

软件工程专业辅修培养方案

Minor Program of Software Engineering

一、培养目标 Objectives

本专业旨在培养适应国民经济与科技发展的需求的、德智体美全面发展的、具备扎实的数理基础、计算机科学基础、软件工程基本理论和基本知识，受到软件工程的基本训练，可在软件工程及相关学科领域从事软件系统研发、软件测试、软件技术支持等工作的复合型高级技术与管理人员，应达到以下具体目标：

(1) 熟悉职业相关的国家法律法规，具有社会和职业道德修养；

(2) 针对实际需求，能运用自然科学、工程基础和软件工程专业知识，对复杂软件系统工程问题进行分析研究，能独立完成软件系统的方案设计、实现和测试；

(3) 具有良好的与业界同行、专业客户和公众沟通交流的能力，以及组织协调和团队合作能力；

(4) 有在工作中继续学习、不断更新知识以适应技术和职业发展需求的能力。

This major aims to cultivate the technical and management talents who will meet the needs of the development of national economy and science and technology. They should develop morally, intellectually, physically and aesthetically in an all-round way, possess solid mathematical and physical foundations, computer science foundations, basic theories and basic knowledge of software engineering. They will also receive basic training in software engineering and be able to engage in software system development, software testing, software technology support and other work in the fields of software engineering and related disciplines. The following specific objectives should be achieved:

(1) Be familiar with national laws and regulations related to occupation, with social and professional ethics accomplishment.

(2) According to the actual needs, be able to use natural science, engineering foundation and software engineering expertise to analyze and research complex software system engineering problems, and independently complete the design, implementation and testing of software system.

(3) Have good communication skills with industry peers, professional customers and the public, as well as organizational coordination and teamwork capabilities.

(4) Be able to continue to learn and update knowledge in order to meet the needs of technical and vocational development.

二、培养要求 Requirement

对于本专业的学生，培养要求包括如下 12 项基本要求：

(1) 工程知识：掌握从事软件工程专业领域工作所需要的数学、自然科学、工程基础和专业知识，并能够运用这些知识解决复杂软件系统工程问题。

(2) 问题分析：能够应用数学、自然科学和软件工程科学的基本原理，识别、表达复杂软件系统工程问题，并能通过文献研究分析，获得有效结论。

(3) 设计/开发解决方案：能够设计针对复杂软件系统工程问题的解决方案，开发满足特定需求的软件系统、模块，在设计中具有一定的创新意识，并考虑社会、健康、安全、法律、文化及环境等因素。

(4) 研究：具有基于科学原理并采用科学方法对复杂软件系统工程问题进行研究的能力，包括设计与实施实验、分析与解释数据、并通过信息综合得到合理有效结论。

(5) 使用现代工具：能够选择与使用恰当的技术、资源、开发环境或开发相关工具，对复杂软件系统工程问题进行模拟和预测，并能够分析和理解其局限性。

(6) 工程与社会：在复杂软件系统工程问题解决方案的设计和实现中，能够根据具体的工程背景合理分析和评价其对社会、健康、安全、法律以及文化的影响，并理解应承担的责任。

(7) 环境和可持续发展：在复杂软件系统工程问题解决方案的设计、实现过程及软件运行中，能够理解和评价其对环境、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和社会责任感，能够在工程实践中理解并遵守工程职业道德和规范，履行责任。

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

(10) 沟通：能够就复杂软件系统工程问题与业界同行及社会公众进行有效沟通和交流，包括撰写报告和设计文稿、陈述发言、清晰表达或回应指令，并具有一定的国际视野和跨文化沟通交流能力。

(11) 项目管理：理解并掌握软件系统工程管理原理与经济决策方法，具有在多学科环境中应用的能力。

(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。

For students of this major, the cultivation requirements include the following 12 basic items:

(1) Engineering Knowledge: be able to master the mathematics, natural science,

engineering foundation and professional knowledge needed to work in the field of software engineering, and can use the knowledge to solve complex software system engineering problems.

(2) Problem Analysis: be able to apply the basic principles of mathematics, natural science and software engineering science to identify and express complex software system engineering problems, and can obtain effective conclusions through literature research and analysis.

(3) Design/Development Solutions: be able to design solutions to complex software system engineering problems and develop software systems to meet specific needs. Have a certain sense of innovation and consider social, health, safety, legal, cultural and environmental factors in the design.

(4) Investigation: be able to study complex software system engineering problems based on scientific principles and scientific methods, including designing and implementing experiments, analyzing and interpreting data, and obtaining reasonable and effective conclusions through information synthesis.

(5) Modern Tool Usage: be able to select and use appropriate technologies, resources, development environments or tools to simulate and predict complex software system engineering problems, and to analyze and understand their limitations.

(6) The Engineer and Society: for the design and implementation of complex software system engineering problem solutions, can reasonably analyze and evaluate its impact on society, health, safety, law and culture according to the specific engineering background, and understand the responsibilities that should be undertaken.

(7) Environment and Sustainability: for the design, implementation process and operation of complex software system engineering problem solution, can understand and evaluate its impact on the sustainable development of environment and society.

(8) Professional Ethics: have humanities and social sciences literacy and social responsibility, and can understand and abide by engineering professional ethics and norms in engineering practice, and fulfill their responsibilities.

(9) Individual and Team Work: have a certain organizational management ability, team cooperation ability, can take on the role of individuals, team members and leaders in a multidisciplinary team.

(10) Communication: be able to effectively communicate and communicate with industry peers and the public on complex software systems engineering issues, including writing reports and designing manuscripts, presenting statements, clearly expressing or responding to instructions, and with a certain international vision and intercultural communication and communication skills.

(11) Project Management: understand and master the principles of software system engineering management and economic decision-making methods, with the ability to apply in a multidisciplinary environment.

(12) Lifelong Learning: be with the awareness of self-learning and lifelong learning, and the ability to constantly learn and adapt to development.

毕业要求对培养目标的支撑关系

The Support Relationship of Graduation Requirements for Cultivation Objectives

毕业要求 Graduation Requirements	培养目标 Cultivating Objectives			
	目标 1 Object 1	目标 2 Object 2	目标 3 Object 3	目标 4 Object 4
毕业要求 1: 工程知识 Graduation requirement 1: Engineering Knowledge		✓		✓
毕业要求 2: 问题分析 Graduation requirement 2: Problem Analysis		✓		
毕业要求 3: 设计/开发解决方案 Graduation requirement 3: Design/development of solutions		✓		
毕业要求 4: 研究 Graduation requirement 4: Investigation		✓		✓
毕业要求 5: 使用现代工具 Graduation requirement 5: Modern Tool Usage		✓		✓
毕业要求 6: 工程与社会 Graduation requirement 6: The Engineer and Society	✓		✓	
毕业要求 7: 环境和可持续发展 Graduation requirement 7: Environment and Sustainability	✓		✓	
毕业要求 8: 职业规范 Graduation requirement 8: Ethics	✓			
毕业要求 9: 个人和团队 Graduation requirement 9: Individual and Team Work	✓		✓	
毕业要求 10: 沟通 Graduation requirement 10: Communication			✓	
毕业要求 11: 项目管理 Graduation requirement 11: Project Management and Finance		✓		
毕业要求 12: 终身学习 Graduation requirement 12: Lifelong Learning				✓

三、学分要求 Credits Requirements

38 学分。

38 credits.

四、课程设置 Course Programs

课程类型 Course Type	课程名称 Course Name	课程性质 Nature of Course	学分 Credits	开课学期 Semester	开课学院 School	备注 Notes
数学类 Mathematics Courses	离散数学 Discrete Mathematics	必修 Compulsory	4	第 2 学期 Semester 2	计算机与人工智能学院 School of Computing and Artificial Intelligence	
专业基础类 Specialized Basic Courses	数据结构 A Data Structure A	必修 Compulsory	4	第 3 学期 Semester 3	计算机与人工智能学院 School of Computing and Artificial Intelligence	
	编译原理 Compilation Principle	必修 Compulsory	3	第 3 学期 Semester 3	计算机与人工智能学院 School of Computing and Artificial Intelligence	
	数据库原理 Principle of Database	必修 Compulsory	3	第 4 学期 Semester 4	计算机与人工智能学院 School of Computing and Artificial Intelligence	
	数据库原理实验 Experiments of Database Principle	必修 Compulsory	1	第 4 学期 Semester 4	计算机与人工智能学院 School of Computing and Artificial Intelligence	
	计算机组成原理(含实验) Computer Composition Principle (with Experiments)	必修 Compulsory	4	第 4 学期 Semester 4	计算机与人工智能学院 School of Computing and Artificial Intelligence	
	算法分析与设计(含实验) Algorithm Analysis and Design (with Experiments)	必修 Compulsory	3	第 4 学期 Semester 4	计算机与人工智能学院 School of Computing and Artificial Intelligence	
	操作系统(含实验) Operating System (with Experiments)	必修 Compulsory	4	第 4 学期 Semester 4	计算机与人工智能学院 School of Computing and Artificial Intelligence	

	软件工程(含实验) Software Engineering (with Experiments)	必修 Compulsory	4	第 5 学期 Semester 5	计算机与人工 智能学院 School of Computing and Artificial Intelligence	
	计算机网络 Computer Networks	必修 Compulsory	3	第 5 学期 Semester 5	计算机与人工 智能学院 School of Computing and Artificial Intelligence	
	计算机网络工程实验 Computer Network Engineering Experiments	必修 Compulsory	1	第 5 学期 Semester 5	计算机与人工 智能学院 School of Computing and Artificial Intelligence	
专业核心课 Specialized Core Courses	软件测试 Software Testing	必修 Compulsory	2	第 5 学期 Semester 5	计算机与人工 智能学院 School of Computing and Artificial Intelligence	
	应用软件综合课程设 计 I Application Software Comprehensive Course Design I	必修 Compulsory	2	第 6 学期 Semester 6	计算机与人工 智能学院 School of Computing and Artificial Intelligence	
总学分 Total Credits			38			