

# 计算机科学与技术专业人才培养方案

## Undergraduate Program for Computer Science and Technology

### Major

学科门类：工学	国标代码：08	
Discipline Type: Engineering	Code: 08	
专业类：计算机类	国标代码：0809	
Type: Computer	Code: 0809	
专业名称：计算机科学与技术	国标代码：080901	校内代码：22
Title of the Major: Computer Science and Technology	Code: 080901	

### 一、学制与学位 Length of Schooling and Degree

学制：四年 Duration: Four years

授予学位：工学学士 Degree: Bachelor of Engineering

### 二、培养目标 Educational Objectives

培养服务于社会主义建设事业，德智体美劳全面发展，理论基础扎实、创新意识强、具有一定的国际视野和优良的发展潜力，适应经济社会发展及未来变化，能源电力特色鲜明的多元化卓越人才；本专业学生应掌握自然科学和人文社科基础知识、计算机科学基础理论和专门知识，具有良好的综合素质、创新意识和团队精神，能够从事计算机相关的科学研究、开发、应用与管理等工作。

This major cultivates diversified and outstanding talents who serve the cause of socialist construction, develop morally, intellectually, physically, aesthetically and laboriously in an all-round way, have a solid theoretical foundation, a strong sense of innovation, have a certain international vision and excellent development potential, adapt to economic and social development and future changes, and have distinctive energy and power characteristics. Students of this major should master the basic knowledge of natural science, humanities and Social Sciences, basic theory and expertise of computer science, have good comprehensive quality, innovation consciousness and team spirit, and be able to engage in computer related scientific research, development, application and management.

学生毕业 5 年左右能够达到的职业和专业成就：

- (1) 具备良好的理工基础与人文素养，具有健全的人格和正确的价值观，能够正确认识计算机软硬件工程实践对环境、社会可持续发展的影响；
- (2) 能够系统运用计算机理论与技术，综合考虑社会、健康、安全、法律、文化以及环境等因素，具有从事计算机系统的分析、设计、应用和集成能力，能从事软硬件设计与开发工作，针对计算机及能源电力相关行业领域复杂工程问题，设计开发相应的解决方案；
- (3) 具有良好的团队合作精神和项目管理能力，遵守法律法规，具有工程职业道德，

遵守职业规范，有社会责任感；

(4) 能够跟踪计算机领域的前沿技术和相关行业国内外发展趋势，具备良好的主动发展意识、创新精神与自主终身学习能力；

(5) 具备良好的表达与沟通能力，能够承担国际交流与对外合作工作。

Graduates are expected to have the following professional achievements after 5 years of work practice:

(1) They will have a good scientific and technological foundation and humanistic literacy, and have a sound personality and correct values;

(2) They can systematically use computer theory and technology, comprehensively consider social, health, safety, legal, cultural and environmental factors, have the ability to engage in computer system analysis, design, application and integration, and be able to engage in software and hardware design and development, and design and develop corresponding solutions for complex engineering problems in computer related industries;

(3) They will have a good team spirit and project management ability, abide by laws and regulations, have engineering professional ethics, abide by professional norms, and have a sense of social responsibility;

(4) They are able to track the cutting-edge technology in the computer field and the development trend of related industries at home and abroad, with a good sense of initiative development, innovative spirit and self-learning ability;

(5) They will have good expression and communication skills. They will be able to undertake international exchanges and foreign cooperation.

### 三、专业培养基本要求 Skills Profile

本专业学生毕业时应达到以下要求：

(1) 工程知识：掌握数学、自然科学、工程基础和计算机专业知识，能够用于解决计算机软硬件系统及能源电力相关行业计算机领域的复杂工程问题。

(2) 问题分析：具有良好的科学素养和强烈的工程意识或研究探索意识，能够将计算机软硬件系统相关的基础理论知识用于计算机软硬件系统的抽象、分析，并通过文献研究分析计算机软硬件系统中的复杂工程问题，以获得有效结论，为系统方案设计提供依据。

(3) 设计/开发解决方案：能够应用计算机软硬件系统的基本原理和方法，设计满足特定需求的合理方案，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。

(4) 研究：能够利用计算机学科的基本概念、知识结构，典型方法，建立数字化、算法、模块化与层次化等核心专业意识，对计算机软硬件系统中的复杂工程问题进行研究，并通过信息综合得到合理有效的结论。

(5) 使用现代工具：针对实际工程问题，能够选择、使用合适的开发工具和测试技术，对计算机软硬件系统进行设计、模拟或实现，解决计算机工程实践中的复杂问题，并能理解工具和技术的局限性。

(6) 工程与社会：能够基于工程相关背景知识进行合理分析、评价计算机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) 环境和可持续发展：能够理解和评价针对复杂工程问题的计算机工程实践对环境、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，熟悉国家信息产业政策及国内外有关信息安全和知识产权的法律法规，在工程实践中能够综合考虑经济、环境、法律、法规、安全、健康、伦理等制约因素。

(9) 个人和团队：能够在多学科背景下的团队中承担个体、团队成员或负责人的角色。

(10) 沟通：能够就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，并能在计算机软硬件系统的设计、运行及管理中的应用。

(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，能及时了解计算机科学与技术最新理论、技术及国际前沿动态。

The graduates should meet the following requirements:

(1) Engineering knowledge: they should possess mathematics, natural science, engineering foundation and professional knowledge to analyze and solve the complicated engineering problems in computer field of energy and power related industries.

(2) Problem analysis: they will have good scientific literacy and strong engineering consciousness or research and exploration consciousness, be able to comprehensively use the knowledge and technology and basic thinking methods and research methods of computer science, solve complex practical problems and analyze the results.

(3) Solutions design/development: they will design and develop computer hardware and software, provide effective solutions, be able to engage in the analysis, design, application and integration of computer systems, and consider legal, safety, environmental protection and cultural factors.

(4) Research: they will have the ability to use the basic concepts, knowledge structure and typical methods of computer science to establish core professional consciousness such as digitization, algorithm, modularization and hierarchy, study complex engineering problems in computer software and hardware system, and obtain reasonable and effective conclusions through information synthesis.

(5) Modern tool usage: they will be able to select appropriate tools and information technology tools for computer engineering problems, and be able to understand the limitations of tools and technologies.

(6) Engineer and society relations: they will be able to reasonably analyze and evaluate the impact of computer engineering practice and complex engineering problem solutions on society, health, safety, law and culture based on engineering related background knowledge, and understand the responsibilities.

(7) Environment and sustainable development: they will be able to understand and evaluate the impact of professional engineering practice on the sustainable development of environment and society.

(8) Professional standard accomplishment: they will have the quality of Humanities and Social Sciences, sense of social responsibility, be familiar with the national information industry policy and the laws and regulations related to information security and intellectual property at home and abroad, and be able to comprehensively consider the restrictive factors such as economy, environment, laws, regulations, safety, health and ethics in the process of system design.

(9) Individual and team competence: they will be able to play the role of individual, member or person in charge in a multidisciplinary team, and have certain organization and management ability, interpersonal skills and team cooperation ability.

(10) Communication: they will be able to effectively communicate with peers in the industry and the public on complex engineering problems, including writing reports and design manuscripts, making statements, clearly expressing or responding to instructions; Have preliminary foreign language application ability, can read the foreign language materials of this major; And have a certain international vision, be able to communicate, exchange, compete and cooperate in the cross-cultural background.

(11) Project management: they will be able to understand and master the principles of engineering management and economic decision-making methods, and be able to apply them in a multidisciplinary environment.

(12) Lifelong learning: they will have the awareness of independent learning and lifelong learning, have the ability to constantly learn and adapt to development, and be able to timely understand the latest theories, technologies and international cutting-edge trends of computer science and technology.

#### 四、学时与学分 Hours and Credits

类别		学时	学分	比例
必修课 Required courses	公共基础 Public infrastructure	644	33	19.41%
	学科门类基础 Basis of discipline	576	36	21.18%
	专业类基础 Basis of major	376	23.5	13.82%
	专业核心 Required courses of major	360	22.5	13.24%
	集中实践 Intensive practice	208 学时+18 周 208 class hours + 18 weeks	30	17.65%
必修课小计 Subtotal of Required courses		2164 学时+18 周 2164 class hours + 18 weeks	145	85.29%
选修课 Electives		320	20	11.76%
课外实践学分 Practice credits of extra-curricular		5 周	5	2.94%
总计 Total		2484 学时+23 周 2484 class hours + 23 weeks	170	100%

#### 说明:

必修实践环节学分包括: 集中实践课程 30 学分, 课外实践课程 5 学分, 学科门类基础、专业基础课程中的实验课程 5.5 学分, 学科门类基础、专业基础、专业必修课程中的实验、上机学时折算 2 学分, 共计 42.5 学分, 占总学分 25%。

#### Note:

Total of 42.5 credits for required practice training, accounting for 25% of the total credits, including: 30 credits for Intensive practice, 5 credits for practice credits of extra-curricular, 5.5 credits for basis of discipline and basis of major, 2 credits for experiment and computer practice in

basis of discipline, basis of major, and required courses of major.

### 五、专业主干课程 Main Course

离散数学、数据结构、面向对象程序技术、计算机组成原理、操作系统、数据库原理、软件工程、编译技术、计算机网络、计算机系统结构、嵌入式系统。

Discrete mathematics, data structure, object-oriented program technology, principles of computer organization, operating system, database principle, software engineering, compilation technology, computer network, computer system structure, embedded system.

### 六、总周数分配 Arrangement of the Total Weeks

学期 Semester 教学环节 Teaching Program	一	二	三	四	五	六	七	八	合计
理论教学 Theory Teaching	17	16	16	17	15	17	17	2	118
复习考试 Review and Exam	2	2	1	2	1	3	3	0	14
集中实践环节 Intensive Practice	3	2	3	1	5	0	1	16	30
小计 Subtotal	22	20	20	20	21	20	21	18	162
寒假 Winter Vacation	5		5		5		5		20
暑假 Summer Vacation		6		6		6			18
合计 Total	27	26	25	26	26	26	26	18	200

计算机科学与技术专业必修课程体系及教学计划

Table of Teaching Schedule for Required Course and Teaching Plan

类别 Type	课程编号 Course ID	课程名称 Course name	学分 Credits	总学时 Hours	课内学时 In class hours	实验学时 Lab hours	课外学时 Off class hours	开课学期 Semester
公共基础课程 Public basic courses	00700975	中国近现代史纲要 Chinese Modern and Contemporary History Outline	3	48	32		16	2
	00701353	思想道德与法治 Ideology and Moral Cultivation & Law Basis	3	48	32		16	1
	00700983	毛泽东思想和中国特色社会主义理论体系概论 Mao Zedong Thought and the Theory of Building Socialism with Chinese Characteristics	3	48	32		16	3
	00700971	马克思主义基本原理 Marxist Theory	3	48	32		16	3
	00700988	习近平新时代中国特色社会主义思想概论 Outline of Xi Jinping's New China's Socialist Ideology	3	48	32		16	2
	00701661-00701668	形势与政策 Current Affair and Policy	2	64	64			1-8
	01390011	军事理论 Military Theory	2	36	24		12	1
	J100010	现代电力工程师	2	32	32			2
	00801410	通用英语 General English	4	64	64			1
	00801400	学术英语 Academic English	4	64	64			2
	01000011	体育(1) Physical Education (1)	1	36	30		6	1
	01000021	体育(2) Physical Education (2)	1	36	30		6	2
	01000031	体育(3) Physical Education (3)	1	36	30		6	3
	01000041	体育(4) Physical Education (4)	1	36	30		6	4
	公共基础课程小计 Subtotal of public basic courses			33	644	528		116
学科门类基础课程 Basis of discipline	00900130	高等数学(1) Advanced Mathematics (1)	5.5	88	88			1
	00900140	高等数学(2) Advanced Mathematics (2)	6	96	96			2
	00900462	线性代数 Linear Algebra	3	48	48			3
	00900111	概率论与数理统计 Probability and Mathematical Statistics	3.5	56	56			4
	00900053	大学物理(1) College Physics (1)	3.5	56	56			2
	00900064	大学物理(2) College Physics (2)	3	48	48			3
	00900440	物理实验(1) Experiments of Physics (1)	2	32		32		2
	00900450	物理实验(2) Experiments of Physics (2)	2	32		32		3
	04100300	高级语言程序设计 Advanced Language Programming	3.5	56	56			1
	04101700	计算机导论 Introduction to Computer Science	1	16	16			1

类别 Type	课程编号 Course ID	课程名称 Course name	学分 Credits	总学时 Hours	课内学时 In class hours	实验学时 Lab hours	课外学时 Off class hours	开课学期 Semester
	10410221	面向对象程序设计 Object-Oriented Programming	3	48	40	8		3
	工程基础类课程小计 Subtotal of Engineering foundation		36	576	504	72		
专业基础类课程 The major basic courses	00600460	离散数学 Discrete Mathematics	4	64	64			1
	00600600	数据结构 Data Structure	3.5	56	56			2
	00600651	数字逻辑与数字系统设计 Design in Digital Logic and Digital System	3	48	48			5
	00200491	电路分析基础 Fundamentals of Circuit Analysis	3.5	56	56			4
	00200522	电路实验 Experiment of Circuit Analysis Fundamentals	0.5	8		8		4
	00500351	模拟电子技术基础 Fundamentals of Analogue Electronics	3	48	48			4
	00500171	模拟电子技术实验 Experiments of Electronics Technique	1	16		16		4
	00600660	算法设计与分析 Algorithm Design and Analysis	3	48	40	8		4
	10410971	汇编语言程序设计 Assembly Language Programming	2	32	32			4
	专业基础类课程小计 Subtotal of The major basic courses		23.5	376	344	32		
专业核心课程 Required courses of major	10410560	计算机组成原理 Principles of Computer Organization	3.5	56	56			5
	00600100	操作系统 Operating Systems	3.5	56	56			4
	10410160	计算机网络 Computer Network	3	48	48			3
	00601380	软件工程 Software Engineering	2	32	32			5
	00600091	编译技术 Compiling Technology	2.5	40	40			5
	00600621	数据库原理 Database Principles	2.5	40	40			5
	00600512	嵌入式系统 Embedded System	3	48	32	16		6
	00600351	计算机体系结构 Computer Architecture	2.5	40	40			6
		专业核心课程小计 Subtotal of Required courses of major		22.5	360	344	16	
必修课学分合计 Subtotal of Required courses			115					

## 计算机科学与技术专业部分集中实践环节设置

Table of Teaching Schedule for Main Practical Training

类别 Type	课序号 ID	环节名称 Name	学分 Credits	周数 Weeks	学时数 Hours	开课 学期 Semester
必修 Required	01390012	军事技能 Military Training	2	2周		1
	00690092	程序设计实验 Programming Experiments	1	1周		1
	00690210	数据结构课程设计 Curriculum Design of Data Structure	1	1周		2
	00690380	数字逻辑与数字系统设计综合实验 Comprehensive Experiment of Digital Logic and Digital System Design	1	1周		5
	10410569	计算机组成原理综合实验 Comprehensive Experiment of Principles of Computer Organization	1	1周		5
	00690061	操作系统综合实验 Comprehensive Experiment of Operating System	1	1周		4
	00690290	计算机网络综合实验 Comprehensive Experiments of Computer Networks	1	1周		3
	00690040	编译技术课程设计 Curriculum Design of Compiling Technology	1	1周		5
	00690161	软件工程课程设计 Curriculum Design of Software Engineering	1	1周		5
	00690190	数据库原理课程设计 Curriculum Design of Database Principles	1	1周		5
	00690202	硬件设计与实践 Design and Practice of Hardware	1	1周		7
	00690021	毕业设计 Graduation Project	13		208	7-8
	J100060	劳动教育 Labor Education	2	2周		3
	00690130	认识实习 Acquaintanceship Practice of Computer	1	1周		2
	00690031	毕业实习 Major Practice	2	2周		8
00690010	毕业教育 Graduation Education	0	1周		8	
集中实践小计 Subtotal of major practical training			30	18周	208	



## 计算机科学与技术专业选修课教学进程

Table of Teaching Schedule for Electives

组别 Group	课程编号 Course ID	课程名称 Course name	学分 Credits	总学时 Hours	课内 学时 In class hours	实验 学时 Lab hours	课外 学时 Off class hours	开课 学期 Semester	模块 Module
1	00600151	单片机原理及应用 Principle and Application of Single Chip Microcomputer	2	32	32			3	总学分 不少于 12 学分 Electives, not less than 12 credits
	10141060	计算机前沿技术 Computer Lecture Technology	1	16	16			4	
	10410240	人工智能导论 Introduction to Artificial Intelligence	2	32	32			5	
	00600702	接口与通信技术 Interface and Communication Technology	2	32	28	4		5	
	00201980	智能电网导论 Introduction to Smart Grid	2	32	32			5	
	00601790	计算理论 Computational theory	2	32	32			3	
	00600811	计算机专业英语 Computer English	2	32	32			7	
	006001800	并行计算技术 Parallel Computing Technology	2	32	32			6	
	00601331	大数据处理技术 Big Data Processing Technology	2	32	32			6	
	00600361	计算机图形学 Computer Graphics	2	32	32	6		6	
	00601000	云计算技术及应用 Cloud Computing Technology and Application	2	32	24	8		7	
	00600990	物联网技术及应用 Internet of Things Technology and Application	2	32	24	8		7	
	00600040	LINUX 体系及编程 LINUX system and programming	2	32	32			5	
	00601740	Web 智能编程与应用 Web Intelligent Programming and Application	2	32	32			5	
00600770	虚拟现实 Virtual Reality	2	32	32	6		6		
	跨专业选修其他专业的专业课程 Interdisciplinary Electives								
2	通识教育选修课程 General Education Electives	公共艺术类课程至少选修 2 学分; 其它可用组别 1 中课程学分替代							
选修课总学分不低于 20 学分。其中, 组别 1 中的课程学分不低于 12 学分。									

### 选修课选课建议: Recommendations for electives

1. 第二、第三学期: 建议每学期选修通识教育选修课程模块中的课程 1-2 门。
2. 第四、五、六、七、八学期: 建议每学期从专业选修课各模块中选修 1-3 门课程; 也可根据个人兴趣, 跨专业选修其他专业的专业课程。

1. Second and third semesters: It is recommended to select 1-2 courses in **General Education Electives** every semester.
2. Fourth, fifth, sixth, seventh, and eighth semesters: It is recommended to choose 1-3 courses from each part of electives each semester; you can also select **Interdisciplinary Electives** based on personal interests.

## 辅修计算机科学与技术专业人才培养方案

### Undergraduate Program for the Computer Science and Technology Minor

组别 Group	课程编号 Course ID	课程名称 Course name	学分 Credits	总 学时 Hours	课内 学时 In class hours	实验 学时 Lab hours	课外 学时 Off class hours	备注
A	00600600	数据结构 Data Structure	3.5	56	56			
	00600660	算法设计与分析 Algorithm Design and Analysis	3	48	40	8		
	10410560	计算机组成原理 Principles of Computer Organization	3.5	56	56			
	00600100	操作系统 Operating Systems	3.5	56	56			
	10410160	计算机网络 Computer Network	3	48	48			
	00601380	软件工程 Software Engineering	2	32	32			
	00600091	编译技术 Compiling Technology	2.5	40	40			
	00600621	数据库原理 Database Principles	2.5	40	40			
	00600512	嵌入式系统 Embedded System	3	48	32	16		
	00600351	计算机体系结构 Computer Architecture	2.5	40	40			
B	00690021	毕业设计 Graduation Project	13	208		208		
学分合计 Subtotal of courses			42	672	440	232		