

软件工程（全英语） 留学生本科培养方案

（专业代码：080902 学制：四年 学位：工学学士）

一、培养目标

本专业旨在培养适应现代软件工程发展需求、具备软件工程师核心基础能力的高素质人才。毕业生应具有开阔的国际视野，知华、友华，能够在多国实际工作环境中有效运用和拓展本学科的知识、技能与方法，初步具备参与国际交流与合作的能力。毕业后可在软件设计、开发、测试、管理及应用研究等多个领域从事专业工作。

二、毕业要求及实现矩阵

毕业生应获得以下几方面的知识和能力：

1. 汉语毕业要求：学生毕业前须通过汉语水平考试（HSK）4级，具备基本的汉语听、说、读、写能力，能够适应在中国学习、生活及未来职业发展的语言需求。学生须完成以下指定课程并取得合格成绩：《中国概况（2-1）》《中国概况（2-2）》《初级汉语》《中级汉语》《高级汉语》。
2. 具备扎实的数学与工程基础，基本掌握汉语的运用能力；
3. 掌握本专业所需的基础理论与专业知识，具备运用专业知识进行软件工程解决方案设计的能力，并具有分析和解决软件工程实际问题，以及开展开发与应用研究的能力；
4. 掌握文献检索及其他科技信息获取的方法；
5. 具备较强的自主学习能力、岗位适应能力、熟练的应用能力以及初步的创新意识。

毕业要求指标点分解与实现矩阵

毕业要求	指标点	课程
1. 具有数学和计算机的扎实基础，基本掌握汉语；	1.1 具有数学扎实基础	离散数学 线性代数 高等数学(2-1)
	1.2 具有计算机基础知识	操作系统 计算机组成原理 软件体系结构 程序设计（C/C++） 数据结构 专业基础实训 软件系统分析与设计

毕业要求	指标点	课程
	1.3 基本掌握汉语	初级汉语口语(2-1) 初级汉语精读(2-1) 初级汉语口语(2-2) 初级汉语精读(2-2) 中级汉语(2-1) 中级汉语(2-2) 高级汉语(2-1) 高级汉语(2-2)
2. 掌握本专业所需的基础理论和专业知识,具有应用基础理论和基础知识进行软件工程解决方案的初步能力,具有分析和解决软件工程实际问题、进行开发和应用研究的初步能力;	2.1 能够运用软件工程的基本原理和方法,识别和判断软件工程领域复杂工程问题的关键需求	操作系统 计算机组成原理 软件工程过程与项目管理 软件系统分析与设计
	2.2 能够运用软件工程原理和建模方法,抽象描述和分解软件工程领域的复杂工程问题,建立软件系统模型	操作系统 计算机组成原理 软件工程 软件系统分析与设计
	2.3 能通过文献调研分析和探索软件工程领域的复杂工程问题的多种可行方案	计算机网络原理 数据库原理 软件体系结构
3. 具有较强的软件编写、测试能力,掌握文献搜索和其他获取科技信息的方法;	3.1 能够将层次化、模块化等设计策略运用于软件系统的总体设计	软件体系结构 专业工程实训
	3.2 能够针对满足特定需求的软件系统、组件或模块进行详细设计与实现	专业基础实训
	3.3 能够借助专业工具,综合运用数据挖掘与处理方法对实验结果进行分析和解释,得到合理有效的结论	数据库原理 软件测试与质量保证 专业工程实训
	3.4 能够基于科学原理,针对软件工程领域的复杂工程问题的对象特征,通过文献研究,调研、分析研究路线,设计研究方案	数据结构 专业工程实训
4. 具有较强的自学能力、工作适应能力、较熟练的应用能力和创新意识。	4.1 关注并实时把握 IT 行业发展动态,具有自主学习的能力,包括对技术问题的理解能力、归纳总结的能力和提出问题的能力	新生研讨课 创新工程实践
	4.2 能够不断地将 IT 行业新技术、新方法应用于软件工程领域复杂工程问题的解决过程	创新工程实践(2-1 企业实训) 创新工程实践(2-2 毕业设计) 软件测试与质量保证

三、主干学科、专业核心课程

主干学科：软件工程

专业核心课程：软件体系结构、软件系统分析与设计、软件工程过程与项目管理、软件测试与质量保证

四、特色课程

(一) 专业特色课程

专创融合课：专业工程实训

(二) 其他课程

无

五、毕业要求及学时、学分分配

分类		学分	学时	备注
必修 133	理论	105	1680	含实验学时 34, 上机学时 152
	实验	0		
	上机	0		
	实践	28	28 周	
选修		27	432	
毕业要求	1、本专业学生需修满教学计划要求的 160 学分，通过 HSK4 级，方可毕业。 2、符合条件，授予工学学士学位。 3、本专业学生应使用英语撰写毕业论文，但需有汉语论文摘要。			

六、课程设置、教学环节及指导性修读计划

(一) 软件工程专业必修课程设置

课程类别	课程编码	课程名称	学分	课内学时					课外学时	学期	备注
				合计	讲授	实验	上机	实践			
通识教育课程	2091199	初级汉语口语(2-1) Primary Oral Chinese (2-1)	4.0	64	64					1	
	2092199	初级汉语精读(2-1) Primary Chinese Reading (2-1)	4.0	64	64					1	
	99CST3228110 10	新生研讨课 Freshman Seminar	1.0	16	16					1	
	2091299	初级汉语口语(2-2) Primary Oral Chinese (2-2)	4.0	64	64					2	
	2092299	初级汉语精读(2-2) Primary Chinese Reading (2-2)	4.0	64	64					2	
	2092099	道德与法律 Ideological Morality and Rule of Law	1.0	16	16				0	1	
	2095199	中级汉语(2-1) Intermediate Chinese (2-1)	4.0	64	64					3	
	2094199	中国概况(2-1) Survey of China (2-1)	3.0	48	48					3	
	2094299	中国概况(2-2) Survey of China (2-2)	3.0	48	48					4	
	2095299	中级汉语(2-2) Intermediate Chinese (2-2)	4.0	64	64					4	
2096199	高级汉语(2-1) Advanced Chinese (2-1)	4.0	64	64					5		

课程类别	课程编码	课程名称	学分	课内学时					课外学时	学期	备注
				合计	讲授	实验	上机	实践			
	2096299	高级汉语(2-2) Advanced Chinese (2-2)	4.0	64	64					6	
学科 基础 课程	99CST3241110 20	计算科学导论 Introduction to Computational Science	2.0	32	32					1	
	99CST3203110 36	程序设计 (C/C++) Programming in C/C++	3.5	56	32					1	
	0911199	高等数学 (2-1) Advanced Mathematics (2-1)	6.0	96	96					1	
	0911299	高等数学 (2-2) Advanced Mathematics (2-2)	5.0	80	80					2	
	99CST2108110 40	离散数学 Discrete Mathematics	4.0	64	64					2	
	0910399	线性代数 Linear Algebra	3.0	48	48					3	
	99CST3306121 00	专业基础实训 Professional Basic Training	4.0	4周				4周	0	S1	
	99CST3102110 20	软件工程 Software Engineering	4.0	64	40		24		32	3	
	99CST3240110 31	数据结构 Data Structures	4.0	64	40		24		52	3	
	99CST2111110 30	数据库原理 Principles of Database Systems	3.5	56	40		16		44	3	
	99CST2254110 32	计算机组成原理 Computer Organization and Architecture	4.5	72	54	18			70	4	
	99CST2107110 30	计算机网络原理 Computer Networks	3.5	56	40	16			52	4	
	99CST2267110 30	操作系统 Operating System	4.0	64	64				48	5	
专业 课程	99CST3283110 30	软件系统分析与设计 Software System Analysis and Design	4.0	64	40		24		56	4	
	99CST3319142 00	专业工程实训 Professional Engineering Training	4.0	4周				4周	0	S2	
	99CST3112110 20	软件测试与质量保证 Software Testing and Quality Assurance	3.5	56	40		16		32	5	
	99CST3116110 20	软件体系结构 Software Architecture	3.5	56	56				32	6	
	99CST3325110 25	软件工程过程与项目管理 Software Engineering Process and Project Management	3.5	56	56				40	6	
	99CST3300131 00	创新工程实践 (2-1 企业实训) Innovative Engineering Practice (2-1 Corporate Internship)	4.0	4周				4周	0	S3	

(二) 软件工程专业选修课程设置

课程类别	专业方向	课程编码	课程名称	学分	课内学时					课外学时	学期	备注
					合计	讲授	实验	上机	实践			
学科基础课程		99CST330721025	面向对象程序设计 (Java) Object-Oriented Programming (Java)	4.0	64	40		24		44	2	
		99CST329921025	数据分析 (Python) Data Analysis with Python	3.5	56	32		24		44	3	
		99CST325221032	机器学习 Machine Learning	4.0	64	40		24		56	5	
		99CST310521020	云计算技术与应用 Cloud Computing Technologies and Applications	4.0	64	32		32		0	5	
		99CST325421020	大数据技术与应用 Big Data Technologies and Applications	4.0	64	32		32		0	5	
		99CST320721021	基于架构的软件开发 Architecture-Based Software Development	4.0	84	24		60		40	6	
专业课程		99GE0167721020	油气勘探开发技术 Oil & Gas Exploration and Development Technology	4.0	64	56		8		32	4	
		99CST227621020	区块链技术与应用 Blockchain Technologies and Applications	4.0	64	48		16			7	
		99CST332113300	创新工程实践 (2-2 毕业设计) Innovative Engineering Practice (2-2 Graduation Project)	16.0	16 周						8	
		99CST310721020	计算机视觉 Computer Vision	4.0	64	40		24		36	6	
		99CST329321020	软件安全 Software Security	4.0	64	48		16		36	5	

Undergraduate Program for International Students Software Engineering

Major Code: 080902 | Duration: 4 Years | Degree: Bachelor of Engineering

I. Educational Objectives

This program aims to cultivate talents who meet the demands of modern software engineering development and receive basic training as software engineers. Graduates will possess a global vision in the discipline, have an understanding of China and goodwill towards it, be able to apply and advance professional knowledge, skills and methods in real-world environments across multiple countries, and have preliminary competence for international exchange and cooperation. Upon graduation, they can engage in software design, coding, testing, management, and applied research.

II. Graduation Requirements & Achievement Matrix

Graduates shall acquire the following knowledge and capabilities:

1. Language Requirements: Students must pass the HSK Level 4 prior to graduation and possess basic Chinese listening, speaking, reading and writing skills, so as to meet the language requirements for their study, daily life and future career development in China. Students are required to complete the designated courses listed below and obtain passing grades: Survey of China (2-1), Survey of China (2-2), Elementary Chinese, Intermediate Chinese, Advanced Chinese.
2. Solid foundation in mathematics and computing, and basic proficiency in Chinese.
3. Master the fundamental theories and professional knowledge required for the major; have the preliminary ability to design software engineering solutions using basic theories; be able to analyze and solve practical software engineering problems and conduct development and applied research.
4. Strong competence in software coding and testing; master literature search and other methods for acquiring scientific and technical information.
5. Strong self-learning ability, work adaptability, proficient application skills, and

innovative awareness.

Graduation Requirements – Indicators & Achievement Matrix

毕业要求	指标点	课程
1. Solid foundation in mathematics and computing; basic proficiency in Chinese	1.1 Solid foundation in mathematics	Discrete Mathematics Linear Algebra Advanced Mathematics (2-1)
	1.2 Basic computer knowledge	Operating Systems Computer Organization and Architecture Software Architecture Programming in C/C++ Data Structures Professional Basic Training Software System Analysis and Design
	1.3 Basic proficiency in Chinese	Primary Oral Chinese (2-1) Primary Chinese Reading (2-1) Primary Oral Chinese (2-2) Primary Chinese Reading (2-2) Intermediate Chinese (2-1) Intermediate Chinese (2-2) Advanced Chinese (2-1) Advanced Chinese (2-2)
2. Master fundamental theories and professional knowledge; be able to design solutions, solve practical problems, and conduct research	2.1 Identify and judge key requirements of complex engineering problems using basic software engineering principles	Operating Systems Computer Organization and Architecture Software Engineering Process and Project Management Software System Analysis and Design
	2.2 Abstract, decompose complex problems and establish system models using modeling methods	Operating Systems Computer Organization and Architecture Software Engineering Software System Analysis and Design
	2.3 Analyze feasible solutions to complex problems via literature review	Computer Network Principles Principles of Database Systems Software Architecture
3. Strong software coding and testing ability; master literature search skills	3.1 Apply hierarchical and modular design strategies in overall system design	Software Architecture Professional Engineering Training
	3.2 Conduct detailed design and implementation of software systems, components or modules	Professional Basic Training
	3.3 Analyze and interpret experimental results using professional tools and data processing methods	Principles of Database systems Software Testing and Quality Assurance Professional Engineering Training
	3.4 Design research routes and schemes based on scientific principles and literature study	Data Structures Professional Engineering Training
4. Strong self-learning, adaptability, application ability and innovation awareness	4.1 Keep up with IT industry trends; have autonomous learning ability	Freshman Seminar Innovative Engineering Practice
	4.2 Apply new technologies and methods to solve complex software engineering problems	Innovative Engineering Practice (2-1 Enterprise Training) Innovative Engineering Practice (2-2 Graduation Project) Software Testing and Quality Assurance

III. Major Discipline & Core Courses

Major Discipline: Software Engineering

Core Courses: Software Architecture, Software System Analysis and Design, Software Engineering Process and Project Management, Software Testing and Quality Assurance

IV. Featured Courses

1. Specialized Featured Courses

Industry-Education Integration Course: Professional Engineering Training

2. Other Courses

Labor Education Practice Courses:

Model Courses for Curriculum-Based Ideological and Political Education:

V. Credit Requirements

Students are required to complete 160 credits within the prescribed period of study and obtain 10 credits from auxiliary training program. Students must pass HSK Level 4 before graduation. Students meeting the requirements for the bachelor's degree will be awarded a Bachelor of Management degree.

Degree Awarded: Bachelor of Management

Category	Credits	Hours	Notes	
Required Courses (133)	Theoretical:	105	1680	Including 34 lab hours and 152 computer hours
	Laboratory:	0	—	—
	Computer Practice:	0	—	—
	Practical Training:	28	28 weeks	—
Elective Courses	27	432		
Graduation Rules	1. Students must complete 160 credits required by the curriculum plan and pass HSK Level 4 to graduate. 2. Qualified graduates are awarded the Bachelor of Engineering degree. 3. Students must write their graduation thesis in English, with a Chinese abstract.			

VI. Curriculum Structure

(Note: Foundation courses shall follow the curriculum plan regarding course names, credits, and semester offerings.)

(1) Required Courses

Course Category	Course Code	Course Name	Credits	In-Class Hours					Extracurricular Hours	Semester	Remarks
				Total Hours	Lecture	Experiment	Computer Lab	Practice			
General Education Courses	2091199	初级汉语口语(2-1) Primary Oral Chinese (2-1)	4.0	64	64					1	
	2092199	初级汉语精读(2-1) Primary Chinese Reading (2-1)	4.0	64	64					1	
	99CST322811010	新生研讨课 Freshman Seminar	1.0	16	16					1	
	2091299	初级汉语口语(2-2) Primary Oral Chinese (2-2)	4.0	64	64					2	
	2092299	初级汉语精读(2-2) Primary Chinese Reading (2-2)	4.0	64	64					2	
	2092099	道德与法律 Ideological Morality and Rule of Law	1.0	16	16				0	1	
	2095199	中级汉语(2-1) Intermediate Chinese (2-1)	4.0	64	64					3	
	2094199	中国概况(2-1) Survey of China (2-1)	3.0	48	48					3	
	2094299	中国概况(2-2) Survey of China (2-2)	3.0	48	48					4	
	2095299	中级汉语(2-2) Intermediate Chinese (2-2)	4.0	64	64					4	
2096199	高级汉语(2-1) Advanced Chinese (2-1)	4.0	64	64					5		
2096299	高级汉语(2-2) Advanced Chinese (2-2)	4.0	64	64					6		
Discipline Foundation Courses	99CST324111020	计算科学导论 Introduction to Computational Science	2.0	32	32					1	
	99CST320311036	程序设计(C/C++) Programming in C/C++	3.5	56	32					1	
	0911199	高等数学(2-1) Advanced Mathematics (2-1)	6.0	96	96					1	
	0911299	高等数学(2-2) Advanced Mathematics (2-2)	5.0	80	80					2	
	99CST210811040	离散数学 Discrete Mathematics	4.0	64	64					2	
	0910399	线性代数 Linear Algebra	3.0	48	48					3	
	99CST330612100	专业基础实训 Professional Basic Training	4.0	4周				4周	0	S1	
	99CST310211020	软件工程 Software Engineering	4.0	64	40		24		32	3	
	99CST324011031	数据结构 Data Structures	4.0	64	40		24		52	3	
99CST211111030	数据库原理 Principles of Database Systems	3.5	56	40		16		44	3		
99CST225411032	计算机组成原理 Computer Organization and Architecture	4.5	72	54	18			70	4		
99CST2107110	计算机网络原理	3.5	56	40	16			52	4		

Course Category	Course Code	Course Name	Credits	In-Class Hours					Extracurricular Hours	Semester	Remarks
				Total Hours	Lecture	Experiment	Computer Lab	Practice			
	30	Computer Networks									
	99CST2267110 30	操作系统 Operating System	4.0	64	64				48	5	
Major Courses	99CST3283110 30	软件系统分析与设计 Software System Analysis and Design	4.0	64	40		24		56	4	
	99CST3319142 00	专业工程实训 Professional Engineering Training	4.0	4 周				4 周	0	S2	
	99CST3112110 20	软件测试与质量保证 Software Testing and Quality Assurance	3.5	56	40		16		32	5	
	99CST3116110 20	软件体系结构 Software Architecture	3.5	56	56				32	6	
	99CST3325110 25	软件工程过程与项目管理 Software Engineering Process and Project Management	3.5	56	56				40	6	
	99CST3300131 00	创新工程实践 (2-1 企业实训) Innovative Engineering Practice (2-1 Corporate Internship)	4.0	4 周				4 周	0	S3	

(2) Selective Courses

Course Category	Course Code	Course Name	Credits	In-Class Hours	Extracurricular Hours					Semester	Remarks	Course Category
					Total Hours	Lecture	Experiment	Computer Lab	Practice			
Discipline Foundation Courses	99CST3307210 25	面向对象程序设计 (Java) Object-Oriented Programming (Java)	4.0	64	40		24		44	2		
	99CST3299210 25	数据分析 (Python) Data Analysis with Python	3.5	56	32		24		44	3		
	99CST3252210 32	机器学习 Machine Learning	4.0	64	40		24		56	5		
	99CST3105210 20	云计算技术与应用 Cloud Computing Technologies and Applications	4.0	64	32		32		0	5		
	99CST3254210 20	大数据技术与应用 Big Data Technologies and Applications	4.0	64	32		32		0	5		
	99CST3207210 21	基于架构的软件开发 Architecture-Based Software Development	4.0	84	24		60		40	6		
Major Courses	99GE01677210 20	油气勘探开发技术 Oil & Gas Exploration and Development Technology	4.0	64	56		8		32	4		
	99CST2276210 20	区块链技术与应用 Blockchain Technologies and Applications	4.0	64	48		16			7		
	99CST3321133 00	创新工程实践 (2-2 毕业设计) Innovative Engineering Practice (2-2 Graduation Project)	16.0	16 周						8		
	99CST3107210 20	计算机视觉 Computer Vision	4.0	64	40		24		36	6		
	99CST3293210 20	软件安全 Software Security	4.0	64	48		16		36	5		