

沈阳化工大学本科培养方案

计算机科学与技术学院

专业名称：计算机科学与技术

专业代码：080901

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计算机科学与技术专业培养方案

一、专业介绍

本专业从 1986 年开始招收第一届计算机应用专业专科生，1989 年招收第一届计算机应用专业本科生，1999 年由计算机软件和计算机应用专业合并正式组建计算机科学与技术专业。

本专业是国家一流专业，辽宁省一流专业。计算机科学与技术专业培养适应计算机技术发展，适应 IT 行业和区域经济建设需求，具有扎实的数学、自然科学和计算机领域的基础知识，具有良好的职业素质和创新意识，能在计算机及相关领域承担软硬件系统的技术研究、产品研发、应用开发和系统实施与维护等工作，能在多角色团队中担任技术骨干或领导责任。

本专业为辽宁省本科工程人才培养改革试点专业，辽宁省应用型转型示范专业，也是学校 113 人才培养改革试点专业。目前拥有计算机科学与技术一级学科硕士学位授予权和“计算机技术”专业学位硕士点，辽宁省实验教学示范中心一个。专业十分注重学生工程实践能力的培养，曾在中国大学生计算机设计大赛和国家创新训练项目大赛中多次获得国家级奖项和省级奖项。

二、培养目标

本专业面向国家数字经济战略与新一代信息技术产业需求，围绕辽宁省智能化社会建设中关键需要，培养德智体美劳全面发展，适应“物联网、大数据和人工智能技术”融合创新趋势，掌握计算机科学的核心理论，具备复杂系统开发能力、智能算法实现能力及软硬件协同设计能力，具有工匠精神、创新意识、工程伦理和社会责任感，毕业后可在互联网企业、科研院所、金融机构、智能制造等领域，从事系统架构师、算法工程师、系统运维师、嵌入式开发工程师等工作的高素质工程技术人才。

本专业毕业生具有如下目标预测：

培养目标 1:能在社会活动中，综合考虑社会、法律、安全、环境及可持续性等因素，体现高度的社会责任感和工程职业道德，具有服务社会的意愿和能力。

培养目标 2:能够在企业和社会实际环境中，按照计算机工程技术规范将数学、自然科学与计算机科学的基础知识和技术运用于技术研究、产品研发、应用开发和系统实施与维护。

培养目标 3:能够根据 IT 技术发展和社会发展需求，在计算机新产品、新技术等领域，具有研发精神和创新意识，具有积极寻求和获取新知识与新技术的能力。

培养目标 4:能够在社会环境中，熟练运用外语与计算机相关工具，就软硬件系统开发、产品研发、新知识新技术等环节，与国内外同行进行有效沟通。

培养目标 5:能在多角色人员构成的团队中，有效地发挥重要作用，进而从系统的视角管理多学科组成的项目。

三、专业方向（可选）

四、毕业要求及实现矩阵

计算机科学与技术专业要求学生掌握本专业的基础知识和基本技能，在“物联网、人工智能和大数据”融合领域能综合运用本专业及相关领域知识与技能，解决所涉及的复杂工程问题。具备软件设计思想、相关行业软件设计与实现、智能算法分析与设计、物联网应用系统分析与设计、大数据分析展示等能力。

毕业能力要求及其指标点分解：

毕业能力要求	指标点
0. 立德树人： 具有坚定正确的政治方向、良好的思想品德和健全的人格，热爱祖国，热爱人民，拥护中国共产党的领导；具有科学精神、人文修养、职业素养、社会责任感和积极向上的人生态度，了解国情社情民情，践行社会主义核心价值观。	0.1 具有坚定正确的政治方向、良好的思想品德和健全的人格，热爱祖国，热爱人民，拥护中国共产党的领导，
	0.2 具有科学与工匠精神，积极向上的人生态度
	0.3 在了解国情社情民情基础上，能够运用历史、哲学的知识和方法认识、分析社会现象，树立和践行社会主义核心价值观
1. 工程知识： 掌握本专业所需的数学、自然科学知识和计算机学科知识，并能用于解决计算机工程相关领域的复杂工程问题。	1-1. 掌握数学和自然科学的基础知识，培养逻辑思维与逻辑推理能力
	1-2. 具备扎实的计算机学科的原理，能够用于建立实际问题的模型
	1-3. 具备扎实的计算机专业知识和原理，能够用于解决计算机工程复杂问题
2. 问题分析： 能够应用数学、自然科学和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工程相关领域复杂工程问题，综合考虑可持续发展的要求，以获得有效结论。	2-1. 能够运用数学、自然科学和专业基础知识，识别和判断计算机工程相关领域复杂工程问题
	2-2. 能够基于数学、自然科学和专业基础知识，表达计算机工程相关领域复杂工程问题的解决方案
	2-3. 通过文献研究及综合考虑可持续发展需要，分析和筛选出计算机工程相关领域复杂工程问题的解决方案，并得出有效结论
3. 设计/开发解决方案： 能够开发和设计针对计算机工程相关领域复杂工程问题的解决方案，设计满足特定需求的系统、单元（部件）或工艺流程，能够在设计环节中体现创新意识，并从健康与安全、全生命周期成本与净零碳要求、法律与伦理、社会与文化等角度考虑可行性。	3-1. 掌握计算机工程相关领域内工程设计和产品开发全周期、全流程的基本设计/开发方法和技术
	3-2. 能够针对计算机工程相关领域内的特定需求，完成计算机软、硬件系统单元的设计，并能在设计中体现创新意识
	3-3. 针对计算机工程相关领域内复杂工程问题的解决方案，在设计中能够考虑安全、法律、文化以及环境等制约因素
4. 研究： 能够基于科学原理并采用科学方法对计算机工程相关领域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. 基于计算机科学原理，能够利用文献资料，针对计算机工程相关领域复杂工程问题建立相应研究模型，并符合系统开发和工程化的基本要求
	4-2. 针对研究模型，提出自己的研究思路 and 想法，设计出切实可行的模拟或实验方案
	4-3. 能够依据实验方案开展实验，对实验数据进行分析 and 解释、并通过信息综合得到合理有效的结论

5. 使用现代工具： 能够针对计算机工程相关领域复杂工程问题，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，包括对复杂计算机工程及其相关领域问题的预测与模拟，并能够理解其局限性。	5-1. 了解常用开发环境及开发工具的性能、适应范围以及对开发、分析的适应性，并能正确应用
	5-2. 针对具体的对象，能够选择并使用恰当的开发工具进行设计、计算和分析，并能够理解其局限性
	5-3. 能够针对计算机工程相关领域复杂工程问题，选用满足特定需求的现代工具，模拟计算机及其相关领域的专业问题
6. 专业（工程）与可持续发展： 在解决计算机工程相关领域复杂工程问题时，能够基于专业背景知识进行合理分析，评价计算机专业工程实践对健康、安全、环境、法律以及经济和社会可持续发展的影响，并理解应承担的责任。	6-1. 了解与计算机工程相关领域的法律、法规和产业政策，并理解计算机工程实践对于社会、健康、安全、法律以及文化的可能影响
	6-2. 能够基于计算机科学与技术专业知识，结合相关的应用背景知识，评价计算机专业工程实践对于社会、安全、法律和文化的可能影响，并理解应承担的责任
	6-3 能够理解实际解决方案和工程实践的可持续性，理解和评价计算机工程相关领域复杂工程问题的解决方案和计算机专业工程实践对环境、社会可持续发展的影响
7. 伦理和职业规范： 有专业报国、专业为民意识，具有人文社会科学素养和社会责任感，能够理解和应用专业伦理，在计算机工程相关领域工程实践中遵守工程职业道德、规范和相关法律，履行责任。	7-1. 具有工程报国、为民造福的意识，具有人文社会科学素养和社会责任感。
	7-2. 能够拥有健康的体质，具有良好的心理素质和社会责任感
	7-3. 能够理解和遵守在计算机工程领域的工程职业道德、规范和相关法律，理解计算机工程相关领域工程师对公众的社会责任。
8. 个人和团队： 能够在多样化、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。	8-1. 在多学科背景下明确团队的角色构成和职责分工，能够具有团队合作意识，能够提出自己的想法并且倾听其他成员的意见和建议
	8-2. 能够与团队其他成员有效沟通，能够在团队中承担个体、团队成员以及负责人的角色，并完成团队分配的任务
9. 沟通： 能够就计算机工程相关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，理解、尊重语言和文化差异。	9-1. 能够将计算机工程相关领域复杂工程问题用文稿或图纸等技术文件进行清晰表达
	9-2. 能够通过文稿或图纸等技术文件利用现代信息技术与业界同行及社会公众就计算机工程相关领域复杂工程问题进行沟通交流
	9-3. 了解计算机科学与技术专业相关行业的热点问题与国际状况
	9-4. 具备一门外国语的基本听、说、读、写、译能力，能够阅读专业领域的外文资料，能够在跨文化背景下进行沟通和交流
10. 项目管理： 理解并掌握计算机工程相关领域中工程管理原理与经济决策方法，并能在多学科环境中应用。	10-1. 能够理解和掌握计算机工程的管理原理和经济决策方法
	10-2. 能够在解决计算机工程方案设计过程中，运用工程管理和经济决策的方法
11. 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。能够理解广泛的技术变革对计算机专业和社会的影响，适应新技术变革，具有批判性思维能力。	11-1. 具有自主学习和终身学习意识
	11-2. 具有自主学习的能力，包括对技术问题的理解能力、归纳总结的能力和解决问题的能力

毕业要求支撑培养目标实现的关系矩阵

毕业要求	培养目标				
	培养目标 1	培养目标 2	培养目标 3	培养目标 4	培养目标 5
0: 立德树人	√		√		
1: 工程知识		√			
2: 问题分析		√			
3: 设计/开发解决方案	√	√	√		
4: 研究		√	√		
5: 使用现代工具		√		√	
6: 工程与可持续发展	√				
7: 伦理和职业规范	√				
8: 个人和团队					√
9: 沟通				√	
10: 项目管理					√
11: 终身学习			√		

四、主干学科与交叉学科

主干学科：计算机科学与技术学科

交叉学科：软件工程、控制科学与工程、网络空间安全

五、专业核心课程

离散数学、数字逻辑、算法与数据结构、计算机组成原理、操作系统、计算机网络、计算机体系结构

六、学制与学位

学制：基本学制 4 年，弹性修业年限 3-6 年。

毕业要求总学分：160 学分

授予学位：学生应至少修满 160 学分方可毕业。符合《沈阳化工大学本科毕业生学士学位授予工作有关规定(2017 年 3 月修订)》学位授予条件者，可授予工学学士学位。

七、学分要求

培养环节	课程性质	课程类别	课程模块	学分要求	小计
课内环节	必修	通识教育课程	思政类	17	39
			外语类	10	
			军事安全类	2	
			劳动体育类	5	
			创新创业类	2	
			心理健康类	1	
			人工智能类	2	
		学科基础课程	数学与自然科学类	24	57
			工程基础类	4	
			专业基础类	29	
	选修	通识教育课程	美育类(400)	2	10
			中国与世界(500)	1	
			四史(600)	1	
			经济管理类(700)	2	
			科技前沿类(800)	2	
			优秀文化传承类（900）	2	
		专业教育课程	专业方向类	19.5	25.5
			学科领域类	3	
			专业特色（拓展）类	3	
		实践	实践教育课程	通识教育实践类	2
	学科基础实践类			4.5	
	专业实践类			19	
	专业特色（拓展）实践类			3	
	课外环节	课外通识实践		人文社会实践	2
身心健康实践					
创新创业实践		创新训练	4		
		创新大赛			
		创客活动			
生涯教育及成长规划类		职业规划与就业指导	1		
总学分					160

Computer Science and Technology Major 2021 Undergraduate Education Program

I. Major Introduction

This major began admitting the first batch of computer application majors in 1986, followed by the first batch of undergraduate students in 1989. In 1999, the Computer Science and Technology major was officially formed by the merger of the Computer Software and Computer Application majors.

This major is a national first-class major and a first-class major in Liaoning Province. The major of Computer Science and Technology aims to cultivate students who can adapt to the development of computer technology, meet the needs of the IT industry and regional economic construction, have solid basic knowledge in mathematics, natural sciences, and computer fields, possess good professional qualities and innovative consciousness, and be able to undertake technical research, product development, application development, system implementation and maintenance of software and hardware systems in computer and related fields. They can also serve as technical backbone or leadership responsibilities in multi role teams.

This major is a pilot major for undergraduate engineering talent cultivation reform in Liaoning Province, a demonstration major for applied transformation in Liaoning Province, and also a pilot major for the 113 talent cultivation reform in the school. At present, it has the authority to confer master's degrees in computer science and technology as a first level discipline, as well as a master's degree program in "computer technology". It also has one experimental teaching demonstration center in Liaoning Province. The major places great emphasis on cultivating students' engineering practical abilities, and has won national and provincial awards multiple times in the China College Student Computer Design Competition and the National Innovation Training Project Competition

II. Educational Objectives

Facing the national digital economy strategy and the needs of the new generation of information technology industry, this major focuses on the key needs in the construction of an intelligent society in Liaoning Province, and cultivates high-quality engineering and technical talents who are fully developed in morality, intelligence, physique, beauty and labor, adapt to the integration and innovation trend of "Internet of Things, big data and artificial intelligence technology", master the core theory of computer science, have the ability to develop complex systems, realize intelligent algorithms, and design software and hardware collaboratively, and have the spirit of craftsmanship, innovation awareness, engineering ethics and social responsibility. After graduation, they can work as system architects, algorithm engineers, system operators and maintenance engineers, embedded development engineers and other work in Internet enterprises, scientific research institutes, financial institutions, intelligent manufacturing and other fields.

Graduates should obtain knowledge and competences as follows:

(1) To be able to comprehensively consider social, legal, safety, environmental, and sustainability factors in social activities, demonstrate a high sense of social responsibility and engineering professional ethics, and have the willingness and ability to serve society.

(2) To be able to apply the basic knowledge and technology of mathematics, natural sciences, and computer science to technical research, product development, application development, and system implementation and maintenance in accordance with computer engineering technical specifications in the actual environment of enterprises and society.

(3) To be able to develop research and innovation spirit and awareness in the fields of new computer products and technologies according to the needs of IT technology and social development, and to have the ability to actively seek and acquire new knowledge and technologies.

(4) To be able to proficiently use foreign languages and computer related tools in a social environment, and effectively communicate with domestic and foreign peers in software and hardware system development, product research and development, new knowledge and technology, and other aspects.

(5) To be able to effectively play an important role in a team composed of multiple roles, and then manage projects composed of multiple disciplines from a systematic perspective.

III. Major direction

Computer science and technology

IV. Graduation Requirements

The Computer Science and Technology major requires students to master the basic knowledge and skills of their major, and to be able to comprehensively apply their professional and related knowledge and skills in the field of "Internet of Things, Artificial Intelligence, and Big Data" integration to solve complex engineering problems involved. Ability to possess software design concepts, relevant industry software design and implementation, intelligent algorithm analysis and design, IoT application system analysis and design, big data analysis and display, etc.

Graduates should obtain knowledge and competences as follows:

Requirement 0. Moral Education: Having a firm and correct political orientation, good ideological and moral character, and a sound personality; loving the motherland and the people, and supporting the leadership of the Communist Party of China; possessing the scientific spirit, humanistic accomplishment,	0.1 Having a firm and correct political orientation, good ideological and moral character, and a sound personality; loving the motherland and the people, and supporting the leadership of the Communist Party of China.
	0.2 Possessing the scientific spirit and craftsman spirit, and a positive attitude towards life.

professional quality, social responsibility and a positive attitude towards life; understanding the national conditions, social conditions and people's conditions, and practicing the core socialist values.	0.3 On the basis of understanding the national conditions, social conditions and people's conditions, being able to use the knowledge and methods of history and philosophy to understand and analyze social phenomena, and establish and practice the core socialist values.
Requirement 1. Engineering Knowledge: Mastering the mathematical, natural science knowledge and computer discipline knowledge required by the major, and being able to apply them to solve complex engineering problems in the field of computer engineering.	1-1. Mastering the basic knowledge of mathematics and natural sciences, and developing logical thinking and reasoning abilities.
	1-2. Having solid knowledge and principles of computer discipline, and being able to use them to model practical problems.
	1-3. Having solid professional knowledge and principles of computer science, and being able to use them to solve complex engineering problems in computer engineering.
Requirement 2. Problem Analysis: Being able to apply the basic principles of mathematics, natural sciences and engineering sciences to identify, express and analyze complex engineering problems in the field of computer engineering through literature research; comprehensively considering the requirements of sustainable development to obtain effective conclusions.	2-1. Being able to use mathematics, natural sciences and professional knowledge to identify and judge complex engineering problems in the field of computer engineering.
	2-2. Being able to express solutions to complex engineering problems in the field of computer engineering based on mathematics, natural sciences and professional knowledge.
	2-3. Through literature research and comprehensive consideration of sustainable development needs, analyzing and screening solutions to complex engineering problems in the field of computer engineering, and drawing effective conclusions.
Requirement 3. Design/Development of Solutions: Being able to develop and design solutions for complex engineering problems in the field of computer engineering; designing systems, units (components) or process flows that meet specific needs; demonstrating innovative awareness in the design process; and considering feasibility from the perspectives of health and safety, full-life-cycle costs and net-zero carbon requirements, law and ethics, society and culture.	3-1. Mastering the basic design/development methods and technologies for the full cycle and full process of engineering design and product development in the field of computer engineering.
	3-2. Being able to complete the design of computer software and hardware system units according to specific needs in the field of computer engineering, and demonstrate innovative awareness in the design.
	3-3. For solutions to complex engineering problems in the field of computer engineering, being able to consider constraints such as safety, law, culture and environment in the design.
Requirement 4. Research: Being able to conduct research on complex engineering problems in the field of computer engineering	4-1. Based on the principles of computer science, being able to use literature materials to establish corresponding research models for complex engineering problems in the field of computer engineering, in line with the basic

based on scientific principles and using scientific methods, including designing experiments, analyzing and interpreting data, and obtaining reasonable and effective conclusions through information integration.	requirements of system development and engineering.
	4-2. Proposing own research ideas and thoughts for the research model, and designing feasible simulation or experimental schemes.
	4-3. Being able to carry out experiments in accordance with the experimental scheme, analyze and interpret experimental data, and obtain reasonable and effective conclusions through information integration.
Requirement 5. Use of Modern Tools: Being able to develop, select and use appropriate technologies, resources, modern engineering tools and information technology tools for complex engineering problems in the field of computer engineering, including prediction and simulation of complex computer engineering and related field problems, and understanding their limitations.	5-1. Understanding the performance, scope of application and adaptability to development and analysis of common development environments and development tools, and being able to apply them correctly.
	5-2. For specific objects, being able to select and use appropriate development tools for design, calculation and analysis, and understanding their limitations.
	5-3. Being able to select modern tools that meet specific needs for complex engineering problems in the field of computer engineering, and simulate professional problems in computer and related fields.
Requirement 6. Professional (Engineering) and Sustainable Development: When solving complex engineering problems in the field of computer engineering, being able to conduct reasonable analysis based on professional background knowledge, evaluate the impact of computer professional engineering practice on health, safety, environment, law, as well as economic and social sustainable development, and understand the responsibilities to be undertaken.	6-1. Understanding the laws, regulations and industrial policies related to the field of computer engineering, and understanding the possible impact of computer engineering practice on society, health, safety, law and culture.
	6-2. Being able to evaluate the possible impact of computer professional engineering practice on society, safety, law and culture based on the knowledge of computer science and technology and combined with relevant application background knowledge, and understanding the responsibilities to be undertaken.
	6-3. Being able to understand the sustainability of practical solutions and engineering practice, and understand and evaluate the impact of solutions to complex engineering problems in the field of computer engineering and computer professional engineering practice on the environment and social sustainable development.
Requirement 7. Ethics and Professional Norms: Having the awareness of serving the country and the people with professional skills, possessing humanistic and social science literacy and social responsibility, being able to understand and apply professional ethics, abiding by engineering professional ethics, norms and relevant laws in engineering practice in the field of computer engineering,	7-1. Having the awareness of serving the country through engineering and benefiting the people, and possessing humanistic and social science literacy and social responsibility.
	7-2. Having a healthy physique, good psychological quality and social responsibility.
	7-3. Being able to understand and abide by engineering professional ethics,

and fulfilling responsibilities.	norms and relevant laws in the field of computer engineering, and understand the social responsibility of engineers in the field of computer engineering to the public.
Requirement 8. Individual and Teamwork: Being able to take on the roles of individual, team member and leader in teams with diverse and multi-disciplinary backgrounds.	8-1. In a multi-disciplinary context, clarifying the role composition and responsibility division of the team, having the awareness of teamwork, being able to put forward own ideas and listen to the opinions and suggestions of other members.
	8-2. Being able to communicate effectively with other team members, take on the roles of individual, team member and leader in the team, and complete the tasks assigned by the team.
Requirement 9. Communication: Being able to communicate and exchange effectively with industry peers and the public on complex engineering problems in the field of computer engineering, including writing reports and design documents, making presentations, expressing clearly or responding to instructions. Possessing a certain international perspective, being able to communicate and exchange in a cross-cultural context, and understanding and respecting language and cultural differences.	9-1. Being able to clearly express complex engineering problems in the field of computer engineering through technical documents such as manuscripts or drawings.
	9-2. Being able to communicate and exchange with industry peers and the public on complex engineering problems in the field of computer engineering through technical documents such as manuscripts or drawings using modern information technology.
	9-3. Understanding the hot issues and international status of industries related to the computer science and technology major.
	9-4. Possessing basic listening, speaking, reading, writing and translation abilities in a foreign language, being able to read foreign language materials in the professional field, and being able to communicate and exchange in a cross-cultural context.
Requirement 10. Project Management: Understanding and mastering the principles of engineering management and economic decision-making methods in the field of computer engineering, and being able to apply them in a multi-disciplinary environment.	10-1. Being able to understand and master the management principles and economic decision-making methods of computer engineering.
	10-2. Being able to apply the methods of engineering management and economic decision-making in the process of solving computer engineering scheme design.
Requirement 11. Lifelong Learning: Having the awareness of independent learning and lifelong learning, and the ability to continuously learn and adapt to development. Being able to understand the impact of extensive technological changes on the computer profession and society, adapt to new technological changes, and possess critical	11-1. Having the awareness of independent learning and lifelong learning.
	11-2. Having the ability of independent learning, including the ability to understand technical problems, summarize and solve problems.

thinking ability.	
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The relationship between graduation requirements and educational objectives

Graduation Requirements	Educational Objectives				
	Educational Objectives 1	Educational Objectives 2	Educational Objectives 3	Educational Objectives 4	Educational Objectives 5
0: Moral Education		√			
1: Engineering Knowledge		√			
2: Problem Analysis	√	√	√		
3: Design/Development of Solutions		√	√		
4: Research		√		√	
5: Use of Modern Tools	√				
6: Engineering and Sustainable Development	√				
7: Ethics and Professional Norms	√				
8: Individual and Teamwork					√
9: Communication				√	
10: Project Management					√
11: Lifelong Learning			√		

IV. Main Disciplines and Interdisciplinary Disciplines

Main Discipline: Computer Science and Technology

Interdisciplinary Disciplines: Software Engineering, Control Science and Engineering, Cyberspace Security

V. Core Courses of the Major

Discrete Mathematics, Digital Logic, Algorithms and Data Structures, Principles of Computer Composition, Operating Systems, Computer Networks, Computer Architecture

VI. Academic System and Degree

Academic System: The basic academic system is 4 years, with a flexible study period of 3-6 years.

Total Credits Required for Graduation: 160 credits

Degree Awarding: Students must complete at least 160 credits to graduate. Those who meet the degree-awarding requirements specified in the "Provisions on the Awarding of Bachelor's Degrees to Undergraduate Graduates of Shenyang University of Chemical Technology (Revised in March 2017)" shall be awarded a Bachelor of Engineering degree

VII. Credit Requirements

Cultivate Link	Courses Nature	Course Category	Course Module	Credit Request	Subtotal	
In class link	Must Take courses	General education curriculum	Ideological and political education	17	39	
			Foreign language	10		
			Military security category	2		
			Labor sports category	5		
			Innovation and entrepreneurship category	2		
			Psychological health category	1		
			Artificial intelligence category	2		
		Subject based courses	Mathematics and Natural Sciences	24	57	
			Engineering Fundamentals	4		
			Professional Fundamentals	29		
	Elective course	General education curriculum	Art Education (400)	2	10	
			China and the World (500)	1		
			Four Histories (600)	1		
			Economic Management (700)	2		
			Frontiers of Technology (800)	2		
			Excellent Cultural Heritage Category (900)	2		
		Professional education courses	Professional Direction Category	19. 5	25. 5	
			Subject area category	3		
			Professional Characteristics (Expansion) Category	3		
		Practice	Practical Education Course	General Education Practice	2	28. 5
				Discipline Basic Practice	4. 5	
				Professional Practice Category	19	
				Professional Characteristics (Expansion) Practice Category	3	
	Extracurricular link	Extracurricular General Education Practice		Humanities and Social Practice	2	Not included in the total credits
Physical and mental health practice						
Innovation and Entrepreneurship Practice		Innovative training	4			
		Innovation Competition				
		Maker activities				
Career Education and Growth Planning		Career Planning and Employment Guidance	1			
Total Credits					160	

八、计算机科学与技术专业教学进程表

Table of Teaching Schedule for Computer Science and Technology Major

(1) 必修课设置及学分分配表

Compulsory Course Setting and Credit Allocation Table

课程类别 Course Type	课程模块 Course Nature	序号 No.	课程号 Course Code	课程名称 Course Name	学分 Cre.	总学时数 Total Cre.	学时分配 Credit Hour Distribution				开课学期 Semester	备注 Notes
							讲 课 Lec.	实 验 Exp.	上 机 Pro.	课 外 实 践 Pra.		
通识教育课程 General Education	思政类 Ideological & Political	1	0710093001	思想道德与法治 Ideology & Morality and Rule of Law	3.0	48	32			16	2	
		2	0710053001	中国近现代史纲要 Outline of Chinese Contemporary and Modern History	3.0	48	32			16	1	
		3	0710103001	马克思主义基本原理* Basic Principle of Marxis*	3.0	48	32			16	3	
		4	0710143001	毛泽东思想和中国特色社会主义理论体系概论* Mao Zedong Thought and Theory of Socialism with Chinese Characteristics *	3.0	48	32			16	3	
		5	0710153001	习近平新时代中国特色社会主义思想概论 Introduction to Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era	3.0	48	40			8	5	
		6	0710012301	形势与政策 Current Situation and Policies	2.0	64	64				1~8	第8学期记学分
	外语类 Foreign Language	7	0215003101	大学外语 I College English I	3.0	48	48				1	
		8	0215003201	大学外语 II * College English II *	3.0	48	48				2	
		9	0215002301	大学外语III College English III	2.0	32	32				3	五选一
				大学外语III（进阶英语） College English III (Advanced English CET	2.0	32	32				3	

通识教育课程 General Education				6-Orientated)								
				大学外语III（英语口语表达与交流） College English III（English Oral Expression and Communication）	2.0	32	32				3	
				大学外语III（跨文化交际） College English III（Intercultural Communication）	2.0	32	32				3	
				大学外语III（英语写作表达与交流） College English III（English Writing Expression and Communication）	2.0	32	32				3	
		10	0215002401	大学外语IV* College EnglishIV*	2.0	32	32				4	五选一
				大学外语IV（进阶英语） College English IV（Advanced English CET 6-Orientated）	2.0	32	32				4	
				大学外语IV（英语口语表达与交流） College English IV（English Oral Expression and Communication）	2.0	32	32				4	
				大学外语IV（英语写作表达与交流） College English IV（English Writing Expression and Communication）	2.0	32	32				4	
				大学外语IV（跨文化交际） College English IV（Intercultural Communication）	2.0	32	32				4	
	人工智能类 AI	11	1616222001	人工智能导论 Introduction to Artificial Intelligence	2.0	32	32				3	
	军事安全类 Military & Safety	12	0710081001	军事理论 Military Theory	1.0	16	16				2	
		13	1618041001	安全教育 Safety Education	1.0	16	16				1~7	

通识教育课程 General Education	劳动体育类 Labor & Sport Education	14	2640021001	劳动教育 Labour Education	1.0	16	16				1	
		15	0410011101	大学体育 I College Physical Education I	1.0	36		36			1	
		16	0410021201	大学体育 II College Physical Education II	1.0	36		36			2	
		17	0410031301	大学体育 III College Physical Education III	1.0	36		36			3	
		18	0410041401	大学体育 IV College Physical Education IV	1.0	36		36			4	
	创新创业类 Innovation & Entrepreneurship	19	1617021002	创造性思维与创新方法 Creative Thinking and Innovative Methods	1.0	16	4	18			4	
		20	1740011001	创业基础 Entrepreneurial Foundation	1.0	16	16				5	
	心理健康类 Mental & Health	21	0510051001	大学生心理与健康教育 Mental and Health Education for College Students	1.0	16	16				1	
合计 Subtotal					39	736	508	162	0	72		
学科基础课程 Discipline Education	数学与自然科学类 Natural Science & Mathematics	22	0310004101	高等数学 I* Advanced Mathematics I*	4.5	80	72			8	1	
		23	0310005201	高等数学 II* Advanced Mathematics II*	5.5	96	88			8	2	
		24	1617052002	离散数学* Discrete Mathematics *	3	48	48				2	
		25	0310063001	大学物理* University Physics	3.0	48	48				2	
		26	0310034001	线性代数 Linear Algebra	4.0	64	64				3	
		27	0317184001	概率论与数理统计 Probability and Statistics	4.0	64	64				4	
	工程基础类 Foundation Engineering	28	1610052002	计算机科学导论 Introduction to Computer Science	2.0	32	32				1	
		29	1612021002	工程导论 Introduction to Engineering	1.0	16	16				1	
		30	1613051002	专业外语与文献检索及写作 Document Retrieval and Scientific Paper Writing	1.0	16	16				6	
	专业基础类 Subject Foundation Requisite	31	1644270002	学业与专业教育 Academic and Professional Education	0.5	8	8				1	
		32	1610043102	C 语言程序设计*	3.0	48	48				1	

			C Programming Language*								
	33	1617002002	电路与电子技术基础 The Circuit and Electronic Technology	2.5	44	32	12			2	
	34	1610083002	算法与数据结构* Algorithm and Data Structures*	3.0	52	40		12		3	
	35	1610073002	面向对象程序设计 Object-Oriented Programming	3.0	56	32		24		2	
	36	1610243002	数字逻辑 Digital Logic	2.5	44	32	12			3	
	37	1610093002	计算机组成原理* Computer Organization and Architecture*	3.0	52	40	12			4	
	38	1610123002	数据库系统原理 Principle of Database System	3.0	52	40		12		4	
	39	1610142002	计算机网络* Computer Networking*	3	52	40	12			5	
	40	1614332002	操作系统* Operating System	3	48	48				5	
	41	1610152002	软件工程 Software Engineering	2.5	40	40				6	
合计 Subtotal				57	960	848	48	48	16		

注：1. 理论课 1 学分 16 学时，实验课程、上机等 1 学分 24 学时，体育课 1 学分 36 学时，集中实践环节 1 个教学周计 1 学分，学分最小单位为 0.5。

2. 课程名称中带*为考试课。

(2) 选修课设置及学分分配表

Elective Course Setting and Credit Allocation Table

课程类别 Course Type	课程模块 Course Nature	序号 No.	课程号 Course Code	课程名称 Course Name	学分 Cre.	总学时数 Total Cre.	学时分配 Credit Hour Distribution				开课学期 Semester	备注 Notes
							讲	实	上	课		
							课	验	机	外		
							Lec.	Exp.	Pro.	Pra.		
通识教育课程 General Education	分为美育类(2)、中国与世界(1)、四史(1)、经济管理类(2)、科技前沿类(2)、优秀文化传承类(2)6个课程模块 每个模块最多选修 2 学分，每学期最多选修 4 门课程。 Including 6 modules: Aesthetic Education, China and The world, Four Histories, Economic Management,Frontier science and technology, Excellent cultural inheritance, . Up to 2 credits per module and up to 4 courses per semester.											
合计 Subtotal					10							
专业教育课程 Specialized Education	专业方向类 Orientation	42	1610112002	编译原理 Compiler Construction Principles	2.5	44	32		12		6	
		43	1650752102	程序设计竞赛 I Program Design Competition I	2.5	48	24		24		4	
		44	1637093002	单片机原理及接口技术 SCM Principles and Interface Technology	3	56	32		24		5	
		45	1617192002	Linux 操作系统 Linux Operation System	3	56	32		24		5	
		46	1617141002	计算机大数据分析与应用 Analysis and Application of Computer Big Data	1.0	16	16				6	
		47	1610842002	物联网技术概述 Overview of Internet of Things Technology	2	40	16	24			6	
		48	1617072002	计算机体系结构 Computer Architecture	2.5	40	40				6	
		49	1610032002	智能视觉原理及应用 Principles and Applications of Intelligent Vision	2	32	32				5	
		50	1621021002	人工智能技术与应用 Artificial Intelligence Technology and Applications	1	16	16				4	
		小计 Subtotal				19.5	348	240	0	108	0	
	学科领域类 Discipline	51	1630462002	Java 语言程序设计 Java Programming	3.0	56	32		24		5	
	52	1617172002	Python 语言课程设计	3.0	56	32		24		5		

			Python Programming							
	53	1637102002	移动应用开发技术 Android & Application Development	2.0	36	8	24			6
	54	1633322002	信息安全 Information Safety	2.0	32	32				6
	55	1632832002	数学竞赛 Mathematics Competition	2.0	32	32				7
	56	1612102002	计算机组成原理进阶 Advanced Principles of Computer Organization	1.5	24	24				7
	57	1611352002	操作系统进阶 Advanced Operating Systems	1.5	24	24				7
	58	1610092002	算法与数据结构进阶 Advanced Algorithms and Data Structures	1.5	24	24				7
	59	1610162002	计算机网络进阶 Advanced Computer Networks	1.5	24	24				7
	60	1610071002	高级离散数学 Advanced Discrete Mathematics	1.5	24					2
	61	1610051002	C 语言进阶 Advanced C Programming	1.5	24					2
	62									
	小计 Subtotal			19.5	332	208	24	48	0	
	(最低修读 3 学分)									
	专业特色 (拓展) 类	63	1630893002	网络工程技术竞赛 Network Engineering Technology Competition	3	64	16	48		
64		1630752202	程序设计竞赛II Programming Competition	2.5	48	24		24		6
65		1637993002	人工智能系统设计 Artificial intelligence system design	3	56	32		24		6
66		1633202002	安全协议设计与分析 Design and Analysis of Security Protocol	2.0	32	32				6
67		1637223002	算法设计与分析 Algorithm Design and Analysis	3.0	52	40		12		6
小计 Subtotal			13.5	252	144	48	60	0		
(最低修读 3 学分)										
合计 Subtotal				49.5	884	592	72	216	0	

(3) 实践环节设置及学分分配表

Practice section setting and credit allocation table

课程类别 Course Type	课程模块 Course Nature	课程号 Course Code	课程名称 Course Name	学分 Cre.	总学时数 Total Cre.	方式 App.	周数 Weeks	开课学期 Semester	备注 Notes
实践教育课程 Practice Education	通识教育实践类 Ideological and Political Courses	0415102011	军训 military training	2.0	48	集中	+2	1	
	小计 Subtotal			2	48	0	2		
	学科基础实践类 Foreign Language Courses	1615010032	认识实习 Cognition Practice	0.5	12	分散		2	
		1612801022	C 语言实践 Practices for C Language	1.5	36	分散		1	
		0310081011	大学物理实验 Physical experiment of college	1.0	24	分散		2	
		1617121022	计算机组成原理课程设计 The Course Design of the Principle of Computer Composition	1.5	36	分散		5	
	小计 Subtotal			4.5	108				
	专业实践类 Labor and Sport Education	1621021022	人工智能技术与应用实践 Artificial Intelligence Technology and Application Practices	1.0	24	分散		4	
		1621031022	智能系统综合实践 Comprehensive Practice of Intelligent Systems	1.0	24	分散		6	
		1615132022	计算机软件实训 Computer Software Training	2.0	48	分散		5	
		1617151022	大数据应用实践 Big Data Application Practice	1.0	24	分散		6	
		1615232032	生产实习 Production Practice	2.0	48	集中	+2	7	
		1617031042	毕业设计（论文） Graduation Design（Thesis）	12	288	集中	+12	8	
	小计 Subtotal			19	456				
	专业特色（拓展）实践类 Innovation and Entrepreneurship	1617045022	学科特色实践 Discipline Characteristic Practice	3	72	集中	+3	7	

	courses								
	小计 Subtotal			3	72				
合计 Subtotal				28.5	684				

(4) 课外环节设置及学分分配表

Extracurricular activities and credit allocation table

课程类别 Course Type	课程模块 Course Nature	课程号 Course Code	课程名称 Course Name	学分 Cre.	总学时数 Total Cre.	方式 App.	周数 Weeks	开课学期 Semester	备注 Notes
课外通识 实践课程 Extracurricular General Education Practice	人文社会实践 Culture and Society Practice		社会调查 Social Survey	0.5	12	分散			
	身心健康社会实践 Mentally and Physically Practice	0410050751	课外体育锻炼 Extracurricular Physical Exercise	0.5	12	分散			
		2640030011	劳动教育实践 Labour Education Practice	0.5	12	分散			
		0510070311	心理健康辅导 Mental Health Counseling	0.5	12	分散			
	能力与创新实践 Capability and Innovation Practice		大学生素质拓展与创新实践 Quality Development and Innovation Practice	4.0	96	分散	1~8 学期依据《沈阳化工大学创新创业实践学分认定办法》由创新创业学院认定		
	生涯教育及成长规划类 Career Education and Growth Plan		职业规划与就业指导 Career Planning and Employment Guidance	1.0	40	分散			
合计 Subtotal				7	184				

九、计算机科学与技术专业学士学位课程一览表

A list of bachelor's degree programs in Computer Science and Technology

课程类别 Course Type	模块名称 Modules	序号 No.	课程编号 Course Codes	课程名称 Course Name	学分 Credits	开课学期 Semester
通识教育课 General Education	思政类 Ideological and Political	1	0710043001	马克思主义基本原理* Basic Principle of Marxis*	3	3
		2	0710133001	毛泽东思想和中国特色社会主义理论体系概论* Mao Zedong Thought and Theory of Socialism with Chinese Characteristics *	3	3
学科平台课 Discipline Education	学科基础类 Foundation Engineering"	3	0310004101	高等数学I* Advanced Mathematics I*	4.5	1
		4	0310005201	高等数学II* Advanced Mathematics II*	5.5	2
		5	1617052002	离散数学* Discrete Mathematics *	3.0	2
	专业基础类 Subject Foundation Requisite	6	1610043102	C 语言程序设计* C Programming Language *	3.0	1
		7	1610073002	面向对象程序设计 Object-Oriented Programming	3.0	2
		8	1610083002	算法与数据结构* Algorithm and Data Structures*	3.0	3
		9	1610093002	计算机组成原理* Computer Organization and Architecture*	3	4
		10	1610123002	数据库系统原理 Principle of Database System	3	4
		11	1610142002	计算机网络* Computer Networking*	3	5
		12	1614332002	操作系统* Operating System	3	5
		13	1610152002	软件工程 Software Engineering	2.5	6
专业教育课 Specialized Education	专业方向类 Orientation	14	1617072002	计算机体系结构 Computer Architecture	2.5	6
		15	1617192002	Linux 操作系统 Linux Operation System	3	5

说明：关于学士学位课的具体要求见《沈阳化工大学关于学士学位课程水平审核制度的若干规定》

十、全学程实践环节周历安排

Weekly Calendar of all Practice Sessions

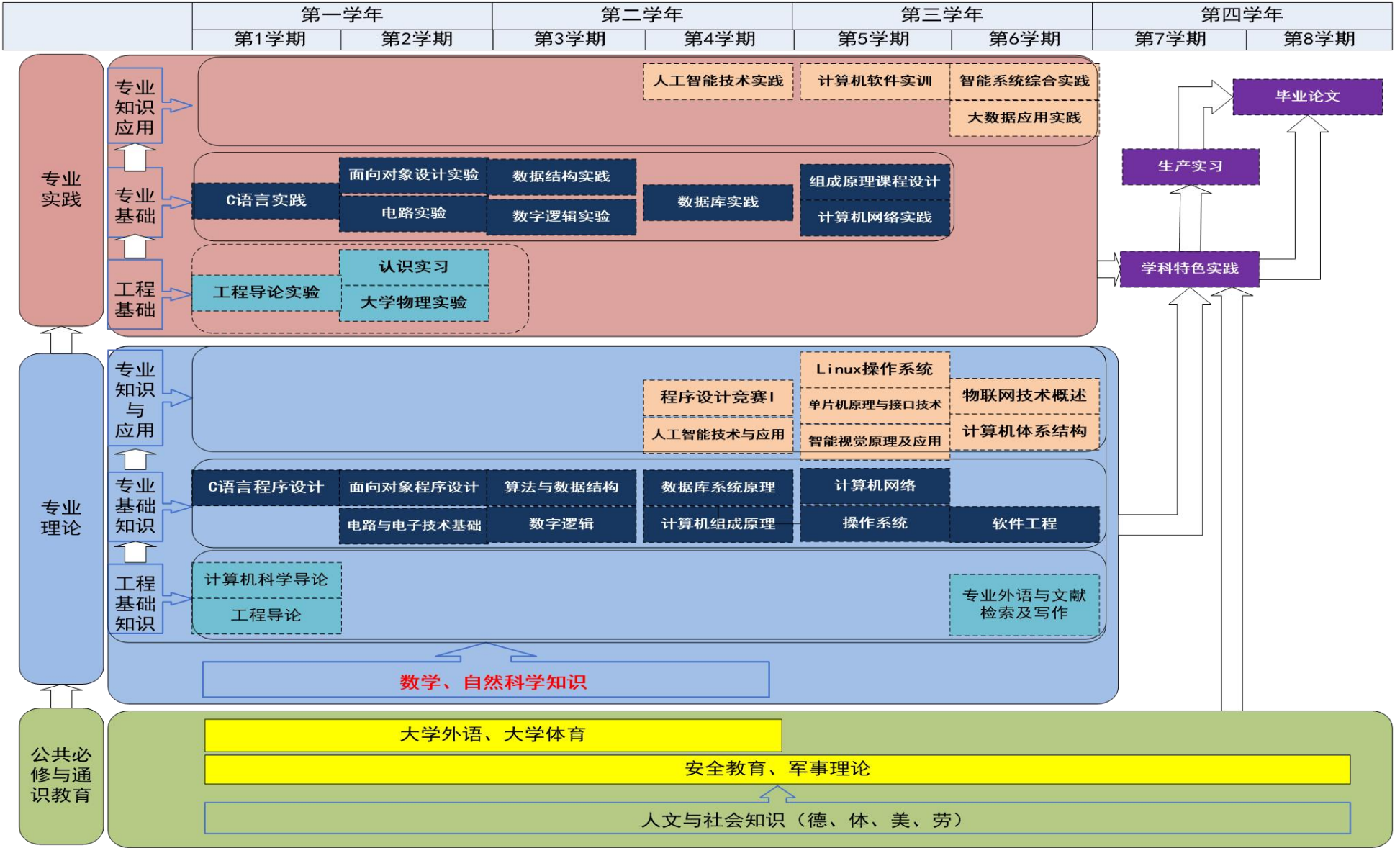
学期	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	备注
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符号说明(Symbol Description):

※金工实习||Metalworking Practice △课程设计||Curriculum Design /生产实习||Specialized Production Practice L 专业实验||Specialty

Experiment P 各类实训、学年论文||Practical Training、Term Paper :: 考试||Examination ▼ 认识实习||Cognition Practice ☆军训
||Military Training = 毕业设计（论文）||Graduation Project(Thesis) ·小学期||Primary Term

十一、课程体系配置图 Curriculum System Configuration Diagram



Correlation Matrix between Key Courses and Graduation Requirements (High Correlation—H, Medium Correlation—M, Low Correlation—L)

[illegible]

课程 (Courses)	毕业能力要求 (Graduation Requirements)																																		
	0.1	0.2	0.3	1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3	5.1	5.2	5.3	6.1	6.2	6.3	7.1	7.2	7.3	8.1	8.2	9.1	9.2	9.3	9.4	10.1	10.2	11.1	11.2	
Safety Education																																			
劳动教育																																			
Labour Education																																			
大学体育																							H												
College Physical Education																																			
创造性思维与创新方法																																	H		
Creative Thinking and Innovative Methods											H																						H		
创业基础																																			
Entrepreneurial Foundation																							H												
大学生心理与健康教育																																			
Mental and Health Education for College Students																						H	M												
军训																							H												
military training																						H													
高等数学					H																														H
Advanced Mathematics																																			
大学物理*					H																														H
University Physics																																			
线性代数						H		H	M																										
Linear Algebra							H																												
概率论与数理统计						H		H	H																										
Probability and Statistics							H																												
离散数学					H																														H
Discrete Mathematics *																																			
计算机科学导论																																			
Introduction to Computer Science																					L		M					M							H
工程导论																																			
Introduction to Engineering		H																	L	L	L														

[illegible]

[illegible]

[illegible]