

浙江科技学院计算机科学与技术专业培养方案

实施“卓越工程师教育培养计划”本科培养方案

一、培养目标

培养在嵌入式系统与软件系统、电子商务、电子政务、信息系统相关领域具有使用数理知识分析解决实际问题，熟练的专业外语运用技能，熟悉IT企业运作模式，系统掌握计算机科学基本理论和知识，精通流行软件开发技术和平台，并能根据不同组织和机构的需求选择相应的技术，用符合国际标准的开发规范实施团队合作项目的软硬件开发、维护、服务的应用型计算机工程师。本专业的培养目标体现了对学生专业工作能力（在计算机相关领域从事分析、设计、开发、项目实施及管理工作）和综合素质（国际视野，承担科技、经济及可持续发展等方面的社会责任）的总体要求。

二、毕业要求

依据本专业的培养目标、德国应用科学大学人才培养的经验、地方经济社会发展的需求和近年来我国工程教育认证标准的相关要求，确定本专业现阶段的毕业要求为：

- （1）能够将数学、自然科学、工程基础和专业知用于解决计算机领域复杂工程问题；
- （2）能够应用数学、自然科学、工程科学的基本原理，识别、表达、并通过文献研究分析计算机科学与技术领域复杂工程问题，以获得有效结论；
- （3）能够设计针对信息系统的解决方案，设计满足特定用户需求的系统、模块或流程，并能在设计环节中体现创新意识，考虑社会、健康、安全、法律、文化及环境等因素。
- （4）能够基于科学原理并采用科学方法对复杂工程问题进行研究，包括设计实验、分析与解释数据、并通过信息综合得到合理有效的结论。
- （5）能够针对复杂工程问题，开发、选择与使用恰当的技术、资源、现代工程工具和信息技术工具，包括对复杂工程的预测与模拟，并能理解局限性。
- （6）能够基于工程相关背景知识进行合理分析，评价专业工程实践和复杂工程解决方案对社会、健康、安全、法律及文化的影响，并理解应承担的责任。
- （7）能够理解和评价针对信息技术领域复杂工程问题的工程实践对环境、社会可持续发展的影响。
- （8）具有人文社科知识和人文素质，以及较强的团队协作、社会交流能力，能够在工程实践中理解并遵守工程职业道德和规范，履行职责
- （9）能够在多学科背景下的团队承担个体、团队成员以及负责人的角色。
- （10）能够就信息技术领域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，具有较强的外语语言运用能力，能够在跨文化背景下进行交流。
- （11）理解并掌握工程管理与经济决策方法，并能在多学科环境中应用。
- （12）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。

三、毕业要求达成矩阵

毕业要求	指标点	相关教学活动	学生考核方式
1. 能够将数学、自然科学、工程基础和专业知用于解决化学工程与技术领域复杂工程问题。	1.1掌握数学、工程数学的基本知识，并能应用于建立和求解数学方程。	高等数学； 线性代数； 概率论与数理统计；	课程平时考核； 期末考试
	1.2掌握力学、光学、热学及电磁学基本知识，并能用于辅助求解计算机工作领域复杂工程问题。	大学物理	课程平时考核； 期末考试
	1.3 掌握电路系统基础知识，并能用于解决计算机工程领域复杂工程问题。	电路分析基础； 数字信号处理；	课程平时考核； 期末考试； 实验操作成绩； 实验报告成绩

	1.4 掌握计算机专业的专业工程知识，并能用于解决计算机工程领域复杂工程问题。	计算机科学与技术专业课程*	课程平时考核； 期末考试； 实验操作成绩； 实验报告成绩
2. 能够应用数学、自然科学、工程科学的基本原理，识别、表达、并通过文献研究分析计算机科学与技术领域复杂工程问题，以获得有效结论；	2.1 能应用数学、工程数学的基本原理，对计算机工程领域内的复杂工程问题进行数学建模。	高等数学； 线性代数； 离散数学；	课程平时考核； 期末考试
	2.2 能应用力学、光学、热学及电磁学基本原理，对计算机工程领域内复杂工程问题的机理进行分析。	大学物理； 大学物理实验；	课程平时考核； 期末考试； 实验操作成绩； 实验报告成绩
	2.3 能应用工程科学的基本原理，并通过文献研究，对计算机工程领域内复杂工程问题进行识别、分析、表达，以获得有效结论。	专业基础课程； 计算机科学与技术专业模块课程； 工程实习； 毕业设计；	课程平时考核； 期末考试或考查； 实验操作成绩； 实验报告成绩； 毕业论文阅评和答辩
3. 能够设计针对信息系统的解决方案，设计满足特定用户需求的系统、模块或流程，并能在设计环节中体现创新意识，考虑社会、健康、安全、法律、文化及环境等因素。	3.1 掌握主要的程序设计语言和算法和知识，精通主流的计算机代码开发技术和平台，具备计算机软件或嵌入式系统的开发能力。	程序设计基础（C语言） 数据结构 算法设计与分析 JAVA面向对象程序设计 Web组件开发 基于J2EE企业级开发技术 应用集成原理与工具； C++程序设计； .Net 平台技术	课程平时考核； 期末考试； 实验操作成绩； 实验报告成绩； 毕业论文阅评和答辩
	3.2 掌握计算机工程技术核心知识，具备计算机系统的项目方案设计能力。	计算机组成； 操作系统原理； 数据库系统原理； 计算机网络； 软件工程； 汇编语言与接口技术 Soc 技术原理与编程； 嵌入式计算机系统； 各课程设计； 毕业设计；	课程平时考核； 期末考试； 实验操作成绩； 实验报告成绩； 毕业论文阅评和答辩
	3.3 具有方案设计中综合考虑社会、健康、安全、法律、文化及环境的意识。	思想道德修养和法律基础； 软件项目管理与案例分析； 系统管理与维护 工程实习 毕业设计；	课程平时考核； 期末考试； 实验操作成绩； 实验报告成绩； 毕业论文阅评和答辩
	3.4 在解决方案的设计环节中能体现创新意识。	校企培训课程（四选一） 综合课程设计 毕业设计；	课程平时考核； 期末 考核或考查； 实验操作成绩； 实验 报告成绩； 课程设计答辩、报告 和作品成绩； 毕业论文阅评和答辩

4. 能够基于科学原理并采用科学方法对复杂工程问题进行研究, 包括设计实验、分析与解释数据、并通过信息综合得到合理有效的结论。	4.1 具备针对计算机及相关电子电路科学设计实验的能力。	专业基础课程实验; 计算机专业方向模块课程; 课程设计; 电路原理B实验; 电子技术实验	课程平时考核; 期末考核或考查; 实验操作成绩; 实验报告成绩
	4.2 能对实验结果进行分析、解释数据。	专业基础课程实验; 计算机专业方向模块课程; 专业综合实验; 电路原理B实验; 电子技术实验;	课程平时考核; 期末考核或考查; 实验操作成绩; 实验报告成绩
	4.3 会采用信息综合手段对实验结果得出合理有效的结论。	专业基础课程实验; 计算机专业方向模块课程; 课程设计	课程平时考核; 期末考核或考查; 实验操作成绩; 实验报告成绩
5. 能够针对复杂工程问题, 开发、选择与使用恰当的技术、资源、现代工程工具和信息技术工具, 包括对复杂工程问题的预测与模拟, 并能够理解其局限性。	5.1 具有工程问题需求分析能力, 能够综合运用计算机科学和工程技术完成实验设计、实施, 并对实验结果进行分析	数据库原理及应用、Oracle 数据、Matlab基础、大学物理实验、汇编语言与接口技术、技术实习	课程平时考核; 期末考核或考查; 实验操作成绩; 实验报告成绩
	5.2 掌握多种开发语言, 熟悉各种系统开发环境及调试技巧;	C++程序设计、JAVA面向对象程序设计、Linux系统及分析、Web组件开发、基于J2EE企业级开发技术、应用集成原理与工具、.Net 平台技术	课程平时考核; 期末考核或考查; 实验操作成绩; 实验报告成绩
	5.3 运用工程化思想进行软/硬件系统解决方案构建和开发	Java语言课程设计、数据库系统课程设计、嵌入式系统开发课程设计、数字电子技术综合实验、校企培训课程(四选一)*、工程技术实习、毕业设计	课程平时考核; 期末考核或考查; 实验操作成绩; 实验报告成绩
	5.4 掌握根据工程问题检索文献、资料查询的基本方法。	文献检索与技术交流; 毕业设计	课程平时考核; 期末考核或考查; 实验操作成绩; 实验报告成绩; 毕业论文阅评和答辩
6. 能够基于工程相关背景知识进行合理分析, 评价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。	6.1 了解计算机科学与技术工程领域的工程技术发展现状与趋势。	信息技术导论; 工程实习; 毕业设计	课程平时考核; 期末考核或考查; 实验操作成绩; 实验报告成绩; 毕业论文阅评和答辩
	6.2 了解计算机科学与技术实践及解决方案的社会制约因素及评价要素。	校企培训课程(四选一) 工程实习; 毕业设计;	课程平时考核; 期末考核或考查; 实验操作成绩; 实验报告成绩; 毕业论文阅评和答辩

	6.3 明确实施计算机科学技术领域软件和硬件系统及其解决方案中应承担的社会、安全、健康、法律及文化责任。	校企培训课程（四选一） 工程实习； 毕业设计；	课程平时考核； 期末考试或考查； 实验操作成绩； 实验报告成绩； 毕业论文阅评和答辩
7. 能够理解和评价针对计算机工程领域复杂工程问题的工程实践对环境、社会可持续发展的影响。	7.1 理解计算机软硬件及工程项目运行时对人文和自然环境的影响以及能源消耗的因素。	Java语言课程设计、数据库系统课程设计、嵌入式系统开发课程设计、数字电子技术综合实验、校企培训课程（四选一）、工程技术实习、毕业设计	课程平时考核； 期末考试或考查；
	7.2 具有了解及追踪国家及地区产业发展的形势及政策的意识。	信息技术导论； 工程实习； 毕业设计	课程平时考核； 期末考试或考查； 毕业论文阅评和答辩
	7.3 了解计算机软硬件系统及工程项目的相关标准和规范，能评价工程实践对社会可持续发展的影响	毕业设计	期末考试或考查； 毕业论文阅评和答辩
8. 具有人文社会科学素养，社会责任感，能够在计算机科学与技术工程领域工程实践中理解并遵守工程职业道德和规范，履行职责。	8.1 具有人文社会科学素养，社会责任感。	大学始业教育； 马克思主义基本原理概论； 形势与政策； 大学生心理健康教育； 马克思主义基本原理概论； 毛泽东思想与中国特色社会主义理论体系概述； 中国近代史纲要； 大学语文 体育军训； 思想道德修养和法律基础； 思政社会实践	期末考试或考查； 课程平时考核； 期末考试或考查
	8.2 能够在工程实践中理解并遵守工程职业道德和规范，履行职责。	工程师职业道德与科学伦理； 工程实习； 思想道德修养和法律基础； 认识实习； 第二课堂	课程平时考核+期末考试或考查； 企业评定+实习报告阅评； 实习答辩及报告阅评； 毕业论文阅评和答辩
	9.1 具备从事计算机工程专业领域工作的职业技能。	工程实习； 金工实习； 系统管理与维护； 校企培训课程（四选一）	实习答辩及报告阅评
	9.2 对企业运作的模式有认知能力。	软件项目管理与案例分析； 系统管理与分析 工程实习； 认识实习	实习答辩及报告阅评； 企业评定+实习报告阅评

9. 能够在多学科背景下的团队承担个体、团队成员以及负责人的角色。	9.3 具备计算机领域各交叉学科的基础知识。	物联网技术及应用	课程平时考核；期末考核或考查
	9.4 具有技术团队的构建、运行、协调和负责的能力。	课程设计； 毕业设计； 工程实习 第二课堂 军训； 思政社会实践	课程设计答辩及报告阅评； (若有实物制作要求则附加考核实物成果)； 实验操作+实验报告阅评； 实习答辩及报告阅评； 毕业论文阅评和答辩
10. 能够就计算机领域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。	10.1 具备就计算机工程领域复杂工程问题进行人际交往、口头表达及准确回应指令的能力。	工程实习； 毕业设计；	实习答辩及报告阅评； 毕业论文阅评和答辩
	10.2 具有撰写实验报告、设计报告、总结报告能力。	毕业设计； 专业基础课程*实验； 计算机专业方向模块课程*实验； 课程设计； 工程实习；	毕业论文阅评和答辩； 实验操作+实验报告阅评； 实习答辩及报告阅评
	10.3 具备外文文献检索、阅读、理解能力。	计算机科学与技术导论； 大学英语； 毕业设计； 工程实习	期末考核或考查； 课程平时考核；期末考核或考查； 实习答辩及报告阅评； 毕业论文阅评和答辩
	10.4 能有一定的外语交流和沟通能力。	大学英语； Java面向对象程序设计（双语）、计算机网络（双语）、软件工程（双语）	课程平时考核；期末考核或考查
11. 理解并掌握计算机工程领域工程管理与经济决策方法，并能在多学科环境中应用。	11.1 具有计算机工程项目经济和管理的一般知识。	软件项目管理与案例分析 毕业设计； 系统管理与维护	期末考核或考查； 毕业论文阅评和答辩
	11.2 了解相关学科在项目应用中有关经济决策和管理的知识。	校公选课	期末考核或考查； 课程平时考核；期末考核或考查
	11.3 具有初步的项目实施过程中的运行和管理能力。	工程实习； 软件项目管理与案例分析； 校企培训课程（四选一）	实习答辩及报告阅评； 课程平时考核；期末考核或考查

12. 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。	12.1 有积极向上的价值观，具备自主学习和终身学习的意识。	马克思主义基本原理概论； 大学始业教育； 大学生职业发展和就业指导；	课程平时考核；期末考核或考查； 期末考核或考查
	12.2 掌握良好的学习方法，具有一定的探索知识能力	大学始业教育； 工程实习； 毕业设计；	课程平时考核；期末考核或考查； 实习答辩及报告阅评； 期末考核或考查

四、主干学科

计算机科学与技术

五、专业核心课程

程序设计基础（C语言）、计算机科学与技术导论、离散数学、模拟与数字电子技术、数据结构、计算机组成、Java面向对象程序设计、操作系统原理、计算机网络、数据库系统原理、汇编语言与接口技术、软件工程

六、主要实践环节

认识实习、科研实践、课程实验、课程设计、技术实习或岗前培训、毕业设计（论文）

七、学制、学位及毕业学分要求

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：工学学士学位
3. 本专业毕业最低学分要求：173

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	通识教育课	必修	57	32.9%
		选修	8	4.6%
	学科专业类基础课	必修	21.5	12.4%
	专业核心课（必修）		24	13.9%
	拓展复合课（选修）		15	8.7%
	小计		125.5	72.5%
	实践教学环节	必修	47.5	27.5%
合计			173	100.0%

Undergraduates Program in Computer Science and Technology

(A Pilot Project of Cultivating Excellent Engineers)

I. Educational Objectives

Cultivate high-quality application-oriented computer engineer in computer-related applications of information technology and embedded software systems, with the ability of using mathematical knowledge to analyze and solve practical problems, skilled professional foreign languages skills, being familiar with IT businesses operation, systemically master computer science basic theory and knowledge, being proficient in popular software developing technologies and platforms, and has the ability to select the appropriate technology according to the needs of different organizations and institutions, using the international development standards, be qualified in information system project design, developing, implementing, managing, testing and maintenance, and could undertake the responsibility of sustainable development of social economy and science and technology, achieve success in creative engineering practice activities with the role of technology and management backbone.

II. Graduation Requirements

According to the professional training objectives, with the experience of German FH Applied Science university personnel training, considering local economic and social development needs and in recent years, China's engineering education certification standards requirements, the current stage graduation requirements are as follows:

- (1) to be able to use mathematics, natural sciences, engineering fundamentals and expertise to solve complex engineering problems in the computer field;
- (2) to apply the basic principles of mathematics, natural sciences, engineering science, identify, express, and through literature research and analysis of computer science and technology in the field of complex engineering problems in order to obtain effective conclusions;
- (3) to design solutions for information systems, to design a system, module or process to meet specific user needs, and to reflect innovation in the design process, taking into account social, health, safety, legal, cultural and environmental factors.
- (4) It is possible to study complex engineering problems based on scientific principles and scientific methods, including designing experiments, analyzing and interpreting data, and obtaining reasonable and effective conclusions through information synthesis.
- (5) be able to develop, select and use appropriate technologies, resources, modern engineering tools and information technology tools for complex engineering issues, including predictions and simulations of complex projects and understand limitations.
- (6) to be able to conduct a reasonable analysis based on engineering-related background knowledge, evaluate the impact of professional engineering practices and complex engineering solutions on society, health, safety, law and culture, and understand the responsibilities that should be borne.
- (7) to understand and evaluate the impact of engineering practice on the environmental and social sustainable development of complex engineering problems in the field of information technology.
- (8) with humanities and social knowledge and humanities quality, and strong teamwork, social communication skills, in engineering practice to understand and comply with engineering ethics and norms, to fulfill their duties
- (9) The team in a multidisciplinary context can take on the individual, team members and the role of the person in charge.
- (10) able to communicate and communicate effectively with industry peers and the public in the field of information technology, including writing reports and design manuscripts, presenting statements, clearly expressing or responding to directives, and having a certain international perspective, with strong Foreign language language ability, able to communicate in a cross-cultural context.
- (11) to understand and master the project management and economic decision-making methods, and can be applied in a multi-disciplinary environment.
- (12) with independent learning and lifelong learning awareness, have the ability to continue to learn and adapt to development.

III. Achievement Matrix of Graduation Requirements

Graduation Requirements	Indicators of Graduation Requirements	The Main Courses and Programs	Assessment
1.Mathematics, natural sciences, engineering and expertise can be applied to complex projects in the field of chemical engineering and technology problems.	1.1 Basic knowledge of mathematics, engineering, mathematics, and can be used to set up and solve mathematical equations.	Advanced mathematics; Linear algebra; Probability theory & mathematical statistics;	Courses and routinely; The final examination
	1.2 Master the basic knowledge of mechanical, optical, thermal and electromagnetic, and can be used to assist in solving complex engineering problems in the field.	University Physics	Courses and routinely; The final examination
	1.3 Basic knowledge of control circuit system, and can be used to solve complex engineering problems in computer engineering field.	Principles of Electrical Circuits; Digital signal processing;	Courses and routine; The final examination; Experiment results; Test report
	1.4 Computer professional specialized engineering knowledge, and can be used to solve complex engineering problems in computer engineering field.	Computer science and technology speciality*	Courses and routinely; The final examination; Experiment results; Test report
2.Able to apply basic principles of mathematics, natural sciences, engineering sciences, identification, expression, and through the study of literature analysis of computer science and technology complex engineering problems in the field in order to draw valid conclusions;	2.1 Basic principles of applied mathematics, engineering mathematics and computer engineering in the field of mathematical modelling of complex engineering problems.	Advanced mathematics; Linear algebra; Discrete mathematics;	Courses and routinely; The final examination
	2.2 Application of mechanical, optical, thermal and electromagnetic principles, within the field of computer engineering mechanism analysis of complex engineering problems.	College physics; Experiment of College physics;	Courses and routinely; The final examination; Experimental results; Test report
	2.3 To apply the basic principles of engineering science and literature studies of computer engineering in the field of complex engineering problem identification, analysis, expression, to achieve effective conclusions	Basic course; Computer science and technology specialty module courses; Engineering practice; Graduation thesis;	Courses and routinely; The final examination or test; Experiment results; Lab report results; Graduate dissertation comment and reply

3.To design solutions for information systems, designing systems that meet specific user requirements, module or process and reflected in the design innovation, taking into account social, health, safety, legal, cultural and environmental factors.	3.1 Master knowledge of programming languages and algorithms and proficient in mainstream computer code development technologies and platforms, with computer software or embedded system development capabilities.	Programming Basic (c language) Data structure Algorithmic design & analysis JAVA object-oriented programming Web component development Based on J2EE enterprise development technology Principle of application integration and tools; C + + program designing; . Net platform technology	Courses and routinely; The final examination or test; Experiment results; Lab report results; Graduate dissertation comment and reply
	3.2 Computer engineering technology core knowledge and project design capacity of the computer system.	Computer composition; Operating system principles; Principles of database system; Computer networks; Software engineering; Assemble language and interface techniques Soc System Principle and Programming; Embedded computer systems; The design of the programme; Graduation thesis;	Courses and routinely; The final examination; Experimental results; Lab report results; Graduate dissertations comment and reply
	3.3Design considering social, health, safety, legal, cultural and environmental awareness.	Ideological and moral cultivation and legal basis; Software project management and analysis; System management and maintenance Engineering Internship Graduation thesis;	Courses and routinely; The final examination; Experimental results; Lab report results; Graduate dissertations comment and reply
	3.4 Can reflect the sense of innovation in the design of the solution.	School and enterprise training courses (four) Comprehensive curriculum design Graduation thesis;	Courses and routinely; the final examination or investigation; Experimental results; test report results; Reply of course design, reporting and work performance; Graduate dissertations comment and reply

4. Based on scientific principles and the use of scientific methods to study the complex engineering problems, including design, analysis and interpretation of data, and information are reasonable and valid conclusions.	4.1 For computers and related electronic circuit design experiment of science capacity.	Basic course experiment; Computer specialty module courses; Course exercise; Circuit b test; Experiment in electronic technology	Courses and routinely; The final examination or test; Experimental results; Test report
	4.2 Analysis, interpretation of results data.	Basic course experiment; Computer specialty module courses; Comprehensive experiment; Circuit b test; Experiment in electronic technology;	Courses and routinely; The final examination or test; Experimental results; Test report
	4.3 Using information obtained by means of a rational and effective conclusion.	Basic course experiment; Computer specialty module courses; Course exercise	Courses and routinely; The final examination or test; Experimental results; Test report
5. Able to solve complex engineering problems, development, selection and use of appropriate technology, resources, and modern engineering tools and information technology tools, including prediction and simulation of complex engineering problems, and be able to understand its limitations.	5.1 With engineering problems needs analysis, can be completed using a combination of computer science and engineering experiments to design, implement, and analyze results	Principles and applications of database, Oracle data, College physics, Matlab based experiments, assembly language and interface technology, technology practice	Courses and routinely; The final examination or test; Experimental results; Test report
	5.2 A variety of development languages, knowledge of system development and debugging skills;	C++ programming, JAVA, Linux systems and analysis of object-oriented programming, Web component development, J2EE-based enterprise-class development principles and tools of technology, application integration, . Net platform technology	Courses and routinely; The final examination or test; Experimental results; Test report
	5.3 Use of engineering software/hardware system solutions for construction and development	Java language course design, course design of database systems, embedded system course design, comprehensive experiment of digital electronic technology, school-enterprise training course (iv) *, engineering practice, design	Courses and routinely; The final examination or test; Experimental results; Test report

	5.4 Master the engineering problems of literature search and query methods.	Document retrieval and Exchange; Graduation thesis	Courses and routinely; The final examination or test; Experimental results; Lab report results; Graduate dissertations comment and reply
6.Related background knowledge can be based on rational analysis, evaluation of the practice of professional engineering and solutions to complex engineering problems on social, health, safety, legal, and cultural influence, responsibility and understanding.	6.1 Understanding of computer science and technology, engineering projects in the field of technology and trends.	An introduction to information technology; Engineering practice; Graduation thesis	Courses and routinely; The final examination or test; Experimental results; Lab report results; Graduate dissertations comment and reply
	6.2 Understanding of computer science and technology practice and social constraints and evaluation elements of the solution.	School and enterprise training courses (four) Engineering practice; Graduation thesis;	
	6.3 Explicitly implemented field of computer science and technology, software and hardware systems and solutions should bear social responsibility, safety, health, legal and cultural.	School and enterprise training courses (four) Engineering practice; Graduation thesis;	
7.To understand and evaluate complex engineering problems in the field of computer engineering engineering practice environmental, social impact on sustainable development.	7.1 Understanding of computer hardware and software projects running on the human and natural environment impacts and energy consumption factor.	Java language course design, course design of database systems, embedded system course design, comprehensive experiment of digital electronic technology, school-enterprise training courses (four), the graduation design of engineering practice.	Courses and routinely; The final examination or test;
	7.2 Understanding and tracking national and regional industrial development situation and policy awareness.	An introduction to computer science and technology; Engineering practice; Graduation thesis	Courses and routinely; The final examination or test; Graduate dissertations comment and reply
	7.3Knowledge of computer software and hardware systems and the relevant standards and norms of project, to evaluate the practical impact on society sustainable development	Graduation thesis	The final examination or test; Graduate dissertations comment and reply

8. Humanities and social science literacy, social responsibility, in computer science, engineering and technology understand and comply with engineering ethics in engineering practice and norms in carrying out his duties.	8.1 Humanities and social science literacy, social responsibility	Introduction of university education; An introduction to the basic principles of Marxism; Situation & policy; Psychological health education for college students; An introduction to the basic principles of Marxism; Overview of Mao Zedong thought and the theories of socialism with Chinese characteristics; Outline of Chinese modern history; College Chinese Physical training; Ideological and moral cultivation and legal basis; Social practice of ideological and political	The final examination or test; Courses and routinely; the final examination or investigation
	8.2 Able to understand and comply with engineering ethics in engineering practice and norms in carrying out his duties.	Engineering ethics and ethics of science; Engineering practice; Ideological and moral cultivation and legal basis; Cognition practice; The second class	Courses and routinely + final examination or investigation; Enterprise assessment + internship report reading assessment; Practice reading comments on the reply and report; Graduate dissertations comment and reply
9. In the context of a multidisciplinary team to take individual, team members and responsible role.	9.1 With professional skills in the field of computer engineering.	Engineering practice; Metalworking practice; System management and maintenance; School and enterprise training courses (Choose one of four)	Internship report and reply read review
	9.2 Cognitive mode of operation of the company.	Software project management and analysis; System analysis and management Engineering practice; Cognition practice	Practice reading comments on the reply and report; Enterprise assessment + internship report read review
	9.3 Basic computer field of interdisciplinary knowledge.	Technology and application of Internet of things	Courses and routinely; the final examination or investigation

	9.4 With a technical team responsible for building, running, coordination and capacity.	Course exercise; Graduation thesis; Engineering Internship The second class Military training; Social practice of ideological and political	Read comments on the reply of course design and report; (If there are any real making of objects requires additional assessment outcome); Test + test report read review; Practice reading comments on the reply and report; Graduate dissertations comment and reply
10.To complex engineering problems in computing with industry peers and the public for effective communication and Exchange, including report writing and design your presentation, representation, statement or respond to instructions, clear expression, and good command in an international perspective, in the context of cross-cultural communication and Exchange.	10.1 Computer works with complex engineering problems in the field of interpersonal and verbal communication and the ability to accurately respond to instruction.	Engineering practice; Graduation thesis;	Practice reading comments on the reply and report; Graduate dissertations comment and reply
	10.2 Writing lab reports, design reports, summary report.	Graduation thesis; * Professional basic courses experimental; Specialty module courses * computer experiment; Course exercise; Engineering practice;	Graduate dissertations comment and reply; Test + test report read review; Internship report and reply read review
	10.3 Literature search, reading, comprehension of foreign languages.	An introduction to information technology; College English; Graduation thesis; Engineering Internship	The final examination or test; Courses and routinely; the final examination or investigation; Practice reading comments on the reply and report; Graduate dissertations comment and reply
	10.4 Can have some foreign language communication and interpersonal skills.	College English; Java object-oriented programming (bilingual), computer networking (bilingual), software engineering (bilingual)	Courses and routinely; the final examination or investigation
	11.1 Computer general knowledge of Economics and management of the project.	Software project management and case study Graduation thesis; System management and maintenance	The final examination or test; Graduate dissertations comment and reply

11. Understand and master of computer engineering engineering management and economic decision-making method and application in a multidisciplinary environment.	11.2 Relevant disciplines relating to economic decision-making and management in the project application knowledge.	School elective	The final examination or test; Courses and routinely; the final examination or investigation
	11.3 Initial operation and management in the implementation of the project.	Engineering practice; Software project management and analysis; School and enterprise training courses (Choose one of the four)	Practice reading comments on the reply and report; Courses and routinely; the final examination or investigation
12. With awareness of learning and lifelong learning, have the ability to learn and adapt to the development.	12.1 With positive values, with awareness of learning and lifelong learning.	An introduction to the basic principles of Marxism; Introduction of university education; College students' career development and career guidance;	Courses and routinely; the final examination or investigation; The final examination or test
	12.2 Mastery Learning methods, with some new knowledge and competence	Introduction of university education; Engineering practice; Graduation thesis;	Courses and routinely; the final examination or investigation; Practice reading comments on the reply and report; The final examination or test

IV. Subordinate Disciplines

Computer Science and Technology

V. Core Courses

Fundamentals of Programming(C Language) , Introduction to Computer Science and Technology, Discrete Mathematics, Analog and Digital Electronic Technology, Data Structure, Computer Organization, Java Object-Orient Programming, Principles of Operating System, Computer Network, Principles of Database System, Assembly Language and Interface Technology, Software Engineering

VI. Internship and Practice

Cognition Practice, Scientific Research Practice, Curriculum Tests, Curriculum Designs, Technology Practice or Pre-job Training, Graduation Project on which a thesis will be written.

VII. Duration of Schooling, Degree and Credits Requirements for Graduation

1. Duration 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 Engineering
3. The Minimum Graduation Credits: 173

VIII. Credits Structure and Ratio:

The curriculum Provision and Study Type	Credits	Credits Ratios
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Theory Teaching	General Education Courses	Required	57	32. 9%
		Optional	8	4. 6%
	Discipline & Specialty Basic Courses	Required	21. 5	12. 4%
	Specialty Core Courses（Required）		24	13. 9%
	Expand and Recombination Courses （Optional）		15	8. 7%
	Subtotal		125. 5	72. 5%
Practice Teaching	Required		47. 5	27. 5%
Total			173	100. 0%

课程设置与学时安排（表一）

专业名称：计算机科学与技术

课程类别	课程性质		课程代码	课程名称	学分	总学时	教学安排					考试学期	各学期周学时分配								备注		
							理论学时	实验学时	习题学时	研讨学时	课外学时		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	16周	16周			
通识教育课程	思政类	必修	2615A101	中国近现代史纲要 Outline of Contemporary Chinese History	3	48	32	16	4	8		1	2										
			2615A083	思想道德修养与法律基础 Fundamentals of Morality and Law	3	48	24	6	6	12		2		3									
			2615A084	马克思主义基本原理概论 Introduction to Fundamental Principles of Marxism	3	48	24	6	6	12		3			3								
			2615A102	毛泽东思想与中国特色社会主义理论体系概论 Introduction to Mao Zedong's Thought and Theoretical System of Socialism with Chinese Characteristics	3	48	32	16	12	14		4				3							
			26115201-26115204	形势与政策 Situation and Policy	2	32	32							长1-4讲座									
	外语类	必修	5214A001 5214A002 5214A004 5214A005	大学英语2-3 工程师英语1-2 College English 2-3 Engineer English 1-2	10	160	124		18	18	160	1-4	3	3	2	2					实施分级教学2选1		
			5214A002 5214A003 5214A004 5201A005	大学英语3-4 工程师英语1-2 College English 3-4 Engineer English 1-2																			
			1316A007-1316A010	体育1-4 Physical Education 1-4	4	144		144				1-4	2	2	2	2							
			数理基础类	必修	1011A095 1011A096	高等数学A1-A2 Advanced Mathematics Level A1-A2	10	160	106		32	22	240	1,2	6	4							
					1012A110 1012 A111	大学物理B1-B2 College Physics Level B1-B2	5	80	48		20	12	80			3	2						
	1011A107	线性代数B Linear Algebra Level B			2	32	24		4	4	32			2									
	0222A002	电路分析基础 Principles of Electrical Circuits			3	48	38		6	4	48	2		3									
	1011A113	概率论与数理统计A Probability Theory and Mathematical Statistics Level A			3	48	34		8	6	72	3			3								
	素质类	创业类	必修	3717A039	创业基础 Entrepreneurial Fundamental	2	32	32						2									
	素质类	必修	25215069	大学语文 College Chinese	2	32	32							2									

课程设置与学时安排（表一）

专业名称：计算机科学与技术

课程类别	课程性质		课程代码	课程名称	学分	总学时	教学安排					考试学期	各学期周学时分配								备注
							理论学时	实验实践学时	习题学时	研讨学时	课外学时		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	16周	16周	
就业指导	必修	2717A122	大学生心理健康教育 Mental Health Education for College Students	1	16	8		4	4			2									
		31117082 31117083	大学生职业发展与就业指导 1-2 Career planning and guidance for college students 1-2	1	16	16									2						
	素质选修课	8个学分必修，课程选修	自然科学拓展及工程技术拓展之外的课程群至少选修6个学分	6	96	96									2	2	2				
			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				
	通识教育类课程小计				65	1120	734	188	120	116	632		19	20	16	9	4	2			
学科专业基础课	必修	0221A009	计算机科学导论 Introduction to Computer Science	1.5	24	24				24		2									
		0221A010	程序设计基础 Fundamentals of Programming	3	48	48				96	1	3									
		0221A003	离散数学 Discrete Mathematics	3	48	48				64	2		3								
		0221A004	数据结构 Data Structure	4	64	48	16			64	3			4							
		0221A005	数据库系统原理 Principles of Database System	3	48	40	8			72	3			3						*	
		0221A006	模拟与数字电子技术 Analog and Digital Electronic Technology	3	48	48				72	4				3						
		0221A007	计算机网络 Computer Network	3	48	42	6			64	5					3					
		0221A008	知识产权与职业素养 Intellectual Propety Rights and Career Quality	1	16	16											2				
	学科专业基础课小计				21.5	320	290	30			456		5	3	7						
专业核心课	必修	0231A001	Java面向对象程序设计 Java Object-Orient Programming	4	64	48	16			128	4				4					*	
		0231A002	计算机组成 Computer Organization	4	64	48	16			64	4				4						
		0231A004	操作系统原理 Principles of Operating System	4	64	56	8			64	4				4						
		0231A005	计算机系统安全 Computer System Security	2	32	32				32					2						
		0231A006	汇编语言与接口技术 Assembly Language and Interface Technology	4	64	56	8			64	5					4					

课程设置与学时安排（表一）

专业名称：计算机科学与技术

课程类别	课程性质	课程代码	课程名称	学分	总学时	教学安排					考试学期	各学期周学时分配								备注
						理论学时	实验学时	习题学时	研讨学时	课外学时		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	16周	16周	
		0231A006	移动应用开发技术 Mobile Devices Development Technology	3	48	32	16									3				
		0231A007	软件工程 Software Engineering	3	48	32	16			48	6					3				
专业核心课小计				24	384	304	80			352					12	6	3			
拓展复合课	企业级开发	0241B016	基于JavaEE企业级开发技术 Enterprise Level Development Technology Based on JavaEE	4	64	48	16			64						4				
		0241B011	信息技术服务管理 Information Technology Service Management	3	48	32	16			32						3				
		0241B013	应用集成原理与工具 Principle and Tools of Application Integration	3	48	32	16			48						3				
		0241B015	Web组件开发 Web Groupware Development	3	48	32	16			64						3				
		小计		13	208	144	64			144						3	6			
	大数据与人工智能	0241B006	数据挖掘技术 Data Mining Technology	3	48	24	24			48						3				
		0241B007	人工智能导论 Introduction for Artificial Intelligence	4	64	32	32			64						4			*	
		0241B008	深度学习应用开发 Deep Learning Application Development	3	48	24	24			48							3			
			0241B009	大数据智能分析技术与实践 Practical Course of Big Data and AI	3	48	24	24			48							3		
		小计		13	208	104	104			208										
	嵌入式软件	0241B001	数字信号处理 Digital Signal Processing	3	48	40	8			48						3				
		0241B002	嵌入式计算机系统 Embedded Computer Systems	4	64	48	16			64						4			*	
		0241B003	Soc 技术原理与编程 Soc System Principle and Programming	3	48	32	16			48							3			
		0241B004	DSP及其应用 DSP Principle and	3	48	36	12			48							3			
		小计			208	156	52			208										
	专业拓展至少选修学分				9.5	152	124	36								6	6.5			
		0241B031	算法设计与分析 Algorithm Analysis and Design	2.5	40	34	6			48						2.5				

课程设置与学时安排（表一）

专业名称：计算机科学与技术

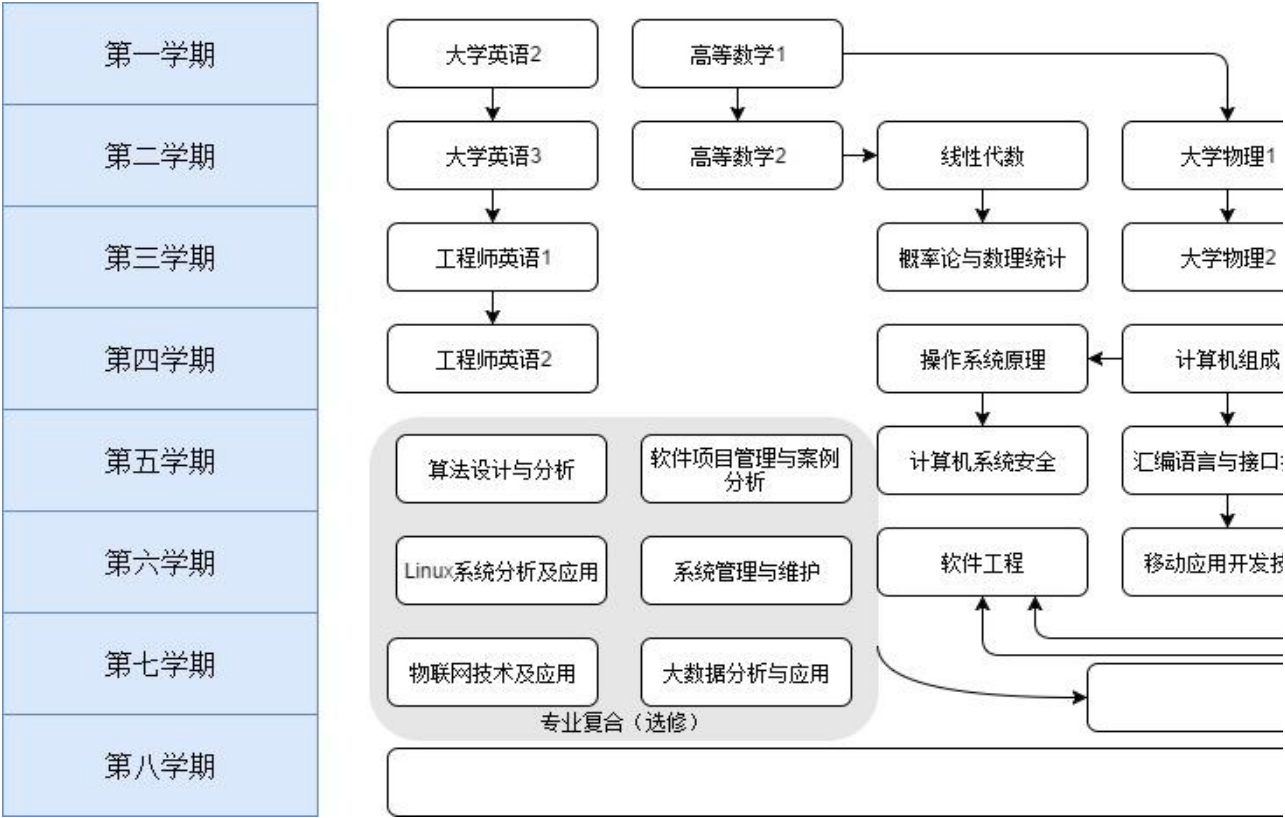
课程类别	课程性质	课程代码	课程名称	学分	总学时	教学安排					考试学期	各学期周学时分配								备注
						理论学时	实验实践	习题学时	研讨学时	课外学时		第一学年		第二学年		第三学年		第四学年		
												长1	长2	长3	长4	长5	长6	长7	长8	
												16周	16周	16周	16周	16周	16周	16周	16周	
拓展复合层次	专业复合（跨专业选修）	0241B033	Linux系统分析及应用 Linux System Analysis and Application	2.5	40	24	16			48							2.5			
		0241B012	软件项目管理与案例分析 Software Project Management and Case Study	2	32	24	8			32					2					
		0241B034	软件测试 Software Test	2	32	16	16			32						2				
		0241B036	网页设计与网站规划 Web-Page Design and Web-Site Planning	2	32	16	16			32						2				
		0241B037	系统管理与维护 System Administratering	3	48	16	32			48						3			企业课程	
		0241B039	多媒体技术 Multimedia Technology	3	48	40	8			48		16周				3				
		0241B040	计算机图形学 Computer Graphics	3	48	40	8			48							3			
		0241B010	Python 程序设计 Python Programming	3	48	24	24			48						3				
		0241B042	物联网技术及应用 Technology and Application of the Internet of Things	3	48	40	8			48								3		1-6周
		0241B043	大数据分析与应用 Big Data Analysis and Application	3	48	48												3		企业课程 1-6周
		0241B044	信息系统理论及实践 Theory and Practice of Information System	2	32	16		16		32								2		校企培训课程（二选一），1-6周
		0241B046	嵌入式系统与软件综合实践 Comprehensive Practice of Embedded Systems and Software	2	32	16		16		32								2		
		小计		33	528	354	142	32	0	496							10.5	12.5	6	
	专业复合至少选修学分		5.5	88	80	16	16									5	4	2		
专业拓展复合至少选修学分合计		15	112																	
理论教学学分学时合计				125.5	2064.0	1532.0	350.0	136.0	116.0	1440.0		24.0	23.0	23.0	21.0	21.0	15.5	2.0		

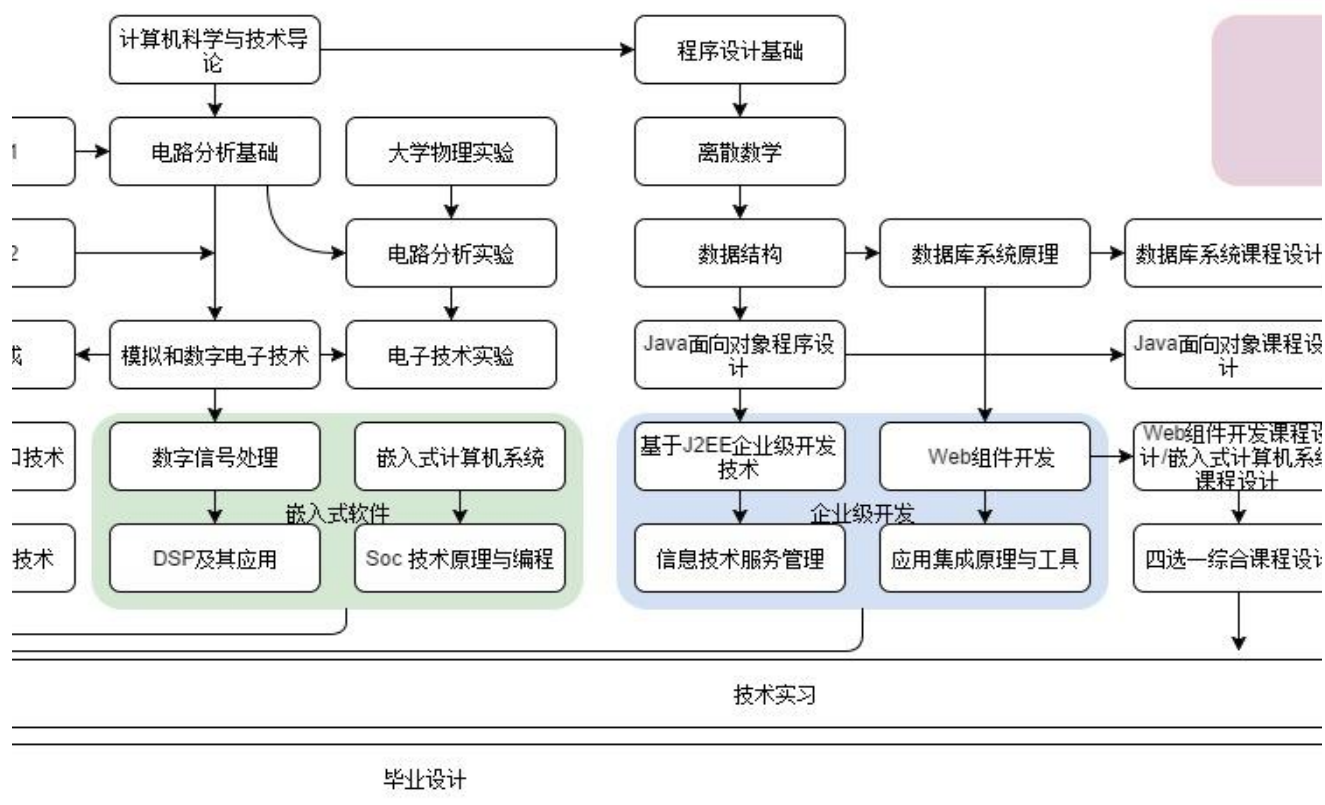
实践教学安排（表二）

课程 代码	所属 模块	实践教学活动内容	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			第三学年			第四学年			
					长 1	长 2	短 1	长 3	长 4	短 2	长 5	长 6	短 3	长 7	长 8		
31461014	公共 实践	大学始业教育 Induction of university life	1	1	1												
13461013		军事理论及训练 Military Theory and Training	4	4	4												
13461015		体质健康训练 Health Training	0.5	16						2							
3752A018		金工实习B Metalworking practiceB	2	2				2									
31463007		思政社会实践 Ideological Social Practice	2	2					2								
31467084		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									
1012A022	基础 实验	大学物理实验B Experiment of College Physics Level B	1	33		2											
0261A203		电路分析基础实验 Experiments of Circuit Principles	0.5	16				2									
0261A216	专业 大 实验	程序设计基础实验 Experiments in Fundamentals of Programming	1	32	2												
0261A102		电子技术实验 Experiment in Electronic Technology	0.5	16					1								
小计			14														
0251A401	专项 设计	Java面向对象课程设计 Course Design of Java Programming	1	32					2								
0251A403		Web组件开发课程设计 Course Design of Web Groupware Development	1	32	0						2						
0251A404		嵌入式计算机系统课程设计 Course Design of Embedded Computer Systems	1	32							2				17-18周 嵌入式 软件		
0251A405		数据库系统原理课程设计 Principles of Database System	0.5	16					1								
小计			2.5	112					1	2		2					
0251A406	基础 实践	应用软件架构综合课程设计(不限方向) Comprehensive Course Design of Application Software Architecture	1.5	48									3		结合企 业课题 完成		
0251A407		软件工程综合课程设计(不限方向) Comprehensive Course Design of Software Engineering	1.5	48									3		结合企 业课题 完成		
0251A408		集成程序开发综合课程设计（限企业级开发方向） Comprehensive Course Design of Integrated Program Development	1.5	48									3		结合企 业课题 完成		
0251A409		嵌入式应用综合课程设计(限嵌入式软件方向) Comprehensive Course Design of Application of Embedded System	1.5	48									3		结合企 业课题 完成		
至少选修学分和学时(任选一项)			1.5	48									3				

0251A101	专 业 实 践	认识实习 Cognition Practice	1	1						1						
0251A301		技术实习或岗前培训 Technology Practice or Pre-job Training	10	10										10		7-16周
0257A50 1		毕业设计（论文） Graduate Project (Thesis)	16	16											16	1-16周
31462009		第二课堂 Extracurricular Teaching	3													
小计			30	27												
合计			###													

第二课堂包括开放性实验、大学生科技竞赛、参加教师科研项目、各级大学生项目立项、创业等。





公共实践

计

金工实习

设

认识实习

设

统

计算机网络

计

知识产权与职业素养

自然科学及其他素质
选修课