

# 浙江科技学院信息与计算科学专业培养方案

## 一、培养目标

本专业培养具有良好数学素养，掌握信息科学和计算科学的基础理论与方法，受到科学研究的初步训练，能运用所学知识解决实际工作中遇到的信息处理问题的高素质应用型专门人才。毕业生能胜任信息产业、经济金融等部门的数据处理与计算、应用软件开发或金融问题建模、管理决策等工作，也能在科技、教育等部门从事科研、教学等工作，也可以攻读相关专业的研究生学位。

## 二、培养标准

本专业学生主要学习信息和计算科学的基础理论、基本知识和基本方法，打好数学基础，受到较扎实的计算机训练，使学生具有较强的数学建模、数值计算、数据处理及程序设计、应用软件开发与开发，或金融信息分析、精算设计与应用等能力。本专业分应用软件和金融数学两个专业模块。毕业生的知识、能力和素质应达到以下几方面的要求：

### 1、基本素质要求

(1) 热爱祖国，拥护中国共产党的领导，树立科学的世界观、人生观和价值观，具有责任心和社会责任感，自觉遵纪守法，注重职业道德，具有诚信意识和团队精神。

(2) 具有一定的文学艺术修养、人际沟通修养和现代意识。

(3) 具有较为扎实的数学知识，学会科学思维和科学研究方法，具备求实创新意识和严谨的科学素养。

(4) 具有良好的身体素质，健康的心理素质及良好的行为习惯。"

### 2、能力结构要求

(1) 具有良好的自学能力以及获取新知识的能力。

(2) 具有较强的分析、归纳、抽象、演绎推理、空间想象、科学计算等能力，并具有综合运用所学知识解决实际问题的能力，应用软件模块学生应具有一定的程序设计、系统分析与设计、应用软件开发与开发等能力，金融数学模块学生应具有一定的金融信息分析、精算设计与应用、计算机财务管理应用等能力。

(3) 具有良好的团结协作能力，一定的组织管理能力以及较好的人际交往、社会适应能力。

(4) 具有一定的创造性思维能力，并对新知识、新技术具有较强的求知欲望和良好的接受能力。

### 3、知识结构要求

(1) 掌握一门外语，能熟练使用计算机（程序设计、办公自动化等），能利用现代信息技术查阅专业文献资料。

(2) 有一定的文学、哲学、历史、经济等人文社科知识及自然科学知识。

(3) 具有良好的数学基础，掌握数学软件（MATLAB 等）、数学建模和数值计算方法等基本知识，掌握数据管理、数据分析与数据挖掘的基本技能，应用软件模块学生应有较强的编程知识及技能，并掌握软件开发的相关工具及流程，金融数学模块学生应有较好的经济金融知识，并掌握财务管理、精算方法应用等的基本理论与方法。

## 三、知识、能力和素质实现矩阵

要求内容		配套主要课程或教育培养措施
知识要求	工具性知识	通过大学英语、双语课程等教学及专业文献翻译，达到熟练使用英语阅读和翻译专业文献并进行简单交流；通过 C 语言程序设计、数据结构、数据库原理等相关课程、毕业设计（论文）过程等，实现计算机的熟练使用，掌握文献资料的查阅方法。

	人文社科及自然科学知识	通过大学语文、大学物理、公共拓展复合课程选修等教学环节实现。
	专业知识	通过专业层次课程的必修、专业拓展与专业复合课程的选修，达到熟练掌握数学基础以及专业模块相关的基础知识与方法。
能力要求	获取知识的能力	通过课内外教学，提高知识的消化和吸收能力，培养自主学习能力。
	知识应用与实践能力	通过课程实验、课程设计、开放性实验、学科竞赛、科技项目、技术实习以及毕业设计（论文）等环节，逐步提高知识应用与实践能力。
	交流协作及组织管理能力	通过参加社会实践、学科竞赛、科技项目、技术实习、志愿者活动、学会与社团活动等环节锻炼和培养学生的交流协作、组织管理及社会适应能力。
	创新能力	通过专项设计、开放性实验、学科竞赛、科技项目以及毕业设计（论文）等环节，逐步提高创新能力。
素质要求	思想道德素质	通过“思政”类课程和思政社会实践等环节实现。
	文化素质	通过选修人文社科艺术类、经济管理类等公共拓展复合课程以及参加相关活动来实现。
	专业素质	通过专业课程学习，参加专业学术报告、专业实践等环节，逐步培养专业的的基本素质。
	身心素质	通过体育、大学生心理健康教育等课程以及参加体质健康训练、军事训练、各类有益身心健康的活动等环节，提高身体素质和心理素质。

#### 四、主干学科

数学、计算机科学与技术、金融学。

#### 五、专业核心课程

数学分析、高等代数与解析几何、概率论、数理统计、常微分方程（双语）、离散数学、数据结构、数值计算方法、复变函数、数据库原理、数据分析、运筹与优化、C++面向对象程序设计等。

#### 六、主要实践环节

认识实习、课程设计、数学建模实训、技术实习、毕业设计(论文)等。

#### 七、学制、学位及学分要求

- 1、学制：实行弹性学制，本科基本学制一般为4年，可提前1年毕业，最长不超过8年。
- 2、授予学位：授理学学士学位。
- 3、本专业毕业最低学分要求：170学分。

#### 八、学分结构要求

课程设置及修读类型		学分及占比	
		学分	学分比例
理论教学环节	基础层次（必修）	46.5	40.26%
	专业层次（必修）	39	33.77%
	拓展复合层次（选修）	30	25.97%
	小计	115.5	67.94%
实践教学环节	必修	54.5	32.06%
合计		170	100%

# **Undergraduate Program in Information and Computing Science**

## **I. Training Objectives**

The specialty is designed to give students a solid understanding of mathematical knowledge, an in-depth knowledge of fundamental theories and methods of Information and Computational Science with a fundamental training of scientific research. The training can provide students skills required dealing with practical problems on information processing. The graduate could be qualified to several works such as information processing and computing, application software developing, or financial problem modeling, managing and decision-making in information industries or economics and financial sectors. The graduate could become advanced practical professional personnel in a wide variety of areas, such as science and technology, education, to be engaged in research and teaching. In addition, they could pursue further study in the relative areas.

## **II. Training Standards**

Students of the specialty would mainly study primary theories, basic knowledge and fundamental methods on information and computational science to lay a good foundation of mathematics, gain solid computer training. The objective is to enable students to have the abilities of mathematical modeling, numerical calculating, data processing, program designing, application software designing and developing, financial information analyzing, and actuarial designing and applying. The specialty includes two modules, which are application software and financial mathematics. Knowledge, ability and quality of graduates should meet the following standards:

### 1. The basic quality requirements

(1) To love the motherland, to support the leadership of Chinese Communist Party, to establish a scientific outlook on world life, and values, to have a sense of responsibility and the sense of social responsibility, to consciously abide by the law, to follow occupation morality, to have the good faith consciousness and team spirit.

(2) To have a certain literary and artistic accomplishment, interpersonal communication skills and modern consciousness.

(3) To have a solid knowledge of mathematics, to learn scientific thinking and scientific research methods, to have innovation consciousness and scientific literacy.

(4) To have the good physical quality, psychological quality and good habits.

### 2. The ability structure

(1) To have good self-learning ability and the ability to obtain new knowledge.

(2) To have the ability of strong analysis, induction, abstraction, deductive reasoning, spatial imagination ability, and scientific computing, to have the ability of solving practical problems by applying the knowledge, to have the ability for application software module students of program design, the system analysis and design, and software design and development, to have the ability for financial mathematics module students of sound financial information analysis, design and application of computer application, financial actuarial management.

(3) To have the ability of cooperation, to have the certain ability of organization management and

good interpersonal communication and the ability of social adaptation.

(4) To have the ability of creative thinking, to have strong desires for new knowledge and new technology, and to have the good ability to accept them.

### 3. Aspects of knowledge structure

(1) To master a foreign language, to have in-depth skills of using computers (program design, office automation, etc.), to have the ability to access professional information literature by modern information technology.

(2) To have the knowledge of certain literature, philosophy, history, economy, humanities and social science, and natural science.

(3) To have a solid understanding of Mathematics, to master mathematical softwares (Matlab), to have certain knowledge of mathematical modeling and numerical calculation method, to have the required skills to master data management, data analysis and data mining, to have knowledge and skills for application software module students of strong programming and software development and processes, to have knowledge and skills for financial mathematics module students of economic and financial, basic theory and method of financial management and control, the actuarial method application.

### III. Realization Matrix of Knowledge, Ability and Quality

Contents		The Main Courses or Education Training Strategy
Knowledge	Instrumental knowledge	By attending College English and bilingual courses, students can gain proficiency in reading and translation of professional literature, and the ability to have a simple conversation in English. By attending C Programming, Data Structures, Database Principle, and so on, students can gain the skills of using computers and the methods of inspection of the literature data.
	Humanities and Social Science and Natural Science Knowledge	By attending College Chinese, College Physics, and other Public Expand Composite Elective courses, students can achieve this knowledge.
	Professional knowledge	By attending electing compulsory professional level courses and professional composite courses, the fundamental knowledge and methods in mathematics and professional courses can be gained.
Ability	Abilities of study	By the teaching in classes and outside classes, the students can gain the abilities of digestion and absorption of knowledge, and cultivate the abilities of self-learning.
	Abilities of knowledge application and practice	By course experiment, curriculum design, open experiment, academic competitions, science and technology projects, technology practice and undergraduate thesis, and so on, the abilities can be gradually improved.
	Abilities of communication, cooperation and management	By participating in social practice, academic competitions, science and technology projects, internships, volunteer activities, academic societies, the abilities of communication, collaboration, organization and management can be trained.
	Innovation abilities	By participating in special design, open experiment, academic competitions, science and technology projects as well as graduation thesis, the innovation ability can be gradually improved.

Quality	Ideological and moral qualities	By participating in ideological and political courses, ideological and political and social practice, and other aspects of implementation, the qualities can be achieved.
	Cultural qualities	By electing art of Humanities and Social Sciences, Economics and Management, other Public expand composite courses, and participating related activities, the qualities can be achieved.
	Professional quality	By participating in professional courses, participating professional and academic reports, professional practices, professional qualities can be cultivated gradually.
	Physical and mental qualities	By participating in Physical Education, Mental Health Education for College Students courses, participating in physical health training, military training, all kinds of wholesome activities, the physical and mental qualities can be improved.

#### IV. Major Disciplines

Mathematics, Computer Science and Technology, Finance

#### V. Core Courses

Mathematical Analysis, Advanced Algebra and Analytic Geometry, Probability Theory, Mathematical Statistics, Ordinary Differential Equations, Discrete Mathematics, Data Structures, Numerical Computation Method, Function of Complex Variable, Database Principle, Data Analysis, Operations Research, C++ Object-Oriented Programming, and so on.

#### VI. Main Internship and Practice

Cognition Practice, Integrated Course Design, Practice of Mathematical Modeling Training, Technology Practice, Undergraduate Thesis, and so on.

#### VII. Length of Schooling, Degree and Credits Requirements for Graduation

1. Length of Schooling: The length of schooling is flexible, generally it lasts four years. The students can graduate one year in advance or within 8 years.
2. Degree Conferred: Bachelor's degree in Science
3. The Minimum Graduation Credits: 170

#### VIII. Credits Structure and Ratio:

The curriculum Provision and Study Type		Credits	Credits Ratios
Theory Teaching	Basic Level (Required)	46.5	40.26%
	Specialty Level (Required)	39	33.77%
	Expand and Recombination Level (Optional)	30	25.97%
	Total	115.5	67.94%
Practice Teaching	Required	54.5	32.06%
Total		170	100%



## 课程设置与学时安排（表一续一）

专业名称：信息与计算科学

课程层次	课程性质	课程代码	课程名称	学分	总学时	课内教学			考试学期	各学期周学时分配								备注	
						理论学时	实验学时	实践学时		第一学年		第二学年		第三学年		第四学年			
										长1	长2	长3	长4	长5	长6	长7	长8		
										16周	16周	16周	16周	16周	16周	8周	16周		
专业层次	必修	10131006	概率论 Probability Theory	3	48	48				3									
		10131007	数理统计 Mathematical Statistics	2	32	32				2									
		10131008	离散数学 Discrete Mathematics	3	48	48				3									
		10131009	数据结构 Data Structures	4	64	48	16			4									
		10131910	数值计算方法 Numerical Computation Method	4	64	56	8					4							
		10231012	复变函数 Function of Complex Variable	3	48	48						4							1-12周
		10231014	数据库原理 Database Principle	3	48	48				3									
		10231015	数据分析 Data Analysis	3	48	32	16					4							1-12周
		10131035	运筹与优化 Operations Research	4	64	48	16				4								
		10131036	C++面向对象程序设计 C++ Object-Oriented Programming	2	32	24	8			2									
专业层次合计				43	688	624	64	0		5	6	9	13	8	4	0	0		
拓展复合层次	模块一（应用软件） （按模块选修）	10332037	Java 程序设计 Java Programming	3	48	32	16				3								
		10232022	网络程序设计 Network Programming	3	48	48				3									
		10231017	信息系统 分析与设计 Information Systems Analysis and Design	3	48	48						4							1-12周
		10232038	算法分析与设计 Algorithm Analysis and Design	2	32	32						2.5							1-13周
		10232039	软件工程 Introduction to Software Engineering	2.5	40	40						2.5							
		10232023	Linux 操作系统及应用 Linux Operating System and Applications	3	48	32	16						3						
		10332045	移动应用软件设计 Mobile Application Software Design	2	32	24	8						2						
		10332041	物联网技术基础 Technical Foundation of the Internet of Things	2	32	32										4			
		10332042	计算机网络 Computer Network	2	32	32										4			

## 课程设置与学时安排（表一续二）

专业名称：信息与计算科学

课程层次	课程性质	课程代码	课程名称	学分	总学时	课内教学			考试学期	各学期周学时分配								备注	
						理论学时	实验学时	实践学时		第一学年		第二学年		第三学年		第四学年			
										长1	长2	长3	长4	长5	长6	长7	长8		
	模块一(应用软件)	10232043	计算机组成 Computer Organization	2	32	32							2						
		10332044	软件开发集成技术 Software Development Integration Technology	3	48	24	24								6				
		10232024	计算机图形学 Computer Graphics	2	32	32								4					
		小计		29.5	472	408	64	0											
		至少选修学分		22.5	360	320	40	0	0	0	3	3	6.5	7.5	8	0			
专业拓展 (按模块选修)	模块二(金融数学)	10333045	微观经济学 Microeconomics	2.5	40	32	8				2.5								
		10333046	金融学 Principles of Finance	3	48	48					3								
		10233064	精算学 Actuarial Science	3	48	48						4							1-12周
		10333047	随机过程 Stochastic Process	2	32	32						2.5							1-13周
		10233026	金融数学 Financial Maths	2	32	32							2						
		10333048	财务会计 Financial Accounting	2	32	32								2					
		10333049	精算风险理论 Actuarial Risk Theory	3	48	32	16							3					
		10323032	计量经济学 Econometrics	3	48	32	16								6				
		10333065	宏观经济学 Macroeconomics	2	32	32										4			
		10233051	金融衍生品定价 Derivatives Pricing	2	32	16	16								2				
		10333052	保险经营与管理 Insurance Business Operation and Management	3	48	48										6			
		10333053	风险管理 Risk Management	3	48	48										6			
				小计		30.5	488	432	56	0									
		至少选修学分		22.5	360	320	40	0	0	0	2.5	3	6.5	7	10	0			
		专业拓展至少选修学分		22.5	360	320	40		0	0	3	3	6.5	7.5	10	0			



### 课程设置与学时安排（表一续三）

专业名称：信息与计算科学

课程层次	课程性质	课程代码	课程名称	学分	总学时	课内教学			考试学期	各学期周学时分配								备注		
						理论学时	实验学时	实践学时		第一学年		第二学年		第三学年		第四学年				
										长1	长2	长3	长4	长5	长6	长7	长8			
										16周	16周	16周	16周	16周	16周	8周	16周			
拓展复合层次	专业复合（跨专业选修）	10322930	数据挖掘技术 Data Mining	3	48	32	16							3						
		10332054	Oracle 数据库应用与开发 Oracle Database Application and Development	3	48	32	16										6		建议应用软 件选修	
		10332055	操作系统原理 Principles of Operating System	2	32	32											4			
		10332056	单片机原理及其应用 Microcontroller Theory and Applications	3	48	48											6			
		10333057	证券投资分析 Analysis of Securities Investment	3	48	32	16										6		建议金融 数学选修	
		10233058	预测与决策 Forecast and Decision-Making	2	32	16	16							2						
		10233059	时间序列分析 Time Series Analysis	3	48	32	16										6			
		10231060	人工智能 Artificial Intelligence	2	32	32											4			
		10322031	小波方法及应用 Wavelet Methods and Applications	3	48	48											6			
		10331061	微分方程数值解 The Numerical Solution of Differential Equations	3	48	48									3					
		10231011	信息论基础 Fundamental Information Theory	3	48	48						3								
		10331062	数学分析选讲 Selected Topics in Mathematical Analysis	3	48	48											6			
		10331063	高等代数与概率统计选讲 Selected topics in Advanced Algebra and Probability Statistics	3	48	48											6			
		小计				36	576	496	80	0										
		专业复合至少选修学分				6	96	64	32	0		0	0	0	0	0	3	6	0	
		专业拓展复合至少选修学分合计				28.5	456	384	72	0		0	0	0	0	0	3	6	0	
拓展复合层次	公共拓展复合选修	自然科学拓展及工程技术拓展课程群	至少选修 2 个学分	2	32	32							2							
		自然科学拓展及工程技术拓展之外的课程群	至少选修 4 个学分	4	64	64							2	2						
		公共拓展复合至少选修学分		6	96	96	0	0			0	0	0	0	4	2	0	0		
		拓展复合层次课程至少选修学分合计		34.5	552	480	72	0			0	0	3	3	10.5	12.5	16			
<b>(基础层次+专业层次+拓展复合层次) 合计</b>				<b>132.5</b>	<b>2184</b>	<b>1848</b>	<b>160</b>	<b>176</b>		<b>26</b>	<b>24.5</b>	<b>24</b>	<b>21</b>	<b>18.5</b>	<b>17</b>	<b>16</b>	<b>0</b>			

