地提取和收集实验数据。 Be able to construct experimental or simulation systems according to the technical route and experimental scheme, carry out experiments safely, and correctly extract and collect experimental data.</p>	<p>大学物理实验 B 面向对象程序设计方法（++） 数字电子技术实验 嵌入式系统综合设计 College Physics Experiment B Object-Oriented Programming Method（C++） Digital Electronics Technique Experiment Integrated Design of Embedded System</p>
	<p>4.4 能够对实验数据和实验结果进行分析和解释，通过信息综合分析，得出合理有效的结论。 Be able to analyze and interpret experimental data and experimental results, draw reasonable and effective conclusions through comprehensive analysis of information.</p>	<p>数据库应用系统综合设计 算法分析与设计实践 计算机科学与技术专业毕业设计 Comprehensive Design of Database Application System Algorithm Analysis and Design Practice Graduation Design (Thesis) for Computer Science and Technology</p>
<p>5、使用现代工具（能够针对复杂工程问题，开发、选择和使</p>	<p>5.1 能够描述常用的计算机软硬件开发环境和开发工具的基本性能、使用原理、操作方法、适用范围及其局限性。</p>	<p>程序设计基础实验 面向对象程序设计实践(C++)</p>

<p>用恰当的技术和方法，设计相关的计算机软硬件系统，对计算机领域复杂工程问题进行预测和模拟，并理解其局限性）。</p> <p>5. Use new technical tools: be able to develop, select and use appropriate technologies and methods for complex engineering problems, design related computer software and hardware systems, predict and simulate complex engineering problems in the computer field, and understand their limitations.</p>	<p>Be able to describe the basic performance, usage principles, operation methods, scope of application and limitations of commonly used computer software and hardware development environments and development tools.</p>	<p>数字电子技术实验 Programming Foundation Experiment Object-Oriented Programming Practice (C++) Digital Electronics Technique Experiment</p>
	<p>5.2 能够根据实际需要，开发或选择恰当的工具、资源和技术方法，对复杂工程问题进行系统分析、方案设计、编程计算。 Be able to develop or select appropriate tools, resources and technical methods according to actual needs, to carry out systematic analysis, scheme design and programming calculations for complex engineering problems.</p>	<p>汇编语言程序设计 嵌入式系统综合设计 数据库应用系统综合设计 Assembly Language Programming Integrated Design of Embedded System Comprehensive Design of Database Application System</p>
	<p>5.3 能够针对计算机具体工程应用和特定需求，开发或选用计算设备及相关现代工具，进行模拟仿真和预测分析，并分析其特点和局限性。 Be able to develop or select computing machine and related modern tools for specific computer engineering applications and specific needs, conduct simulation and predictive analysis, and analyze their characteristics and limitations.</p>	<p>计算机电路辅助设计 算法分析与设计实践 计算机科学与技术专业毕业设计 Computer Aided Circuit Design Algorithm Analysis and Design Practice Graduation Design (Thesis) for Computer Science and Technology</p>
<p>6、工程与社会（能够基于计算机工程相关问题背景，进行合理性分析，评价专业工程实践和复杂工程问题解决方案对社会、环境、健康、安全、法律、文化的影响，并理解应当承担的责任）。</p> <p>6. Engineering and</p>	<p>6.1 了解计算机领域的主要技术标准体系、知识产权、产业政策和法律法规，理解其对计算机软件、硬件、网络、信息系统及相应复杂工程问题的影响。 to understand the main technical standard, intellectual property rights, industrial policies/ laws/ regulations in the computer field, and understand their impact on computer software, hardware, networks, information systems and corresponding complex engineering issues.</p>	<p>软件工程 形势与政策 计算机科学与技术专业毕业实习 Software Engineering Situation and Policy Graduation Practice for Computer Science and Technology</p>

<p>society: based on the background of computer engineering-related issues, they perform rationality analysis, evaluate the impact of professional engineering practices and complex engineering problem solutions on society, environment, health, safety, law, and culture, and understand the responsibilities that should be undertaken.</p>	<p>6.2 能够分析和评价计算机软件、硬件、网络及信息系统和相应的复杂工程问题对社会、安全、健康、法律、文化等方面的影响，明确所承担的社会责任。 Be able to analyze and evaluate the impact of computer software, hardware, network and information systems and corresponding complex engineering issues on society, safety, health, law, culture, etc., and clarify social responsibilities.</p>	<p>工程训练（ERP） 计算机科学与技术专业毕业设计 Engineering Training (ERP) Graduation Design (Thesis) for Computer Science and Technology</p>
<p>7、环境和可持续发展（能够理解和评价计算机复杂工程问题的技术解决方案和工程实践对环境、社会可持续发展的影响）。 7. Environment and sustainable development: be able to understand and evaluate the impact of technical solutions and engineering practices of complex computer engineering problems on the environment and social sustainable development.</p>	<p>7.1 知晓和理解环境保护和可持续发展的基本理念和内涵，能够认识到计算机系统的开发、运行、更新等活动对环境和社会可持续发展的影响。 To have abilities to know and understand the basic concepts and connotations of environmental protection and sustainable development, be able to recognize the impact of the development, operation, and update of computer systems on the sustainable development of the environment and society.</p>	<p>计算机学科导论 形势与政策 计算机科学与技术专业毕业实习 工程经济学 Introduction to Computer Science Situation and Policy Graduation Practice for Computer Science and Technology Engineering Economy</p>
<p>7. Environment and sustainable development: be able to understand and evaluate the impact of technical solutions and engineering practices of complex computer engineering problems on the environment and social sustainable development.</p>	<p>7.2 能够基于环境保护和可持续发展理念和要求，思考并指出计算机系统开发应用的可持续性，评估计算机系统开发、运行、更新过程中可能对人类和环境造成的损害和隐患。 Based on the concepts and requirements of environmental protection and sustainable development, think and point out the sustainability of the development and application of computer systems, and evaluate the damage and hidden dangers</p>	<p>工程训练（ERP） 就业创业基础 计算机科学与技术专业毕业设计 Engineering Training (ERP) Fundamentals of Innovation and Entrepreneurship Graduation Design (Thesis) for Computer Science and Technology</p>

	that may be caused to humans and the environment during the development, operation and updating of computer systems.	
<p>8、职业规范（职业规范：具有科学精神、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职业道德和职业规范、履行职业责任和社会责任）。</p> <p>8. Professional norms: to have a good scientific spirit, humanistic and social literacy, science literacy, and social responsibility, and be able to understand and abide by professional ethics and professional norms, perform professional and social responsibilities.</p>	<p>8.1 了解中国国情，具有良好的人文社会科学素养和公共道德，理解个人与社会、工作与生活之间的关系，具有符合中国特色和民族特征的正确价值观。</p> <p>Understand China's national conditions, have good humanities & social sciences and public morals, understand the relationship between individuals and society, work and life, and have correct values that conform to Chinese characteristics and national characteristics.</p>	<p>大学生心理健康教育</p> <p>马克思主义基本原理概论</p> <p>毛泽东思想与中国特色社会主义理论</p> <p>中国近现代史纲要</p> <p>Mental Health Education of College Students</p> <p>Introduction to the Basic Principles of Marxism</p> <p>An Introduction to Mao Zedong Thought and the Theoretical System of Socialism with Chinese Characteristics</p> <p>Conspectus of Chinese Modern History</p>
	<p>8.2 理解诚实公正、诚信守则的工程职业道德和规范，并在计算机工程实践中自觉遵守相关道德和规范。</p> <p>To understand the engineering professional ethics and norms of honesty, fairness and integrity codes, and consciously abide by relevant ethics and norms in computer engineering practice.</p>	<p>工程经济学</p> <p>思想道德修养与法律基础</p> <p>思想政治理论课实践教学</p> <p>Engineering Economy</p> <p>Thought Morals Tutelage and Legal Foundation</p> <p>The Practical Teaching of Ideological and Political Theory</p>
	<p>8.3 理解计算机工程人员对公众安全、健康和福祉，以及环境保护的社会责任，并在计算机工程实践中自觉履行相关责任。</p> <p>To understand the social responsibilities of computer engineers for public safety, health and well-being, and environmental protection, and consciously perform related responsibilities in the computer engineering practice.</p>	<p>计算机网络综合设计</p> <p>思想道德修养与法律基础</p> <p>思想政治理论课实践教学</p> <p>工程经济学 Comprehensive Design of Computer Network</p> <p>Thought Morals Tutelage and Legal Foundation</p> <p>The Practical Teaching of Ideological and Political</p>

		Theory Engineering Economy
<p>9、个人和团队（能在多学科背景下的团队中承担个体、成员、负责人的角色，协同完成团队任务）。</p> <p>9. Individuals and teams: be able to assume the roles of individuals, members, and leaders in a multidisciplinary team, and complete team tasks collaboratively.</p>	<p>9.1 能够合理表达个人观点，并与其他学科成员进行有效沟通，尊重他人意见，合作共事。</p> <p>Be able to express personal opinions reasonably, communicate with members of other disciplines effectively, respect the opinions of others, and work cooperatively.</p>	<p>大学生心理健康教育</p> <p>计算机组成原理实验</p> <p>形势与政策</p> <p>Mental Health Education of College Students</p> <p>Computer Organization Experiment</p> <p>Situation and Policy</p>
	<p>9.2 能够理解团队中不同角色的任务和分工，利用计算机及相关学科知识，独立或合作开展工作，完成所承担任务。</p> <p>Be able to understand the tasks and division of labor of different roles in the team, use computer and related discipline knowledge, work independently or cooperatively, and complete the tasks undertaken.</p>	<p>计算机电路辅助设计</p> <p>微机原理与接口综合设计</p> <p>计算机科学与技术专业毕业实习</p> <p>Computer Aided Circuit Design</p> <p>Comprehensive Design of Microcomputer and Interface</p> <p>Graduation Practice for Computer Science and Technology</p>
	<p>9.3 能够正确理解团队角色的职责和关系，组织、协同和指挥带领团队成员开展工作，完成团队任务。</p> <p>Be able to correctly understand the responsibilities and relationships of roles in the team, organize, coordinate and lead the team members to accomplish tasks to be assigned in the work.</p>	<p>大学物理实验 B</p> <p>编译系统综合设计</p> <p>工程训练（ERP）</p> <p>College Physics Experiment B</p> <p>Comprehensive Design of Compiler System</p> <p>Engineering Training (ERP)</p>
<p>10、沟通与交流（能够就复杂工程问题和科学技术热点，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、表达反馈等；并具备一定的国际视野和表达能力，能够在跨文化</p>	<p>10.1 能够就计算机专业问题，通过口头、文稿、图表等方式，准确表达自己的观点，回应质疑，理解与业界同行和社会公众交流的差异性。</p> <p>Be able to accurately express their opinions on computer professional issues through oral, manuscripts, diagrams, etc., respond to queries, and understand the differences in communication with industry peers and the public.</p>	<p>创新创业基础</p> <p>微机原理与接口技术</p> <p>计算机科学与技术专业毕业实习</p> <p>Fundamentals of Innovation and Entrepreneurship</p> <p>Microcomputer Principle and Interface Technology</p> <p>Graduation Practice for</p>

背景下进行沟通和交流）。		Computer Science and Technology
10. Communication: to have abilities to use the right way effectively to communicate with industry peers and the public on complex engineering issues and scientific & technological hotspots, such as writing reports and designed manuscripts, making presentations, expressing feedback, etc.; and having a certain international perspective and abilities to express communicate and exchange in a cross-cultural context.	10.2 了解计算机专业领域的国内外发展趋势和研究热点,理解和尊重不同文化的差异性和多样性,理解其对计算机技术和工程应用的影响。 To understand the domestic and foreign development trends and research hotspots of the computer professional field, understand and respect the differences and diversity of different cultural backgrounds, and their impact on computer technology and engineering applications.	创新创业基础 数字电子技术 计算机科学与技术专业毕业设计 Fundamentals of Innovation and Entrepreneurship Digital Electronics Technique Graduation Design (Thesis) for Computer Science and Technology
	10.3 具备跨文化交流的语言和书面表达能力,能够就计算机专业问题,进行跨专业、跨学科、跨文化背景下的有效沟通和交流。 To have the language and written expression skills for cross-cultural communication, and be able to communicate and exchange in cross-professional, inter-disciplinary, and cross-cultural contexts on computer professional issues.	综合英语 计算机学科导论 形势与政策 计算机科学与技术专业毕业设计 Comprehensive English Introduction to Computer Science Situation and Policy Graduation Design (Thesis) for Computer Science and Technology
11、项目管理（理解并掌握工程管理原理和经济决策方法,并能在多学科环境中应用相关原理和方法解决实际工程问题）。	11.1 掌握计算机相关项目的开发过程和涉及的管理与经济决策方法,能够将其用于系统开发和项目管理。 To master the development process of computer-related projects, as well as the management and economic decision-making methods involved, and be able to use them for system development and project management.	工程训练（ERP） 工程经济学 创新创业基础 Engineering Training (ERP) Engineering Economy Fundamentals of Innovation and Entrepreneurship
11. Project management: to understand and master engineering management principles and economic decision-making methods, and be able to apply relevant	11.2 了解计算机系统及产品开发全周期、全流程的成本构成,理解其中涉及的工程管理和经济决策问题。 To understand the cost structure of computer systems and product development in the whole cycle and process, and understand the engineering	面向对象程序设计实践(C++) 创新创业基础 计算机科学与技术专业毕业实习 Object-Oriented Programming Practice (C++)

principles and methods to solve complex engineering problems in a multi-disciplinary environment.	management and economic decision-making issues involved.	Fundamentals of Innovation and Entrepreneurship Graduation Practice for Computer Science and Technology
	11.3 多学科背景下,运用工程管理和经济决策方法,指导和规范计算机项目的方案设计、系统规划、开发实施等。 Be able to use engineering management and economic decision-making methods in a multi-disciplinary background to guide and normalize the program design, system planning, development and implementation in computer projects.	工程经济学 软件工程 微机原理与接口技术 Engineering Economy Software Engineering Microcomputer Principle and Interface Technology
12、终身学习（具有自主学习、终身学习和自我管理的意识,能够通过不断学习,适应社会和技术发展）。 12. Lifelong learning: to have the consciousness of independent learning, lifelong learning and self-management, and be able to adapt to the development of society and technology through continuous learning.	12.1 理解社会发展的大背景,了解学科专业发展的趋势,认识到自主学习和终身学习的重要性和必要性。 Understand the general background of social development, understand the trend of disciplinary professional development, and recognize the importance and necessity of self-directed learning and lifelong learning.	计算机学科导论 马克思主义基本原理概论 毛泽东思想与中国特色社会主义理论 计算机科学与技术专业毕业实习 Introduction to Computer Science Introduction to the Basic Principles of Marxism An Introduction to Mao Zedong Thought and the Theoretical System of Socialism with Chinese Characteristics Graduation Practice for Computer Science and Technology
	12.2 具备自主学习新技术、新方法的良好基础和能,不断学习并适应社会和技术的发展,能根据需要进行归纳总结、提出问题。 Possess a good foundation and ability to learn new technologies and methods independently, continuously learn and adapt to the development of society and technology, and can summarize and raises	创新创业基础 综合英语 计算机科学与技术专业毕业设计 Fundamentals of Innovation and Entrepreneurship Comprehensive English

	problems as needed.	Graduation Design (Thesis) for Computer Science and Technology
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毕业要求对培养目标的支撑关系 Matrix of Graduation Requirements and Educational Objectives

毕业要求 (Graduation Requirements)	培养目标(Training Objectives)			
	培养目标 1 Educational Objective 1	培养目标 2 Educational Objective 2	培养目标 3 Educational Objective 3	培养目标 4 Educational Objective 4
毕业要求 1 Graduation Requirement 1		√		
毕业要求 2 Graduation Requirement 2		√		
毕业要求 3 Graduation Requirement 3		√		
毕业要求 4 Graduation Requirement 4		√		
毕业要求 5 Graduation Requirement 5		√		
毕业要求 6 Graduation Requirement 6	√			
毕业要求 7 Graduation Requirement 7	√			
毕业要求 8 Graduation Requirement 8	√			
毕业要求 9 Graduation Requirement 9			√	
毕业要求 10 Graduation Requirement 10			√	
毕业要求 11 Graduation Requirement 11			√	
毕业要求 12 Graduation Requirement 12				√

3.1.4 专业培养阶段教学进程计划表(Courses Schedule of Educational Stages for the Major)

序号 No.	课程编号 Course Code	课程名称 Course Name	学分 Credits	学时 Hours			开课 学期 Semester	学位课 Degree Course	辅修 Minor	双学位 Double Degree
				总学 时 Total	理论 学时 Theory	实践 学时 Practice				
通识教育平台（必修） Basic Courses in General Education (Required)										
1	MY160080	马克思主义基本原理	3	48	48		3			

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序号 No.	课程编号 Course Code	课程名称 Course Name	学分 Credits	学时 Hours			开课 学期 Semester	学位课 Degree Course	辅修 Minor	双学位 Double Degree
				总学 时 Total	理论 学时 Theory	实践 学时 Practice				
		概论 Introduction to the Basic Principles of Marxism								
2	MY160110	毛泽东思想与中国特色 社会主义理论体系 概论 An Introduction to Mao Zedong Thought and the Theoretical System of Socialism with Chinese Characteristics	4	64	64	4				
3	MY160280	思想政治理论课实践 教学 The Practical Teaching of Ideological and Political Theory	2	32	32	3				
4	MY190013	形势与政策 3 Situation and Policy 3	0.25	8	8	3				
5	MY190014	形势与政策 4 Situation and Policy 4	0.25	8	8	4				
6	MY190015	形势与政策 5 Situation and Policy 5	0.25	8	8	5				
7	MY190016	形势与政策 6 Situation and Policy 6	0.25	8	8	6				
8	MY190017	形势与政策 7 Situation and Policy 7	0.25	8	8	7				
9	MY190018	形势与政策 8 Situation and Policy 8	0.25	8	8	8				
10	WY160203	综合英语 3 Comprehensive English 3	2	32	32	3				

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序号 No.	课程编号 Course Code	课程名称 Course Name	学分 Credits	学时 Hours			开课 学期 Semester	学位课 Degree Course	辅修 Minor	双学位 Double Degree
				总学 时 Total	理论 学时 Theory	实践 学时 Practice				
11	WY160104	综合英语 4 Comprehensive English 4	2	32	32		4			
12	JW190010	创新创业基础 Fundamentals of Innovation and Entrepreneurship	2	32	32		4			
小计 Subtotal			16.5	288	256	32				
学科（大类）教育平台（必修） Basic Courses in Discipline (Majors) Education (Required)										
1	LX190020	概率论与数理统计 Probability and Mathematical Statistics	3	48	48		3			
2	LX190101	大学物理实验 B1 College Physics Experiment B1	1	16		16	3			
3	GC160010	工程训练（ERP） Engineering Training(ERP)	1	16		1 周	6			
4	JK190320	工程经济学 Engineering Economy	2.5	40	40		6		▲	
5	JK190390	计算机操作系统原理 Computer Operating System	3	48	48		4	★	◆	▲
6	JK190400	计算机操作系统综合设计 Comprehensive Design of Computer Operating System	1	16		16	4			▲
7	JK190470	计算机网络 Computer Network	2.5	40	40		5	★	◆	▲
8	JK190480	计算机网络综合设计 Comprehensive	1	16		16	5			▲

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序号 No.	课程编号 Course Code	课程名称 Course Name	学分 Credits	学时 Hours			开课 学期 Semester	学位课 Degree Course	辅修 Minor	双学位 Double Degree
				总学 时 Total	理论 学时 Theory	实践 学时 Practice				
		Design of Computer Network								
9	JK191010	数据库应用系统综合设计 Comprehensive Design of Database Application System	1	16		16	5		◆	▲
10	JK191020	数据库原理及应用 Database Principles and Applications	3	48	48		5	★	◆	▲
小计 Subtotal			19	304	224	80				
专业教育平台（必修） Professional Education (Required)										
1	JK190230	编译系统综合设计 Comprehensive Design of Compiler System	1	16		16	5			
2	JK190240	编译原理 Fundamentals of Compiling	2	32	32		5		◆	▲
3	JK190410	计算机电路辅助设计 Computer Aided Circuit Design	2	32		32	5			
4	JK190440	计算机体系结构 Computer Architecture	2.5	40	32	8	4			
5	JK190530	计算机组成原理 Computer Organization	3	48	48		3	★	◆	▲
6	JK190540	计算机组成原理实验 Computer Organization Experiment	1	16		16	3		◆	▲
7	JK190650	面向对象程序设计方法（C++） Object-oriented Programming Method（C++）	2	32	32		3			▲

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				总学 时 Total	理论 学时 Theory	实践 学时 Practice				
8	JK190660	面向对象程序设计实践（C++） Object-oriented Programming Practice（C++）	2	32		32	3			
9	JK190680	嵌入式技术及应用 Embedded Technology and Application	3	48	48		6	★	◆	▲
10	JK190690	嵌入式系统综合设计 Integrated Design of Embedded System	2	32		32	6			
11	JK190750	软件工程 Software Engineering	2.5	40	40		4		◆	▲
12	XX160880	数字电子技术 Digital Electronics Technique	3	48	48		3			
13	XX160890	数字电子技术实验 Digital Electronic Technological Experiment	1	16		16	3			
14	JK191080	算法分析与设计 Algorithm Analysis and Design	2	32	32		4			▲
15	JK191090	算法分析与设计实践 Algorithm Analysis and Design Practice	1	16		16	4			
16	JK191180	微机原理与接口技术 Microcomputer Principle and Interface Technology	3	48	48		6	★		▲
17	JK191190	微机原理与接口综合设计 Comprehensive Design	1.5	24		24	6			

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				总学 时 Total	理论 学时 Theory	实践 学时 Practice				
		of Microcomputer and Interface								
18	JK190340	汇编语言程序设计 Assembly Language Programming	2	32		32	3			
19	JK190420	计算机科学与技术专业毕业设计 Graduation Design for Computer Science and Technology	14	224		224	8		▲	
20	JK190430	计算机科学与技术专业毕业实习 Graduation Practice for Computer Science and Technology	2	32		32	7		▲	
小计 Subtotal			52.5	840	352	488				
个性化培养平台（选修课） Characteristic Education Course (Elective)										
1	JK190290	单片机与接口综合设计 Integrated Design of Single Chip Microcomputer and Interface	2	32		32	6			
2	JK190300	单片微机原理及应用 Principle and Application of Single Chip Microcomputer	3	48	48		5			
3	JK190510	计算机新技术专题讲座 Lecture on New Computer Technology	1	16	16		4			
4	JK190890	软硬件综合设计 Hardware and	2	32		32	5			

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序号 No.	课程编号 Course Code	课程名称 Course Name	学分 Credits	学时 Hours			开课 学期 Semester	学位课 Degree Course	辅修 Minor	双学位 Double Degree
				总学 时 Total	理论 学时 Theory	实践 学时 Practice				
		Software Integrated Design								
5	JK190940	数据分析应用实践 Application Practice of Data Analysis	1.5	24		24	5			
6	JK190950	数据分析原理 Data Analysis Principle	1.5	24	24		5			
7	JK191030	数据挖掘技术 Data Mining	2	32	32		6			
8	JK191040	数据挖掘应用实践 Application Practice of Data Mining	1	16		16	6			
9	JK190100	Java 程序设计方法与 实践 Method and Practice of Java Programming	2.5	40		40	4			
10	JK190180	Web 交互系统综合设计 Comprehensive Design of Web Interactive System	2	32		32	6			
11	JK190860	软件项目开发与实践 Software Project Development and Practice	2	32		32	5			
12	JK191140	网络程序设计 Network Programming	3	48	40	8	6			
13	JK191150	网络程序设计实践 Network Programming Practice	1	16		16	6			
14	JK190450	计算机图形学原理	2	32	32		4			

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序号 No.	课程编号 Course Code	课程名称 Course Name	学分 Credits	学时 Hours			开课 学期 Semester	学位课 Degree Course	辅修 Minor	双学位 Double Degree
				总学 时 Total	理论 学时 Theory	实践 学时 Practice				
		Principle of Computer Graphics								
15	JK190460	计算机图形学原理实践 Computer Graphics Practice	1	16		16	4			
16	JK190980	数据可视化 Data Visualization	1.5	24	24		5			
17	JK190990	数据可视化实践 Data Visualization Practice	1.5	24		24	5			
18	JK191110	图像处理技术 Image Processing Technology	2	32	32		6			
19	JK191120	图像处理技术实践 Image Processing Technology Practice	1	16		16	6			
20	JK190160	Python 程序设计方法与 与实践 Method and Practice of Python Programming	2.5	40		40	4			
21	JK190250	并行计算与程序设计 Parallel Computing and Programming	2	32		32	6			
22	JK190350	机器学习 Machine Learning	3	48	48		6			
23	JK190360	机器学习实践 Machine Learning Practice	1	16		16	6			
24	JK190560	科学计算导论 Introduction to Scientific Computing	1.5	24	24		5			

序号 No.	课程编号 Course Code	课程名称 Course Name	学分 Credits	学时 Hours			开课 学期 Semester	学位课 Degree Course	辅修 Minor	双学位 Double Degree
				总学 时 Total	理论 学时 Theory	实践 学时 Practice				
25	JK190570	科学计算导论实践 Practice of Introduction to Scientific Computing	1.5	24		24	5			
26	JK190700	人工智能技术基础与 实践 Technical Basis and Practice of Artificial Intelligence	3	48	40	8	4			
小计 Subtotal			48	768	360	408				
小计 Subtotal			184	3172	1850	1322				

注：标注★的为“学位课程”，标注◆的为“辅修课程”，标注▲的为“双学位课程”。

3.1.5 集中实践环节（Intensive Practical Training Courses）

序号 No.	课程编号 Course Code	课程名称 Course Name	学分 Credits	实践学 时 Practice Hours	开课学 期 Semester	学位课 Degree Course	辅修 Minor	双学位 Double Degree
1	MY160280	思想政治理论课实践教学 The Practical Teaching of Ideological and Political Theory	2	32	3			
2	LX190101	大学物理实验 B1 College Physics Experiment B1	1	16	3			
3	GC160010	工程训练（ERP） Engineering Training(ERP)	1	16	6			
4	JK190280	程序设计基础实验 Programming Experiment	1	16	1			
5	JK190400	计算机操作系统综合设计 Comprehensive Design of Computer Operating System	1	16	4			
6	JK190480	计算机网络综合设计 Comprehensive Design of Computer	1	16	5			

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序号 No.	课程编号 Course Code	课程名称 Course Name	学分 Credits	实践学 时 Practice Hours	开课学 期 Semester	学位课 Degree Course	辅修 Minor	双学位 Double Degree
		Network						
7	JK191010	数据库应用系统综合设计 Comprehensive Design of Database Application System	1	16	5			
8	JK190230	编译系统综合设计 Assembly Language Programming	1	16	5			
9	JK190410	计算机电路辅助设计 Computer Aided Circuit Design	2	32	5			
10	JK190540	计算机组成原理实验 Computer Organization Experiment	1	16	3			
11	JK190660	面向对象程序设计实践（C++） Object-oriented Programming Practice（C++）	2	32	3			
12	JK190690	嵌入式系统综合设计 Integrated Design of Embedded System	2	32	6			
13	XX160890	数字电子技术实验 Digital Electronic Technological Experiment	1	16	3			
14	JK191090	算法分析与设计实践 Algorithm Analysis and Design Practice	1	16	4			
15	JK191190	微机原理与接口综合设计 Comprehensive Design of Microcomputer and Interface	1.5	24	6			
16	JK190340	汇编语言程序设计 Assembly Language Programming	2	32	3			
17	JK190420	计算机科学与技术专业毕业设计 Graduation Design for Computer Science and Technology	14	224	8			
18	JK190430	计算机科学与技术专业毕业实习 Graduation Practice for Computer Science and Technology	2	32	7			
19	JK190290	单片机与接口综合设计	2	32	6			

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序号 No.	课程编号 Course Code	课程名称 Course Name	学分 Credits	实践学 时 Practice Hours	开课学 期 Semester	学位课 Degree Course	辅修 Minor	双学位 Double Degree
		Integrated Design of single Chip Microcomputer and Interface						
20	JK190890	软硬件综合设计 Hardware and Software Integrated Design	2	32	5			
21	JK190940	数据分析应用实践 Application Practice of Data Analysis	1.5	24	5			
22	JK191040	数据挖掘应用实践 Application Practice of Data Mining	1	16	6			
23	JK190100	Java 程序设计方法与实践 Method and Practice of Java Programming	2.5	40	4			
24	JK190180	Web 交互系统综合设计 Comprehensive Design of Web Interactive System	2	32	6			
25	JK190860	软件项目开发与实践 Software Project Development and Practice	2	32	5			
26	JK191150	网络程序设计实践 Network Programming Practice	1	16	6			
27	JK190460	计算机图形学原理实践 Computer Graphics Practice	1	16	4			
28	JK190990	数据可视化实践 Data Visualization Practice	1.5	24	5			
29	JK191120	图像处理技术实践 Image Processing Technology Practice	1	16	6			
30	JK190160	Python 程序设计方法与实践 Method and Practice of Python Programming	2.5	40	4			
31	JK190250	并行计算与程序设计 Parallel Computing and Programming	2	32	6			
32	JK190360	机器学习实践 Machine Learning Practice	1	16	6			

序号 No.	课程编号 Course Code	课程名称 Course Name	学分 Credits	实践学 时 Practice Hours	开课学 期 Semester	学位课 Degree Course	辅修 Minor	双学位 Double Degree
33	JK190570	科学计算导论实践 Practice of Introduction to Scientific Computing	1.5	24	5			
小计 Subtotal			62.5	1000				

注：标注★的为“学位课程”，标注◆的为“辅修课程”，标注▲的为“双学位课程”。

3.1.6 核心课程和学位课程（Core Courses and Diploma Courses）

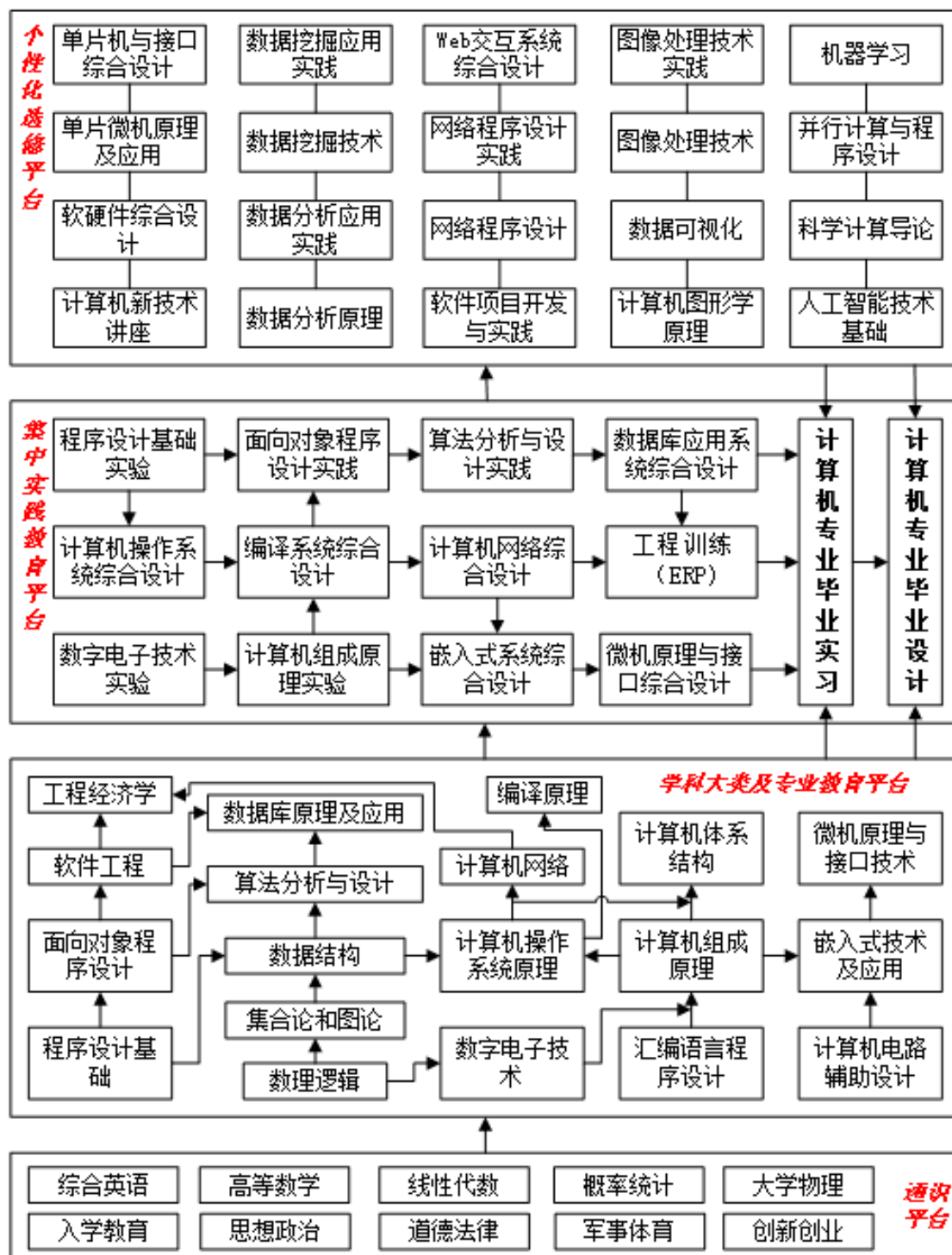
核心课程：集合论与图论、数理逻辑、程序设计基础、数据结构、编译原理、计算机操作系统原理、计算机网络、数据库原理及应用、计算机组成原理、计算机体系结构、嵌入式技术及应用、微机原理与接口技术

Core Courses: Set Theory and Graph Theory, Mathematical Logic, Programming Foundation, Data Structure, Fundamentals of Compiling, Computer Operating System, Computer Network, Database Principles and Applications, Computer Organization, Computer Architecture, Embedded Technology and Application, Microcomputer Principle and Interface Technology

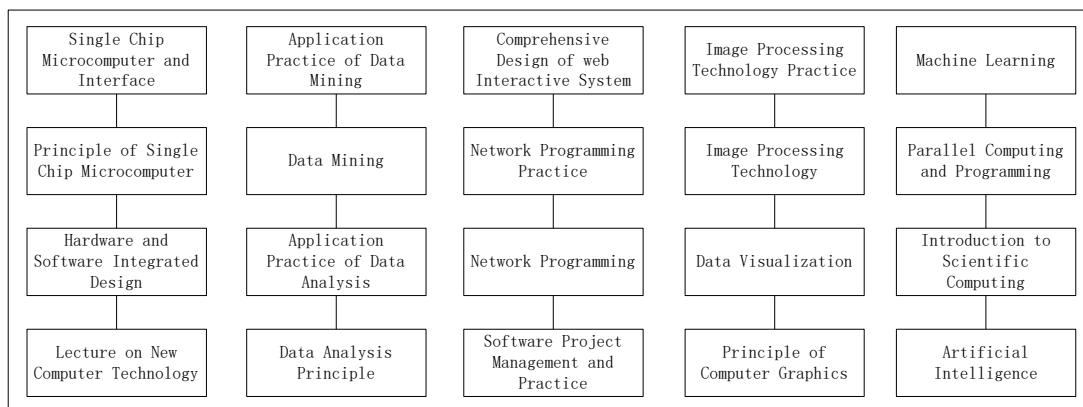
学位课程：综合英语 2、高等数学 B2、程序设计基础、数据结构、计算机组成原理、计算机操作系统原理、计算机网络、数据库原理及应用、嵌入式技术及应用、微机原理与接口技术

Diploma Courses: Comprehensive English 2, Advanced Mathematics B2, Programming Foundation, Data Structure, Computer Organization, Computer Operating System, Computer Network, Database Principles and Applications, Embedded Technology and Application, Microcomputer Principle and Interface Technology

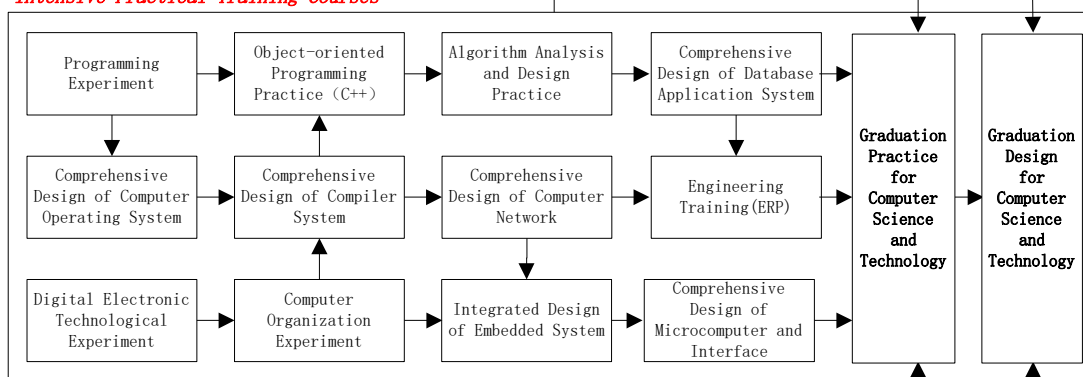
3.1.7 课程体系结构图（The Curriculum Chart）



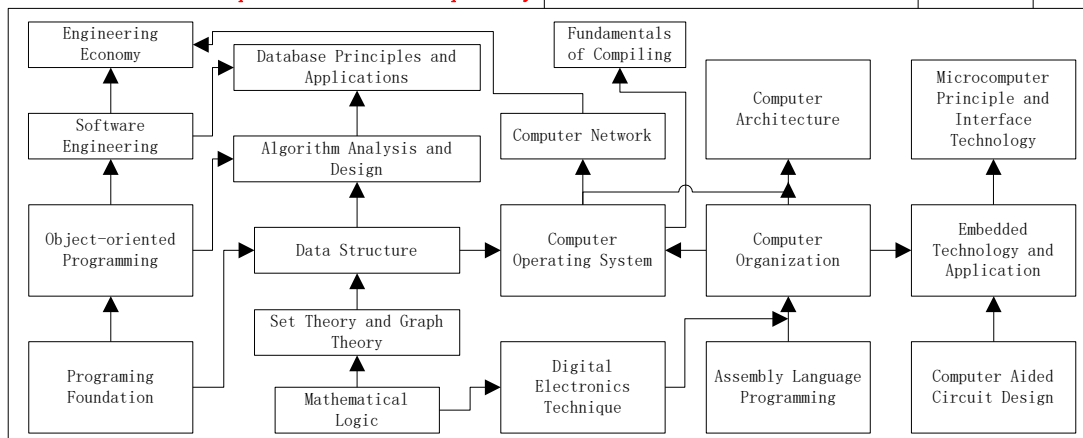
Characteristic Education Course



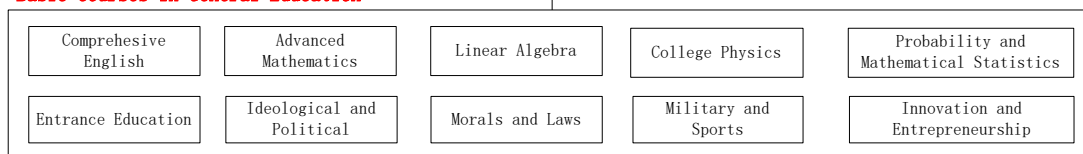
Intensive Practical Training Courses



Basic Courses in Discipline Education and Specialty Education



Basic Courses in General Education



3.1.8 学制及学分要求 (Duration of Schooling and Credit Requirements)

1、学制：4 年。

2、学分要求：学生在校期间必须修满本方案规定的 170 学分方能毕业，其中，各环节的具体学分要求如下表。

1.Duration: 4 years.

2.Credits requirements: students must complete 170 credits specified in this program before graduation. The specific credit requirements are listed in the following table.

	通识教育平台 General Education Courses	学科（大类）教育 平台 Discipline Courses	专业教育 平台 Major Courses	个性化培养 平台 Customized Education Courses	总学分 Total Credits
必修课 Required Courses	35.5	48	52.5	/	170
选修课 Selective Courses	/	/	/	34	

3.1.9 授予学位（Degree Conferred）

毕业时符合学位授予条件的，授予工学学士学位。

The students who meets the requirements for the award of the degree will be awarded a Bachelor's Degree in Engineering.

3.1.10 说明（Notes）

1.各学期应修学分建议(Credit Allotment for Each Semester)

学期 Semester	一 1st	二 2nd	三 3rd	四 4th	五 5th	六 6th	七 7th	八 8th	学分合 计 Total
建议应修学 分 Credits	19.75	26.25	26.25	26.75	27.25	27.25	2.25	14.25	170