

浙江科技学院信息与计算科学专业（专升本）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、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、金融信息分析、精算设计与应用等能力。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，具有综合运用所学知识解决实际问题的能力，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（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，掌握数据分析与数据挖掘的基本技能，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；通过上机实验、实践课程、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	通过思政教育和实践等环节实现。
	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，逐步培养专业的基本素质。
	身心素质	通过参加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

数值计算方法、复变函数、数据分析、运筹与优化等。

六、主要实践环节

课程设计、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，基本学制一般为2年，最长不超过4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：79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 (必修及必选)	7	13.08%
	专业层次(必修)	14	26.17%
	拓展复合层次 (选修)	32.5	60.75%
	小计	53.5	67.72%
实践教学环节	必修	25.5	32.28%
合计		79	100%

Undergraduates Training and Development Program of Zhejiang University of Science and Technology

(Specialty: 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, financial problem modelling, 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, financial information analyzing, and actuarial designing and applying. 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 of sound financial information analysis, design and application of computer finance, 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 analysis and data mining, to have knowledge and skills 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 courses, students can gain proficiency in reading and translation of professional literature, and the ability to have a simple conversation in English. By attending experiment on the computer, practical course, Undergraduate Thesis, 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 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 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 education and 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 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

Numerical Computation Method, Function of Complex Variable, Data Analysis, Operations Research, and so on.

VI. Main Internship and Practice

Integrated Course Design, 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 2 years. The students can graduate one year in advance or within 4 years.
2. Degree Conferred: Bachelor's degree in Science
3. The Minimum Graduation Credits: 79

VIII. Credits Structure and Ratio:

The curriculum Provision and Study Type		Credits	Credits Ratios
Theory Teaching (Including Experiments)	Basic Level (Required)	7	13.08%
	Specialty Level (Required)	14	26.17%
	Expand and Recombination Level (Optional)	32.5	60.75%
	Total	53.5	67.72%
Practice Teaching	Required	25.5	32.28%
Total		79	100%

课程设置与学时安排（表一）

专业名称：信息与计算科学（专升本）

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		
										长1	长2	长3	长4	
						16周	16周	8周		16周				
基础层次	必修	31117082-31117083	大学生职业发展与就业指导1-2 Career planning and guidance for college students practice 1-2	1	16	16					2			
		26115201-26115204	形势与政策 Education of Situation and Policy	2	32	32				长1-2讲座				
	选修		大学英语（外语拓展类课程）	4	64	64				4				学生根据自己基础选修，至少4学分
	基础层次合计				7	112	112	0	0		4	2	0	0
专业层次	必修	10131910	数值计算方法 Numerical Computation Method	4	64	56	8		2		4			
		10231012	复变函数 Function of Complex Variable	3	48	48			1	4				1-12周
		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		2		4			
专业层次合计				14	224	184	40	0		8	8	0	0	
拓展复合层次	专业拓展（选修）	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					
专业拓展至少选修学分	22.5	360	320	40			9	10	10	

课程设置与学时安排（表一续）

专业名称：信息与计算科学（专升本）

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			
										长1 16周	长2 16周	长3 8周	长4 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					
		10333057	证券投资分析 Analysis of Securities Investment	3	48	32	16				6				
		10233058	预测与决策 Forecast and Dedision-Making	2	32	16	16			2					
		10233059	时间序列分析 Time Series Analysis	3	48	32	16				6				
		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				26	416	352	64	0					
		专业复合至少选修学分				6	96	64	32	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	9	13	16	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2个学分	2	32	32				2				
		公共拓展复合至少选修学分				4	64	64	0	0	0	4	0	0	
		拓展复合层次课程至少选修学分合计				32.5	520	448	72	0	9	17	16	0	
（基础层次+专业层次+拓展复合层次）合计				53.5	856	744	112	0	21	27	16	0			

实践教学安排（表二）

课程代码	所属模块	实践教学活动名称	学分	周或学时	按学期分配（周或周学时）					备注
					第一学年			第二学年		
					长1	长2	短1	长3	长4	
31467084	公共实践	大学生职业发展与就业指导实践 Practice of career planning and guidance for college students	1	22	22					
10451103	专业实验	MATLAB与科学计算实验 Matlab and Science Computing Experiment	2	32学时	2					1-16周
10444315	专项设计	精算设计 Actuarial Design	2	2	2					
10444319	专业实践	统计实践 Statistical Practice	1.5	1.5	1.5					
10444311		金融数学课程设计 Curriculum Design of Financial Maths	1.5	1.5			1.5			
10444320		计算机财务实践 Computer Accounting Practice	2	2			2			
10443121		技术实习 Technology Practice	4.5	9				9		10-18周
10445123		毕业设计（论文） Undergraduate Thesis	8	16					16	1-16周
	第二课堂	Extracurricular Teaching	3							
实践课程合计			25.5							

信息与计算科学专业专升本学生学习进程样表(表三)

学期	学期学分分布	累计学分	必修课(课时/学分)	选修课(课时/学分)	实践课(学分/学期)	选课说明 (对相关要求重点进行说明)
1	必修学分: 7 实践学分: 5.5 必选学分: 11.5	24	复变函数(48/3) 数据分析(48/3) 形势与政策1-2(16/1)	大学英语(外语拓展类课程)(64/4) 微观经济学(40/2.5) 精算学(48/3) 随机过程(32/2) 信息论基础(48/3)	MATLAB与科学计算实验(2/长1) 统计实践(1.5/长1) 精算设计(2/长1)	学生根据自己基础选修大学英语(外语拓展类课程),至少4学分
2	必修学分: 10 实践学分: 3.5 必选学分: 17	54.5	大学生职业发展与就业指导1-2(16/1) 数值计算方法(64/4) 运筹与优化(64/4) 形势与政策3-4(16/1)	金融学(48/3) 金融数学(32/2) 财务会计(32/2) 精算风险理论(48/3) 数据挖掘技术(48/3) 自然科学拓展及工程技术拓展课程群(32/2) 自然科学拓展及工程技术拓展之外的课程群(32/2) 预测与决策(32/2) 金融衍生品定价(32/2) 微分方程数值解(48/3)	金融数学课程设计(1.5/短1) 计算机财务实践(2/短1)	公共拓展课程至少选修4学分。
3	必修学分: 0 实践学分: 8.5 必选学分: 8	71		计量经济学(48/3) 宏观经济学(32/2) 证券投资分析(48/3) 风险管理(48/3) 保险经营与管理(48/3) 时间序列分析(48/3) 小波方法及应用(48/3) 数学分析选讲(48/3) 高等代数与概率统计选讲(48/3)	技术实习(4.5/长3)	(1)技术实习为10-18周; (2)开放性实验、学科竞赛、科研项目等第二课堂活动可自行安排时间; (3)“大学生职业发展与就业指导实践”安排在长2-长3内完成。
4	实践学分: 8	79			毕业设计(8/长4)	

备注:

- 1、毕业最低总学分为77学分;同时要求完成所有必修、必选的课程和规定的实践环节。
- 2、公共拓展复合课程可根据自身情况进行选修,选修学期建议按本表推荐的安排。