**计算机科学与技术专业培养方案**

**Undergraduate Program of Computer Science and Technology Major**

**Ⅰ.专业介绍 Introduction**

我校计算机科学与技术专业在全国大学本科教育专业排行A+级。自1960年创办了“计算技术”专业以来，1981年专业在国内首批获得“计算机应用”学科硕士学位授予权。1987年该学科成为铁道部的重点学科。2012年通过全国工程教育专业认证。2016年5月，计算机科学学科进入ESI全球排名前1%。本专业具有“计算机科学与技术”一级学科博士学位授权点和博士后流动站，已连续三次通过工程教育专业认证，是国家级特色专业，并入选首批国家级一流专业建设点。

计算机科学与技术专业旨在培养德、智、体、美全面发展，具备基本的科学素养，系统掌握计算机科学与技术基本理论和专业知识，掌握智能交通信息技术基础知识与方法，拥有较好的实践动手能力、系统分析与开发能力，适应社会经济发展需要的专门人才。毕业后，可从事应用研究、技术开发或管理等工作，并具备在工作中继续学习、不断更新知识的能力。毕业生就业率保持在98%以上，就业单位主要包括知名IT企业、国有大中型企业、事业单位和科研院所等。

The computer science and technology major of our university ranks A+ in the national undergraduate education major ranking. Since the establishment of "Computing Technology" major in 1960, the major was approved to award the first master’s degree in "Computer Application" discipline in 1981. In 1987, this discipline became a key discipline of the Ministry of Railways. In 2012, this major passed the professional certification of engineering education. In May 2016, the computer science discipline entered the top 1% of ESI’s global ranking. The major has the first-level doctoral degree authorization point and post-doctoral mobile station of "Computer Science and Technology". This major has passed the certification of engineering education for three consecutive times, is a national level characteristic major, and has been selected as one of the first batch of national first-class professional construction sites.

The Computer Science and Technology program aims to cultivate students so that they will become professional talents meeting the demand of social and economic development with comprehensive development in personality, fundamental research abilities, systematical mastering of the fundamental theories and professional knowledge in the field of computer science and technology, and appropriate capability in practice, analysis and development. The employment rate for graduates is beyond 98%, where graduates are primarily working for well-known IT enterprises, large- and medium-sized state-owned companies, public institutions, and scientific research institutions.

专业代码： 080901

Program Code: 080901

专业名称： 计算机科学与技术

Program Name: Computer Science and Technology

**Ⅱ.培养目标 Objectives**

我校计算机科学与技术专业旨在培养适应国民经济与科技发展需求，具备较好的科学素养，扎实的专业基础知识，较强的工程实践能力和创新能力，良好的职业道德和人文素养，能够在计算机科学与技术及其相关应用领域从事科研教学、产品研发、系统设计及应用管理，具有“智能+交通”特色的高级专业人才，使其成为社会主义事业的建设者和接班人。

The Computer Science and Technology program at our school aims to cultivate advanced professionals with good scientific literacy, solid foundational knowledge, strong engineering practical skills, innovation ability, ethical values, and humanistic literacy, who are capable of engaging in scientific research, teaching, product development, system design, and application management in the field of computer science and technology and its related applications, with a focus on "Intelligence + Transportation". They are expected to become builders and successors of socialist undertakings.

毕业生经过实践锻炼，能够达到以下目标：

After practicing, the graduates can achieve the following goals:

（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，适应团队工作环境。

Be familiar with professional laws and regulations related to occupations, have social and professional ethics, and adapt to the working environment of the team.

（2）针对实际需求，能运用自然科学、工程基础和计算机专业知识，对复杂计算机系统工程问题进行分析，研究解决方案，承担计算机系统的设计、开发和应用管理任务。

According to practical needs, be able to apply natural science, engineering fundamentals and computer science expertise to analyze and solve complex engineering problems, be able to undertake the design, development and application management tasks of computer systems.

（3）有良好的国际视野，且具有与业界同行、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的能力。

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

（4）具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终身学习的能力。

Be able to continue to learn and update knowledge in order to meet the needs of technical and vocational development for lifelong learning.

**III.专业毕业要求 Graduation Requirements**

对于本专业的学生，毕业要求包括如下12项基本要求：

The graduates are required to meet the following 12 [essential](file:///C:\Users\Keming_Abide\AppData\Local\youdao\dict\Dict\7.5.0.0\resultui\dict\?keyword=essential) requirements:

（1）工程知识：掌握从事计算机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计算机系统工程问题。

（1）Engineering knowledge: Master the knowledge of mathematics, natural science, and engineering fundamentals required for work in the area of computer science and technology, and apply these knowledge to solve complex computer system engineering problems.

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

（2）Problem analysis: Capable of applying the [fundamental](file:///C:\Users\Keming_Abide\AppData\Local\youdao\dict\Dict\7.5.0.0\resultui\dict\?keyword=fundamental) principles of math, natural science and computer engineering science to identify, formulate, and analyze complicated computer system engineering problems, and draw a valid conclusion through literature research.

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

（3）Design/development of solutions: Ability to design solutions for complex computer system engineering, and to develop computer systems, units (modules) that meet specified needs with sense of innovation and with appropriate considerations for society, health, safety, law, culture, environment, etc.

（4）研究：具有基于科学原理并采用科学方法对复杂计算机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。

（4）Research: can use science methods to carry on research on complicated computer system engineering problems based on scientific principles, including designing experiments, analyzing and interpreting data as well as drawing reasonable conclusions from their achieved information.

（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，对复杂计算机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。

（5）Modern Tool Usage: Ability to select and apply appropriate techniques, resources, development environment and related development tools to predict and simulate complicated computer system engineering problems, with an understanding of the limitations.

（6）工程与社会：在复杂计算机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。

（6）Engineering and society: In the design and implementation of complex computer system engineering problem solutions, be able to carry out rationality analysis based on relevant engineering background knowledge and evaluate the impacts on the society, health, security, law, culture and environment; have a clear understanding of their responsibilities.

（7）环境和可持续发展：在复杂计算机系统工程问题解决方案的设计、实现过程及系统运行中，能够理解和评价其对环境、社会可持续发展的影响。

（7）Environment and [sustainable](file:///C:\Users\Keming_Abide\AppData\Local\youdao\dict\Dict\7.5.0.0\resultui\dict\?keyword=sustainable) development: In the design, implementation process and system operation of complex computer system engineering problem solution, can understand and evaluate some complicated engineering practices’ influence on environment and its sustainable development.

（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。

（8）Occupational norms: have humanistic and social science literacy as well as social responsibility, understand and comply with engineering professional ethics and norms in engineering practice and fulfill responsibilities.

（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。

（9）Individual and Team work: Have certain organizational management ability, team cooperation ability, and can work as individuals, team members as well as team leaders in the teams with multidisciplinary backgrounds.

（10）沟通：能够就复杂计算机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。

（10）Communication: can communicate effectively over complicated computer system engineering problems with both industry peers and the general public, including writing reports, designing documents, giving presentations, clearly presenting or responding to instructions; can see into problems in an international perspective and communicate with people of different cultural backgrounds.

（11）项目管理：理解并掌握计算机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。

（11）Project management: Understand and master computer system engineering management principles and economic decision-making methods, being able to apply them in a multidisciplinary environment.

（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。

（12）Lifelong learning: have the consciousness of independent learning and lifelong learning and the ability of continuous learning and adapting 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**  **Training Objectives** | | | |
| **目标1**  **Objective 1** | **目标2**  **Objective 2** | **目标3**  **Objective 3** | **目标4**  **Objective 4** |
| 毕业要求1：工程知识  Graduation Requirements 1: Engineering Knowledge |  | √ |  | √ |
| 毕业要求2：问题分析  Graduation Requirements 2: Problem Analysis |  | √ |  |  |
| 毕业要求3：设计/开发解决方案  Graduation Requirements 3: Design/development of solutions |  | √ |  |  |
| 毕业要求4：研究  Graduation Requirements 4: Investigation |  | √ |  | √ |
| 毕业要求5：使用现代工具  Graduation Requirements 5: Modern Tool Usage |  | √ |  | √ |
| 毕业要求6：工程与社会  Graduation Requirements 6: The Engineer and Society | √ |  | √ |  |
| 毕业要求7：环境和可持续发展  Graduation Requirements 7: Environment and Sustainability | √ |  | √ |  |
| 毕业要求8：职业规范  Graduation Requirements 8: Ethics | √ |  |  |  |
| 毕业要求9：个人和团队  Graduation Requirements 9: Individual and Team work | √ |  | √ |  |
| 毕业要求10：沟通  Graduation Requirements 10: Communication |  |  | √ |  |
| 毕业要求11：项目管理  Graduation Requirements 11: Project Management and Finance |  | √ |  |  |
| 毕业要求12：终身学习  Graduation Requirements 12: Lifelong learning |  |  |  | √ |

**IV.学制与学位 Duration and Degree**

学制：四年

Duration: Four years

学位：工学学士

Degree: Bachelor of Engineering

**V.主干学科与主干课程 Main Subject and Main Course**

主干学科：计算机科学与技术

Main Subject：computer science and technology

主干课程：离散数学，高级语言程序设计，数字电子技术，数据结构，算法分析与设计，计算机组成原理，编译原理，操作系统，数据库原理与设计，微机与接口技术，计算机网络，软件系统综合课程设计，人工智能，智能嵌入式系统设计，网络空间安全技术

Main Course：Discrete Mathematics, Advanced Programming Language, Digital Electronic Technique, Data Structure, Analysis and design of algorithms, Principles of Computer Composition, Compilation Principle, Operating System, Principle and design of database, Microcomputer and interface technology, Computer Networks, Software system comprehensive course design, Artificial Intelligence, Intelligent Embedded System design, Cyberspace Security technology

**VI.毕业学分基本要求 Basic Requirements of Credits for Graduation**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **课程体系  Curriculum System** | | **学分要求**  **Credits Requirements** | | | | | | |
| **必修  Compulsory** | | **限修 Distributional Electives** | | **选修**  **Free Electives** | | **小计 Subtotal** |
| **理论Theory** | **实践Practice** | **理论Theory** | **实践Practice** | **理论Theory** | **实践Practice** |
| **公共基础课程**  **Public Basic Courses** | 思想政治类  Ideological Politics Courses | 15 | 2 |  |  |  |  | 17 |
| 军事类  Military Courses | 2 | 2 |  |  |  |  | 4 |
| 外语类  Foreign Language Courses | 6 |  | 2 |  |  |  | 8 |
| 体育类  Physical Education Courses |  | 4 |  |  |  |  | 4 |
| **通识与多元化课程**  **General Education and Diversified Courses** | “交通天下”通识教育课程（含跨学科课程）  Core General Education Courses（Interdisciplinary Courses） |  |  |  |  | 4 | 2 | 6 |
| 多元化课程  Diversified Courses |
| 国际课程  International Courses |
| 大学生心理健康教育课程  University Student Psychological Health Courses |
| 学生成长与发展规划课程  Student Growth and Development Planning Courses |
| 劳动教育课程  Labor Education Courses |  |  |  |  | 2 |  | 2 |
| 公共艺术课程  Public Art Courses |  |  |  |  | 2 |  | 2 |
| **学科与专业基础课程Discipline and Specialty Foundational Courses** | 数学类  Mathematics Courses | 20 |  |  |  |  |  | 20 |
| 物理类  Physics Courses | 6 | 2 |  |  |  |  | 8 |
| 专业基础类  Specialized Basic Courses | 24 | 4 | 2 |  |  |  | 30 |
| **专业课程Specialized Courses** | 专业核心课程  Specialized Core Courses | 27 | 13 |  |  |  |  | 40 |
| 专业限修课程  Specialized Restricted Courses |  |  | 2 | 1 |  |  | 3 |
| **实践教学环节**  **Practice Courses** | 集中性实践教学环节：基本技能训练、工程实践、综合课程设计、社会与文化素质和实践、毕业实习与毕业设计 Centralized Practical Teaching Process：Basic Skills Training, Practical Training, Integrated Curriculum Design, Social and Cultural Quality Practice, Graduation Internship and Graduation Design |  | 14 |  |  |  |  | 14 |
| 创新创业实践：创新创业训练计划项目、个性化实验、学科竞赛、创新讲座等  Innovation and Entrepreneurship Practice：Innovation and Entrepreneurship Training Program, Personalized Experiments, Subject Competition, Innovation Lectures, etc |  | 2 |  |  |  |  | 2 |
| **必修环节**  **A Compulsory Part** | “第二课堂” 项目：思想政治与道德素养类项目、学术科技与创新创业类项目、艺术体验与审美修养类项目、 文化沟通与交往能力类项目、心理素质与身体素质类项目、社会工作与领导能力类项目、社会实践与志愿服务类项目  "The Second Lesson" Project:  Ideological and Political Education and Moral Literacy Projects, Academic and Technological Innovation and Entrepreneurship Projects, Art Experience and Aesthetic Education Projects, Cultural Communication and Interpersonal Skills Projects, Psychological and Physical Health Projects, Social Work and Leadership Development Projects, Social Practice and Volunteering Projects |  |  |  |  |  |  | 0 |
| 大学生综合素质提升、学生体质达标测评  Comprehensive Quality Improvement Courses for College Students, Assessment of Students' Physical Fitness |  |  |  |  |  |  |  |
| **总 计**  **Total** | | | | | | | | **160** |

**VII.课程设置细化表 Course Programs Table**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **公共基础课程** | | | | | | | | |
| **Public Basic Courses** | | | | | | | | |
| 共33学分，其中必修31学分，限修2学分，选修0 学分 | | | | | | | | |
| A total credits of 33，including 31 for compulsory courses，2 for distributional electives and 0 for free electives | | | | | | | | |
| **课程类型**  **Course Type** | **课程名称**  **Course Name** | **课程性质**  **Nature of Course** | **总学分**  **Credits** | **课内实践学分**  **In-class Practice Credits** | **开课学期**  **Semester** | **开课学院**  **School** | **支撑毕业要求指标点 Indicators which Support Graduation Requirements** | **备注**  **Notes** |
| **思想政治类 Ideological Politics Courses** | 思想道德与法治  Ideological and Moral Education and the Rule of Law | 必修Compulsory | 3 | 0.4 | 第1学期  Semester  1 | 马克思主义学院  School of Marxism | 6，7，8 |  |
| 中国近现代史纲要  Conspectus of Chinese Modern History | 必修Compulsory | 3 | 0.4 | 第2学期  Semester  2 | 马克思主义学院  School of Marxism | 7，8 |  |
| 马克思主义基本原理  The Basic Principles of Marxism | 必修Compulsory | 3 | 0.4 | 第3学期  Semester  3 | 马克思主义学院  School of Marxism | 8 |  |
| 毛泽东思想和中国特色社会主义理论体系概论  Introduction to Mao Zedong Thought and Theoretical System of Socialism with Chinese Characteristics | 必修  Compulsory | 3 | 0.4 | 第4学期  Semester  4 | 马克思主义学院  School of Marxism | 6，7，8 |  |
| 习近平新时代中国特色社会主义思想概论  Outline of Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era | 必修  Compulsory | 3 | 0.4 | 第6学期  Semester  6 | 马克思主义学院  School of Marxism | 6，7，8 |  |
| 形势与政策I  Situation and Policy I | 必修Compulsory | 0 | 0 | 第1学期  Semester  1 | 马克思主义学院  School of Marxism | 6，7，8 |  |
| 形势与政策Ⅱ  Situation and Policy Ⅱ | 必修Compulsory | 0 | 0 | 第2学期  Semester  2 | 马克思主义学院  School of Marxism |  |
| 形势与政策Ⅲ  Situation and Policy Ⅲ | 必修Compulsory | 0 | 0 | 第3学期  Semester  3 | 马克思主义学院  School of Marxism |  |
| 形势与政策Ⅳ  Situation and Policy Ⅳ | 必修Compulsory | 0 | 0 | 第4学期  Semester  4 | 马克思主义学院  School of Marxism |  |
| 形势与政策V  Situation and Policy V | 必修Compulsory | 0 | 0 | 第5学期  Semester  5 | 马克思主义学院  School of Marxism |  |
| 形势与政策Ⅵ  Situation and Policy Ⅵ | 必修Compulsory | 0 | 0 | 第6学期  Semester  6 | 马克思主义学院  School of Marxism |  |
| 形势与政策Ⅶ  Situation and Policy Ⅶ | 必修Compulsory | 0 | 0 | 第7学期  Semester  7 | 马克思主义学院  School of Marxism |  |
| 形势与政策Ⅷ  Situation and Policy Ⅷ | 必修Compulsory | 2 | 0 | 第8学期  Semester  8 | 马克思主义学院  School of Marxism |  |
| **军事类**  **Military Courses** | 军事理论  Military Theories | 必修Compulsory | 2 | 0 | 第1学期  Semester  1 | 武装部 Security Office | 9 |  |
| 军事技能  Military Skills | 必修Compulsory | 2 | 2 | 短1学期  Short Semester1 | 武装部 Security Office | 9 |  |
| **外语类**  **Foreign Language Courses** | 英语I  College English I | 必修Compulsory | 2 | 0 | 第1学期  Semester  1 | 外国语学院  School of Foreign languages | 10 |  |
| 英语Ⅱ  College English Ⅱ | 必修Compulsory | 2 | 0 | 第2学期  Semester  2 | 外国语学院  School of Foreign languages | 10 |  |
| 通用学术英语  English for General Academic Purposes | 必修Compulsory | 2 | 0 | 第3学期  Semester  3 | 外国语学院  School of Foreign languages | 10 |  |
| 职场英语  Workplace English | 限修Distributional Elective | 2 | 0 | 第4学期  Semester  4 | 外国语学院  School of Foreign languages | 10 | 限修1门，2学分  Limited to 1 course, 2 credits |
| 交际与文化视听说  Viewing, Listening & Speaking in English --Communication & Culture |
| 语言、文化与翻译  Language, Culture and Translation |
| 英语公共演讲  Public Speaking in English |
| **体育类**  **Physical Education Courses** | 体育I  Physical Education I | 必修Compulsory | 1 | 1 | 第1学期  Semester  1 | 体育学院School of Physical Education | 9 |  |
| 体育Ⅱ  Physical Education Ⅱ | 必修Compulsory | 1 | 1 | 第2学期  Semester  2 | 体育学院School of Physical Education |  |
| 体育Ⅲ  Physical Education Ⅲ | 必修Compulsory | 0.5 | 0.5 | 第3学期  Semester  3 | 体育学院School of Physical Education |  |
| 体育Ⅳ  Physical Education Ⅳ | 必修Compulsory | 0.5 | 0.5 | 第4学期  Semester  4 | 体育学院School of Physical Education |  |
| 体育健康课程I  Diversified Physical Education Courses I | 必修Compulsory | 0.5 | 0.5 | 第5学期  Semester  5 | 体育学院School of Physical Education | 6 |  |
| 体育健康课程Ⅱ  Diversified Physical Education Courses Ⅱ | 必修Compulsory | 0.5 | 0.5 | 第6学期  Semester  6 | 体育学院School of Physical Education |  |
| **通识与多元化课程** | | | | | | | | |
| **General Education and Diversified Courses** | | | | | | | | |
| 共10学分，其中必修0学分，限修0学分，选修10 学分 | | | | | | | | |
| A total credits of 10，including 0 for compulsory courses，0 for distributional electives and 10 for free electives | | | | | | | | |
| **课程类型**  **Course Type** | **课程名称**  **Course Name** | **课程性质**  **Nature of Course** | **总学分**  **Credits** | **课内实践学分**  **In-class practice credits** | **开课学期**  **Semester** | **开课学院**  **School** | **支撑毕业要求指标点**  **Indicators which Support Graduation Requirements** | **备注**  **Notes** |
| **“交通天下”通识教育课程（含跨学科课程）**  **Core General Education Courses（Interdisciplinary Courses）** | “交通天下”通识教育课程（含跨学科课程）  Core General Education Courses（Interdisciplinary Courses） | 选修  Free Electives | 2 | 0 | 2-8学期  Semester 2-8 | 全校  The whole school |  |  |
| **国际课程**  **International Courses** | 国际课程  International Courses |  |  |
| **大学生心理健康教育课程**  **University Student Psychological Health Courses** | 大学生心理健康教育课程  University Student Psychological Health Courses |  |  |
| **学生成长与发展规划课程**  **Student Growth and Development Planning Courses** | 学生成长与发展规划课程  Student Growth and Development Planning Courses |  |  |
| **多元化课程**  **Diversified Courses** | 电子机械动起来  Play with electronics and machinery | 选修  Free Electives | 2 | 2 | 第5学期  Semester  5 | 计算机与人工智能学院  School of Computing and Artificial Intelligence | 2，6，9，12 | 二选一 |
| 从代码到实物：造你所想  From code to implementation: make what you want | 第4学期  Semester  4 | 计算机与人工智能学院  School of Computing and Artificial Intelligence |
| 智能+交通  Intelligence+Transportation | 选修  Free Electives | 2 | 0 | 第6学期  Semester  6 | 计算机与人工智能学院  School of Computing and Artificial Intelligence | 2，6，9，12 | 二选一 |
| 智慧土木：比特与混凝土的艺术  Intelligent Civil Engineering: Art of Bit and Concrete | 第6学期  Semester  6 | 计算机与人工智能学院  School of Computing and Artificial Intelligence |
| **劳动教育课程**  **Labor Education Courses** | 劳动教育课程  Labor Education Courses | 必修Compulsory | 2 |  | 2-8学期  Semester 2-8 | 全校  The whole school |  |  |
| **公共艺术课程**  **Public Art Courses** | 公共艺术课程  Public Art Courses | 必修Compulsory | 2 |  | 2-8学期  Semester 2-8 | 全校  The whole school |  |  |
| **学科与专业基础课程（含实验）** | | | | | | | | |
| **Discipline and Specialty foundational Courses** **(Including Experiments)** | | | | | | | | |
| 共58学分，其中必修56学分，限修2学分，选修0学分 | | | | | | | | |
| A total credits of 58，including 56 for compulsory courses，2 for distributional electives and 0 for free electives | | | | | | | | |
| **课程类型**  **Course Type** | **课程名称**  **Course Name** | **课程性质**  **Nature of Course** | **总学分**  **Credits** | **课内实践学分**  **In-class practice credits** | **开课学期**  **Semester** | **开课学院**  **School** | **支撑毕业要求指标点**  **Indicators which Support Graduation Requirements** | **备注**  **Notes** |
| **数学类**  **Mathematics Courses** | 高等数学I  Advanced Mathematics I | 必修Compulsory | 5 |  | 第1学期  Semester  1 | 数学学院  School of Mathematics | 1 |  |
| 线性代数B  Linear Algebra B | 必修Compulsory | 3 |  | 第1学期  Semester  1 | 数学学院  School of Mathematics | 1，2 |  |
| 高等数学II  Advanced Mathematics II | 必修Compulsory | 5 |  | 第2学期  Semester  2 | 数学学院  School of Mathematics | 1，2 |  |
| 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 | 1 |  |
| 概率论与数理统计  Probability and Mathematical Statistics | 必修Compulsory | 3 |  | 第3学期  Semester  3 | 数学学院  School of Mathematics | 1，2 |  |
| **物理类**  **Physics Courses** | 大学物理BI  College Physics BI | 必修Compulsory | 3 |  | 第2学期  Semester  2 | 物理科学与技术学院  School of Physical Science and Technology | 1 |  |
| 大学物理实验I  Experiments in College Physics I | 必修Compulsory | 1 | 1 | 第2学期  Semester  2 | 物理科学与技术学院  School of Physical Science and Technology | 4 |  |
| 大学物理BII  College Physics BII | 必修Compulsory | 3 |  | 第3学期  Semester  3 | 物理科学与技术学院  School of Physical Science and Technology | 1，2 |  |
| 大学物理实验II  Experiments in College Physics II | 必修Compulsory | 1 | 1 | 第3学期  Semester  3 | 物理科学与技术学院  School of Physical Science and Technology | 4 |  |
| **专业基础类**  **Specialized Basic Courses** | 计算机学科前沿导论  Introduction to the frontier of computer science | 限修Distributional Elective | 2 |  | 第1学期  Semester  1 | 计算机与人工智能学院  School of Computing and Artificial Intelligence | 8，9，10 | 二选一 |
| 软件学科前沿导论  Introduction to the frontier of software science |
| 高级语言程序设计  Advanced Programming Language | 必修Compulsory | 4 | 0.5 | 第1学期  Semester  1 | 计算机与人工智能学院  School of Computing and Artificial Intelligence | 1，2，3 |  |
| 面向对象程序设计  Object-oriented Programming | 必修Compulsory | 2 |  | 第2学期  Semester  2 | 计算机与人工智能学院  School of Computing and Artificial Intelligence | 1，3，5 |  |
| 电路与电子技术  Circuit and electronic technology | 必修Compulsory | 3 | 0.5 | 第3学期  Semester  3 | 计算机与人工智能学院  School of Computing and Artificial Intelligence | 3，4 |  |
| 数字电子技术B  Digital Electronic TechniqueB | 必修Compulsory | 3 | 0 | 第3学期  Semester  3 | 信息科学与技术学院School of Information Science and Technology | 1，2 |  |
| 数字电子技术实验  Experiments for Digital Electronic Technology | 必修Compulsory | 1 | 1 | 第3学期  Semester  3 | 信息科学与技术学院School of Information Science and Technology | 4，5 |  |
| 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 | 1，2，3，4 |  |
| 计算机组成原理(含实验)  Principles of Computer Composition(with Experiments) | 必修Compulsory | 4 | 1 | 第4学期  Semester  4 | 计算机与人工智能学院  School of Computing and Artificial Intelligence | 1，2，5 |  |
| 编译原理  Compilation Principle | 必修Compulsory | 3 | 0 | 第4学期  Semester  4 | 计算机与人工智能学院  School of Computing and Artificial Intelligence | 1，2 |  |
| 操作系统(含实验)  Operating System(with Experiments) | 必修Compulsory | 4 | 1 | 第4学期  Semester  4 | 计算机与人工智能学院  School of Computing and Artificial Intelligence | 1，2，4，5 |  |
| **专业课程（含实验）** | | | | | | | | |
| **Specialized Courses** **(Including Experiments)** | | | | | | | | |
| 共43学分，其中必修40学分，限修3学分，选修0学分 | | | | | | | | |
| A total credits of 43，including 40 for compulsory courses，3 for distributional electives and 0 for free electives | | | | | | | | |
| **课程类型**  **Course Type** | **课程名称**  **Course Name** | **课程性质**  **Nature of Course** | **总学分**  **Credits** | **课内实践学分**  **In-class practice credits** | **开课学期**  **Semester** | **开课学院**  **School** | **支撑毕业要求指标点**  **Indicators which Support Graduation Requirements** | **备注**  **Notes** |
| **专业核心课程**  **Specialized Core Courses**  **专业核心课程**  **Specialized Core Courses** | 数据库原理与设计(含实验)  Principle and design of database(with Experiments) | 必修Compulsory | 4 | 1 | 第4学期  Semester  4 | 计算机与人工智能学院  School of Computing and Artificial Intelligence | 1，2，3，5 |  |
| 算法分析与设计(含实验)  Analysis and design of algorithms(with Experiments) | 必修Compulsory | 3 | 1 | 第4学期  Semester  4 | 计算机与人工智能学院  School of Computing and Artificial Intelligence | 2，3，4 |  |
| 微机与接口技术(含实验)  Microcomputer and interface technology(with Experiments) | 必修Compulsory | 4 | 1 | 第5学期  Semester  5 | 计算机与人工智能学院  School of Computing and Artificial Intelligence | 1，2，3，5 |  |
| 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 | 1, 2 |  |
| 计算机网络工程实验  Computer Network Engineering Experiments | 必修Compulsory | 1 | 1 | 第5学期  Semester 5 | 计算机与人工智能学院  School of Computing and Artificial Intelligence | 2, 3,10 |  |
| 计算机图形学与人机交互  Computer graphics and Human Computer Interaction | 必修Compulsory | 3 | 1 | 第5学期  Semester  5 | 计算机与人工智能学院  School of Computing and Artificial Intelligence | 1，3，5. |  |
| 机器学习（含实验）  Machine Learning (with Experiments) | 必修Compulsory | 3 | 1 | 第5学期  Semester  5 | 计算机与人工智能学院  School of Computing and Artificial Intelligence | 2，4，7，12 |  |
| 人工智能  Artificial Intelligence | 必修Compulsory | 2 | 0 | 第5学期  Semester  5 | 计算机与人工智能学院  School of Computing and Artificial Intelligence | 4，5，12 |  |
| 智能嵌入式系统设计（含实验） Intelligent Embedded System Design (with Experiments) | 必修Compulsory | 3 | 1 | 第6学期  Semester  6 | 计算机与人工智能学院  School of Computing and Artificial Intelligence | 1，2，3，10 |  |
| 软件系统综合课程设计  Software System Comprehensive Course Design | 必修Compulsory | 4 | 2 | 第6学期  Semester  6 | 计算机与人工智能学院  School of Computing and Artificial Intelligence | 2，9，10，11 |  |
| 云计算技术  Cloud computing and parallel technologies | 必修Compulsory | 2 | 0 | 第6学期  Semester  6 | 计算机与人工智能学院  School of Computing and Artificial Intelligence | 3，7，11，12 |  |
| 网络空间安全技术  Cyberspace Security technology | 必修Compulsor | 3 | 1 | 第6学期  Semester  6 | 计算机与人工智能学院  School of Computing and Artificial Intelligence | 1，3，12 |  |
| 视觉计算  Visual Computing | 必修Compulsor | 2 | 0 | 第6学期  Semester  6 | 计算机与人工智能学院  School of Computing and Artificial Intelligence | 3，4，5，12 |  |
| 智能系统实践  Intelligent System Practice | 必修Compulsory | 3 | 3 | 第7学期  Semester  7 | 计算机与人工智能学院  School of Computing and Artificial Intelligence | 2，6，9，12 |  |
| **专业限修课程**  **Specialized Restricted Courses** | 互联网搜索引擎  Internet search engine | 限修Distributional Elective | 3 | 1 | 第7学期  Semester  7 | 计算机与人工智能学院  School of Computing and Artificial Intelligence | 3，7，11，12 | 限修3学分  Limited to 3 credits |
| 机器人技术(含实验) Robot technology(with Experiments) | 限修Distributional Elective | 3 | 1 | 第7学期  Semester  7 | 计算机与人工智能学院  School of Computing and Artificial Intelligence |
| **实践教学环节** | | | | | | | | |
| **Practice Courses** | | | | | | | | |
| 共16学分，其中必修16学分，限修0学分，选修0学分 | | | | | | | | |
| A total credits of 16，including 16 for compulsory courses，0 for distributional electives and 0 for free electives | | | | | | | | |
| **课程类型**  **Course Type** | **课程名称**  **Course Name** | **课程性质**  **Nature of Course** | **总学分**  **Credits** | **课内实践学分**  **In-class practice credits** | **开课学期**  **Semester** | **开课学院**  **School** | **支撑毕业要求指标点**  **Indicators which Support Graduation Requirements** | **备注**  **Notes** |
| **集中性实践教学环节：基本技能训练、工程实践、综合课程设计、社会与文化素质和实践、毕业实习与毕业设计**  **Centralized Practical Teaching Process：Basic Skills Training, Practical Training, Integrated Curriculum Design, Social and Cultural Quality Practice, Graduation Internship and Graduation Design** | 软件设计实习  Software design internship | 必修Compulsory | 2 | 2 | 短1学期  Short Semester 1 | 计算机与人工智能学院  School of Computing and Artificial Intelligence | 8，11 |  |
| 智能计算硬件平台构建综合实习  Comprehensive Internship of Intelligent Computing Hardware Platform Construction | 必修Compulsory | 2 | 2 | 短2学期  Short Semester 2 | 计算机与人工智能学院  School of Computing and Artificial Intelligence | 3，5，8，10 |  |
| 计算机科学与技术专业工程实习  Engineering Internship ofComputer Science and Technology Major | 必修Compulsory | 2 | 2 | 短3学期  Short Semester 3 | 计算机与人工智能学院  School of Computing and Artificial Intelligence | 3，7，9，11 |  |
| 毕业设计B  Diploma project B | 必修Compulsory | 8 | 8 | 第8学期  Semester  8 | 计算机与人工智能学院  School of Computing and Artificial Intelligence | 2，3，4，10，12 |  |
| **创新创业实践：创新创业训练计划项目、个性化实验、学科竞赛、创新讲座等**  **Innovation and Entrepreneurship Practice：Innovation and Entrepreneurship Training Program, Personalized Experiments, Subject Competition, Innovation Lectures, etc** | 创新创业实践  Innovation and Entrepreneurship Practice | 必修Compulsory | 2 | 2 | 3-7学期  Semester  3-7 | 计算机与人工智能学院  School of Computing and Artificial Intelligence |  |  |
| **必修环节** | | | | | | | | |
| **A compulsory part** | | | | | | | | |
| 共0学分，其中必修0学分，限修0学分，选修0学分 | | | | | | | | |
| A total credits of 0，including 0 for compulsory courses，0 for distributional electives and 0 for free electives | | | | | | | | |
| **课程类型**  **Course Type** | **课程名称**  **Course Name** | **课程性质**  **Nature of Course** | **总学分**  **Credits** | **课内实践学分**  **In-class practice credits** | **开课学期**  **Semester** | **开课学院**  **School** | **支撑毕业要求指标点**  **Indicators which Support Graduation Requirements** | **备注**  **Notes** |
| **“第二课堂” 项目：思想政治与道德素养类项目、学术科技与创新创业类项目、艺术体验与审美修养类项目、 文化沟通与交往能力类项目、心理素质与身体素质类项目、社会工作与领导能力类项目、社会实践与志愿服务类项目**  **"The Second Lesson" Project:**  **Ideological and Political Education and Moral Literacy Projects, Academic and Technological Innovation and Entrepreneurship Projects, Art Experience and Aesthetic Education Projects, Cultural Communication and Interpersonal Skills Projects, Psychological and Physical Health Projects, Social Work and Leadership Development Projects, Social Practice and Volunteering Projects** | “第二课堂” 项目  "The Second Lesson" Project | 必修Compulsory | 0 | 0 | 1-8学期  Semester 1-8 | 校团委  Communist Youth League Committee |  |  |
| **大学生综合素质提升、学生体质达标测评**  **Comprehensive Quality Improvement Courses for College Students, Assessment of Students' Physical Fitness** | 大学生综合素质提升  Comprehensive Quality Improvement Courses for College Students | 必修Compulsory | 0 | 0 | 1-8学期  Semester 1-8 | 校团委  Communist Youth League Committee |  |  |
| 学生体质达标测评  Assessment of Students' Physical Fitness | 必修Compulsory | 0 | 0 | 秋季学期  Fall Semester | 体育学院School of Physical Education |  |  |
| **学分总计**  **Total Credits** | | | **160** | | | | | |