电子信息大类专业本科人才培养方案

Undergraduate Program for the Discipline of Electronic Information

一、 大类专业简介（Brief Introduction to the Discipline）

电子信息大类涵盖电子信息工程（代码：080701）、通信工程（代码：080703）、光电信息科学与工程（代码：080705）、人工智能（代码：080717T）等 4 个专业，采用 “1+4” 培养模式。

电子信息大类坚持“学生为中心、成果产出为导向、持续改进”的工程教育理念，面向工业、面向未来、面向世界，落实立德树人的根本任务。以省级重点学科“信息与通信工程”、国防特色学科“通信与信息系统”和“检测技术与自动化装置”、控制科学与工程博士点“网络传输与组网控制方向”和“模式识别与智能系统方向”、四川省双一流“信息与控制学科群”建设为牵引，立足西部、面向全国、辐射“一带一路”， 充分发挥区域产学研联合办学优势和军民融合特色，培养品德优良，身心健康，基础理论扎实，工程实践能力突出，视野开阔，具有责任意识、科学精神和人文素养，能够适应“电子信息+”和泛信息化时代，德智体美劳全面发展的复合型人才。

电子信息工程专业开办于 1997 年，是学校最早的两个重点本科专业之一， 2001 年被评为四川省电子信息工程本科人才培养基地，是国防特色专业、省级特色专业，省级卓越工程师计划专业。

通信工程专业开办于 2001 年，在无线通信、网络通信、物联网系统及软件方面独具特色，所依托的通信与信息系统学科是国防特色学科，四川省重点学科。

光电信息科学与工程专业开办于 2001 年，经历了理科（2002-2012 年光信息科学与技术）到工科（2013 年光电信息科学与工程）两个阶段，已连续 14 届为国家和社会培养本科毕业生共 1023 人。该专业以激光技术及加工、照明与新型显示、光电传感与检测等国家和四川省战略性新兴产业应用为引导，有机整合光电、机械、计算机等完整的知识链条，突出以光子和电子为信息基本载体的信息特征，旨在培养具有国际视野的高级人才。

人工智能专业开办于 2020 年，是学校设立的特色新工科专业。本专业是智能科学、计算机科学、信息科学与特色行业（如：医疗、安全、环保等）相结合的复合型专业。培养能够进行人工智能算法分析与设计，人工智能核心技术研究、开发及应用，装备机器人化与系统智慧化等复杂工程问题分析与解决的高级专门人才。

The electronic and information discipline, including photoelectric information science and engineering, electronic information engineering, communication engineering and artificial intelligence majors, adopts “1+4” talent-training model.

The discipline of electronic information adheres to the concept of engineering education, which is student-centered, results-oriented and continuous improvement. It is oriented to industry, the future and the world, and carries out the fundamental task of cultivating people. Taking “information and communication engineering” of provincial key disciplines, “communication and information system” and “detection technology and automation device” of national defense discipline, “network transmission and networking control direction” and “pattern recognition and intelligent system direction” of the doctoral program of control science and engineering, “information and control discipline group” of Sichuan’s double first class as the traction, based on the western China, facing to the whole country, and implementing the Belt and Road Initiative, the

discipline of electronic information gives full play to the advantages of joint school of regional integration of enterprises, universities and research institutes, and the integrating features of the military and civilian. Compound talents with good moral character, good physical and mental health, solid theoretical foundation, outstanding engineering practice ability, broad vision, sense of responsibility, scientific spirit and humanistic quality, being able to adapt to the era of "electronic information +" and pan-informatization, who also have the all-round development in morality, intelligence, physical fitness, beauty and labor will be cultivated.

The specialty of electronic information engineering was founded in 1997. It is one of the two earliest key undergraduate majors in our school. In 2001, it was appraised as the undergraduate talent training base of Sichuan province's electronic information engineering. It is a specialty of national defense, provincial characteristics and provincial outstanding engineer program.

The specialty of communication engineering was founded in 2001. It has its own characteristics in wireless communication system, internet communication， internet of things system and software. It relies on the discipline of communication and information system, which is a special subject of national defense and a key subject of Sichuan province.

The photoelectric Information Science and engineering major in our university has 18 years of educational history, and has gone through two stages: science and engineering. It has trained 1023 graduates for the country and society in 14 consecutive sessions. Guided by the strategic emerging industries in Sichuan even whole China such as laser processing technology, lighting system,display technology, and photoelectric sensing and detection, this major integrates complete knowledge chains of photoelectric information, mechanical engineering and computer, highlights the information characteristics regarding photon and electronics as the underlying carriers of information, and aims to cultivate advanced talents with international vision.

The specialty of artificial intelligence was founded in 2020. It is a new engineering speciality of Southwest University of Science and Technology. It is a composite speciality by cooperating intelligent science, computer science, information science and characteristic industries (such as medical service, safety, and environmental protection). It cultivates senior professionals who can analyze and solve complex engineering problems such as analysis/design of artificial intelligence algorithms, research/development/application of artificial intelligence core technologies, equipment robotization, and system intelligence.

二、 大类培养阶段教学进程计划表（Courses Schedule of Educational Stages for the Discipline）

序号 No.	课程编号 Course Code	课程名称 Course Name	学分 Credits	学时 Hours			开课学期 Semester	学位课 Degree Course	辅修 Minor	双学位 Double Degree
				总学时 Credit	理论学时 Theory	实践学时 Experiment				
通识教育平台（必修） Basic Courses in General Education (Required)										
1	XG160010	入学教育 Entrance education	0.5	8	0	8	1			
2	FX160020	大学生心理健康教育 Mental health education of college students	1	16	8	8	1			
3	GF190010	军事理论 Military Theory	0.5	20	20	0	1			
4	BW190010	军事技能训练 Military Skill Training	0.5	112	0	14 天	1			
5	自选项目	体育俱乐部 Sports Club	2	60	0	60	1-7			
6	TY190010	运动基础	1	28	0	28	1			

序号 No.	课程编号 Course Code	课程名称 Course Name	学分 Credits	学时 Hours			开课学期 Semester	学位课 Degree Course	辅修 Minor	双学位 Double Degree
				总学时 Credit	理论学时 Theory	实践学时 Experiment				
		Sports Fundamental								
7	自选项目	限选2学分 体育选项 Sports Options	1	28	0	28	3/5/7			
8	TY190020	游泳 Swimming	1	28	0	28	3/5/7			
9	TY190030	团体操 Group Callisthenics	1	28	0	28	2/4/8			
10	MY160360	中国近现代史纲要 Conspectus of Chinese Modern History	2	32	32	0	1			
11	MY220010	思想道德与法治 Thought Morals and Legal System	3	48	48	0	2			
12	MY190011	形势与政策 1 Situation and Policy 1	0.25	8	8	0	1			
13	MY190012	形势与政策 2 Situation and Policy 2	0.25	8	8	0	2			
14	WY160371	综合英语 1 Comprehensive English 1	3	48	48	0	1	★		▲
15	WY160372	综合英语 2 Comprehensive English 2	3	48	48	0	2			
小计 Subtotal			19							
学科（大类）教育平台（必修） Basic Courses in Discipline (Majors) Education (Required)										
1	LX160071	高等数学 A1 Advanced Mathematics A1	6	96	96	0	1		◆	▲
2	LX160072	高等数学 A2 Advanced Mathematics A2	6	96	96	0	2	★	◆	▲
3	LX190971	大学物理 B1（电子信息类） University Physics B1	2	32	32	0	1			
4	LX190972	大学物理 B2（电子信息类） University Physics B2	4	64	64	0	2			
5	LX190010	线性代数 Linear Algebra	3	48	48	0	2			▲
6	GC160040	工程训练 D Engineering Training D	2	32	0	32	2			
7	XX190340	电子信息类新生研讨课 Freshman Seminar Courses of Electronic Information	1	16	16	0	1			
8	XX190350	电子信息类专业认识实习 Cognition Practice of Electronic Information	1	16	0	16	1			
9	JK160210	程序设计基础 B（C 语言） C Language Programming Foundation B	2	32	32	0	1			
10	JK160170	程序设计基础 B（C 语言）实验 Experiment of C Language Programming Foundation B	1	16	0	16	1			
11	XX160031	电路分析基础 A1 Circuit Analysis Fundamentals A1	2	32	32	0	2		◆	▲
12	XX160041	电路分析基础实验 A1 Experiments of Circuit Analysis Fundamentals A1	0.5	8	0	8	2			▲
小计 Subtotal			**30.5**							
个性化培养平台（选修课） Customized Education Course (Elective)										
1	XX190110	Python 程序设计 Python Programming	1.5	24	24	0	2			
2	XX190120	Python 程序设计实验 Experiments of Python Programming	1.5	24	0	24	2			
3	XX190180	单片机基础与实践 SCM Basis and Practice	1.5	24	24	0	2			
4	XX190190	单片机基础与实践课程实验 Experiments of SCM Basis and Practice	1	16	0	16	2			
小计 Subtotal			**5.5**	**88**	**48**	**40**				

注：标注★的为“学位课程”,标注◆的为“辅修课程”，标注▲的为“双学位课程”。

三、 专业培养阶段方案（分专业培养方案）

(Undergraduate Program for Majors under the Discipline)

3.4 人工智能专业培养方案

（Undergraduate Program for the Major of Artificial Intelligence）

专业负责人：刘知贵　　主管院长：姚远程　　院学术委员会主任：邹传云

Director of Major: Zhigui Liu　　Executive Dean: Yuancheng Yao　　Academic Committee Director: chuanyun Zou

3.4.1 培养目标（Educational Objectives）

人工智能重在研究、开发、模拟、延伸和扩展人的智能。西南科技大学人工智能专业面向国家及地方战略需求和各行各业转型升级的需要，围绕“智能”核心，以“信息利用与智能系统”为特色，侧重人工智能理论、方法、技术的学习及其应用实践，同时启发学生对人类智能本质的探索。

本专业旨在培养具有社会主义核心价值观，德、智、体、美、劳全面发展的社会主义建设者和接班人，掌握人工智能领域基础理论和方法，能够灵活运用人工智能的原理与方法设计有效的工程技术解决方案并能开发应用。毕业生将具备终身学习的能力和动力、跨行业交流能力、良好的团队合作能力以及组织领导能力，能够从事人工智能相关领域研究、生产、管理和技术服务等工作，成为人工智能相关领域的“应用创新型”复合人才。毕业五年后达到以下目标：

（1）职业素养：具有较高的思想政治素质、职业道德、社会责任感，能够在工程实践中遵守职业规范和伦理道德，履行责任；

（2）专业能力：能够综合运用自然科学、工程科学、人工智能领域的基本理论、专业知识及技能，分析和解决相关应用领域中的复杂问题，具有创新意识和较强的工程实践能力；

（3）协作能力：具有良好的团队协作能力和一定的领导能力，具有同理心，能有意识地去构建良好的人际关系并改进，开展有效的交流合作，具备一定的国际视野；

（4）学习能力：具有自主学习和终身学习的意识，能够准确跟踪人工智能领域的前沿技术，不断自我更新知识和提升技能，实现工作能力的自我提升。

Artificial intelligence focuses on researches, developments, simulations, extensions of human intelligence. The artificial intelligence speciality of Southwest University of Science and Technology: faces the needs to the national and local strategies and to the transformation and upgrading in all walks of life; revolves around the core of ‘intelligence’; has the characteristic of ‘information utilization and intelligent systems’; concentrates on the learning and application of artificial intelligence theories, methods, and technologies; also inspire students to explore the nature of human intelligence.

This speciality is aimed at cultivating socialist builders and successors with the core values of socialism, comprehensive development of morality, intelligence, physical fitness, beauty and labor, who master basic theories and methods in artificial intelligence and are able to flexibly use these principles and methods to design effective engineering and technical solutions and to develop applications. Graduates will have some abilities that include lifelong learning, cross-industry communication, good teamwork, and organizational leadership, be able to engage in research, production, management and technical services etc. in the field of artificial intelligence, become ‘application-innovative’ compound talents in the fields related to artificial intelligence. After 5 years of graduation, they should reach the following targets：

(1) Professionalism: possess high ideological and political qualities, professional ethics, and social responsibility, be able to abide by professional norms and ethics in engineering practice, and perform responsibilities;

(2) Professional skills: be able to comprehensively apply the basic theories, professional knowledge and skills in the fields of natural sciences, engineering sciences, and artificial

intelligence, to analyze and solve complex problems in the related applications, with innovative awareness and strong ability in engineering practice;

(3) Cooperation ability: have good teamwork ability and certain leadership, have empathy, be able to consciously build good interpersonal relationships and improve, carry out effective communication and cooperation, and have a certain international vision;

(4) Learning ability: possess the consciousnesses of self-learning and lifelong learning, be able to accurately track the advanced technology in the field of artificial intelligence, constantly self-update knowledge and skills to achieve self-improvement of workability.

3.4.2 毕业要求（Graduation Requirements）

毕业生应获得以下几方面的知识和能力：

毕业要求 1——**工程知识**：能够将数学、自然科学、工程学等领域的理论、方法等知识与人工智能领域的专业知识相结合，并将这些知识有效运用于机器人技术、计算机视觉、语音信号处理等复杂工程问题中。

毕业要求 2——**问题分析**：能够根据目标问题的属性，通过文献研究、数学建模、工程推理等手段，识别和表达人工智能领域复杂工程问题，并分析和判断问题中的难疑点，以获得正确的原理模型等有效结论。

毕业要求 3——**设计/开发解决方案**：针对人工智能领域中所出现的复杂工程问题，设计满足需求的系统方案、硬件电路、关键算法等，并能够在设计环节中融入创新点，同时全面考虑对社会、健康、安全、法律、文化以及环境等方面所可能产生的影响，从而优化系统或算法的整体性能。

毕业要求 4——**研究**：能够基于科学原理并采用科学方法对人工智能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。

毕业要求 5——**使用现代工具**：能够针对人工智能领域复杂工程问题，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，包括对人工智能领域复杂工程问题的预测与模拟，并能够理解其局限性。

毕业要求 6——**工程与社会**：能够基于工程相关背景知识进行合理分析，评价人工智能相关实践活动以及所设计的智能设备或软件系统等对人体健康、社会伦理、安全、法律以及区域文化可能产生的影响，并理解应承担的责任，配合相关部门制定权益规范。

毕业要求 7——**环境和可持续发展**：能够基于环境保护、人文社会等领域的相关背景知识，理解和评价在人工智能设备或软件系统等研发或应用过程中，专业实践活动对环境、社会可持续发展的影响。

毕业要求 8——**职业规范**：具有人文社会科学素养、社会责任感，能够在解决人工智能领域的复杂工程问题中理解并遵守工程职业道德和规范，履行法定或社会约定的责任。

毕业要求 9——**个人和团队**：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。

毕业要求 10——**沟通**：能够就人工智能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。

毕业要求 11——**项目管理**：理解并掌握工程管理原理与经济决策方法，并在人工智能相关项目的研发或应用过程中加以运用，具有良好的项目组织、协调和管理能力。

毕业要求 12——**终身学习**：具有自主学习的意识，能够利用互联网、图书馆等资源，

实践自主学习。同时，具备终身学习的意识，不断更新和学习与人工智能专业相关的知识，适应时代发展。

Graduates should acquire the following knowledge and abilities:

1．Graduation Requirement 1——**Engineering knowledge**：be able to combine the theory method and other knowledge in the fields of mathematics, natural sciences, engineering, etc. with professional knowledge in the field of artificial intelligence, and effectively apply them to solve complex engineering problems such as robot technology, computer vision, and speech signal processing.

2．Graduation Requirement 2——**Problem analysis**：be able to identify and express complex engineering problems in the field of artificial intelligence, by exploiting some approaches such as literature research, mathematical modeling, engineering reasoning and other means based on the attributes of the target problem, and obtain effective conclusions such as correct principle models by analyzing and judging the difficulties in the problem.

3．Graduation Requirement 3——**Design/development solution**：be able to design system solutions, hard circuits, key algorithms, etc. that meet the requirements for the complex engineering problems in the field of artificial intelligence, and incorporate innovations into the design process, while fully consider the resulting possible effects to social, health, safety, legal, cultural, environment, etc., thereby optimizing the overall performance of the system or algorithm.

4．Graduation Requirement 4——**Research**：be able to study complex engineering problems in the field of artificial intelligence based on scientific principles and scientific methods, including designing experiments, analyzing and interpreting data, and obtain reasonable and effective conclusions through information synthesis.

5．Graduation Requirement 5——**Usage of modern tools**：be able to develop, select and use appropriate technologies, resources, modern engineering tools and information technology tools for dealing with complex engineering problems in the field of artificial intelligence, which includes the prediction and simulation of complex engineering problems in the field of artificial intelligence, and understand their limitations.

6．Graduation Requirement 6——**Engineering and society**：based on engineering-related background knowledge, be able to analyze reasonably and evaluate artificial intelligence-related practical activities as well as the possible impacts of designed smart devices or software systems on human health, social ethics, safety, law and regional culture, understand the responsibilities, and constitute rights and interests norms by cooperating with relevant departments.

7．Graduation Requirement 7——**Environment and sustainable development**：be able to understand and evaluate the impacts of professional practice activities on the sustainable development of the environment and society in the development or application of artificial intelligence equipment or software systems, according to relevant background knowledge in the fields of environmental protection, humanities and society, etc.

8．Graduation Requirement 8——**Professional norms**: possess humanistic, social science literacy, and social responsibility, be able to understand and obey engineering professional ethics and norms in solving complex engineering problems in the field of artificial intelligence, and perform statutory or socially agreed responsibilities.

9．Graduation Requirement 9——**Individuals and teams**: be able to assume the roles of the individual, team member, and leader in a multi-disciplinary group.

10．Graduation Requirement 10——**Communication**: be able to effectively communicate

and exchange with peers and the public on complex engineering issues in the field of artificial intelligence, including writing reports and design drafts, making presentations, and clearly expressing or responding to instructions. Have a certain international perspective and be able to communicate and exchange in a cross-cultural context.

11．Graduation Requirement 11——**Project management**： after understanding and mastering the engineering management principles and economic decision-making methods, be able to apply them during the development or application of the project related to artificial intelligence, with good project organization, coordination and management capabilities.

12．Graduation Requirement 12——**Lifelong learning**: having self-learning awareness, be able to use resources such as the Internet and libraries to implement self-learning; meanwhile, having the consciousness of lifelong learning, be able to adapt to the development of the times by constantly updating and learning the knowledge related to artificial intelligence.

3.4.3 培养目标实现矩阵（Realization Matrix of Educational Objectives）

毕业要求与课程的对应矩阵表（Graduation Requirements by Courses）

毕业要求 **Graduation Requirements**	**指标点（知识与能力要求）** **Key Index (Knowledge and Capability Requirements)**	**支撑课程或培养环节** **Realization**
1.工程知识：能够将数学、自然科学、工程学等领域的理论、方法等知识与人工智能领域的专业知识相结合，并将这些知识有效运用于机器人技术、计算机视觉、语音信号处理等复杂工程问题中。 Engineering knowledge：be able to combine the theory method and other knowledge in the fields of mathematics, natural sciences, engineering, etc. with professional knowledge in the field of artificial intelligence, and effectively apply them to solve complex engineering problems such as robot technology, computer vision, and speech signal processing.	1.1 能够运用数学、自然科学和工程基础知识定量描述复杂的人工智能技术领域问题。 Be able to quantitatively describe complex problems in the field of artificial intelligence using mathematics, natural sciences and engineering fundamental knowledge	高等数学 A1 Advanced Mathematics A1
		高等数学 A2 Advanced Mathematics A2
		线性代数 Linear Algebra
		大学物理 B1 College Physics B1
		大学物理 B2 College Physics B2
		概率论与数理统计 Probability and Mathematical Statistics
		人工智能基础 Fundamentals of Artificial Intelligence
		模式识别导论 Introduction to Pattern Recognition
	1.2 能够运用人工智能的基础知识对复杂的人工智能应用问题进行准确建模，满足实际工程设计的需要。 Be able to apply the fundamental	程序设计基础 B（C 语言） C Language Programming Foundation B
		数据结构与算法 Data Structure and Algorithms

	knowledge of artificial intelligence to accurately describe complex application problems, to meet the needs of actual engineering design.	数据结构与算法实验 Experiments of Data Structure and Algorithms
		电路分析基础 A1 Circuit Analysis Fundamentals A1
		电路分析基础 A2 Circuit Analysis Fundamentals A2
		模拟电子技术 Analog Electronic Technology
		数字电子技术 Digital Electronic Technology
		计算机原理及应用 Computer Principles and Applications
		机器学习 Machine learning
		机器学习实验 Experiments of Machine learning
	1.3 能够把人工智能的专业知识用于解决人工智能应用系统设计、信号处理等与本专业相关的复杂工程问题。 Be able to use expertise in artificial intelligence to solve complex engineering problems related to the profession such as application system design and signal processing.	信号与系统分析 Signal and System Analysis
		自动控制理论 Automatic Control Theory
		计算机视觉 Computer Vision
		计算机视觉实验 Experiments of Computer Vision
		机器人技术 Robot Technology
		机器人技术实验 Experiments of Robot Technology
		工业互联网技术 Industrial Internet Technology
		工业互联网技术实验 Experiments of Industrial Internet Technology
2.问题分析：能够根据目标问题的属性，通过文献研究、数学建模、工程推理等手段，识别和表达人工智能领域复杂工程问题，并分析和判断问题中的难疑点，以获得正确的原理模型等有效结论。 Problem analysis： be able to identify and express complex	2.1 能够应用数学、自然科学的基本原理和工程科学基础知识对复杂的工程问题进行识别、表达和有效分解。 Be able to apply the principles of mathematics and natural sciences and fundamental knowledge of engineering sciences to identify, express and effectively decompose	复变函数与积分变换 Complex Variable Functions and Integral Transformation
		最优化方法 Optimization Method
		大学物理实验 A1 Experiments of College Physics A1
		大学物理实验 A2

engineering problems in the field of artificial intelligence, by exploiting some approaches such as literature research, mathematical modeling, engineering reasoning and other means based on the attributes of the target problem, and obtain effective conclusions such as correct principle models by analyzing and judging the difficulties in the problem.	complex engineering problems.	Experiments of College Physics A2
		电路分析基础 A1 Circuit Analysis Fundamentals A1
		电路分析基础 A2 Circuit Analysis Fundamentals A2
		数字电子技术实验 A Experiments of Digital Electronic Technology A
		信号与系统分析 Signal and System Analysis
		自动控制理论 Automatic Control Theory
	2.2 能够针对人工智能应用，识别和表达其复杂工程问题的关键环节和参数，并对有效分解后的问题进行分析。 Aiming at artificial intelligence applications, be able to identify and express the key points and parameters in complex engineering problems, and analyze the problems after effective decomposition.	模拟电子技术 Analog Electronic Technology
		数字电子技术 Digital Electronic Technology
		计算机视觉 Computer Vision
		计算机视觉实验 Experiments of Computer Vision
		机器人技术 Robot Technology
		机器人技术实验 Experiments of Robot Technology
		工业互联网技术 Industrial Internet Technology
		工业互联网技术实验 Experiments of Industrial Internet Technology
	2.3 通过图书馆资料现刊、数据库、网上检索等文献查阅方式开展研究，分析复杂人工智能应用工程问题，以获得有效结论。 Be able to carry out research through literature searching methods from the library, databases, and other internet resources, and analyze complex engineering applications of artificial intelligence, to obtain effective conclusions.	人工智能专业生产实习 Production Practice of Artificial Intelligence
		机器学习项目设计 Design of Machine Learning Project
		信号处理项目设计 Design of Signal Processing Project
		人工智能专业综合设计 Comprehensive Design of Artificial Intelligence
		人工智能专业毕业设计 Graduation Design of Artificial Intelligence

3.设计/开发解决方案：针对人工智能领域中所出现的复杂工程问题，设计满足需求的系统方案、硬件电路、关键算法等，并能够在设计环节中融入创新点，同时全面考虑对社会、健康、安全、法律、文化以及环境等方面所可能产生的影响，从而优化系统或算法的整体性能。 Design/development solution：be able to design system solutions, hard circuits, key algorithms, etc. that meet the requirements for the complex engineering problems in the field of artificial intelligence, and incorporate innovations into the design process, while fully consider the resulting possible effects to social, health, safety, legal, cultural, environment, etc., thereby optimizing the overall performance of the system or algorithm.	3.1 掌握设计/开发人工智能领域复杂工程问题解决方案所需要的设计概念、原理和方法。 Be able to master the design ideas, principles and methods required to design/develop schemes of solving complex engineering problems in the field of artificial intelligence.	人工智能基础 Fundamentals of Artificial Intelligence
		模式识别导论 Introduction to Pattern Recognition
		数字信号处理 Digital Signal Processing
		机器学习 Machine learning
		机器学习实验 Experiments on Machine learning
	3.2 综合利用人工智能领域的专业知识，针对特定需求完成信息系统或其功能模块的设计。 Aiming at specific requirements, be able to design information systems or its functional modules by comprehensively taking advantage of the knowledge in artificial intelligence.	模拟电子技术实验 Experiments of Analog Electronic Technology
		数字信号处理实验 Experiments of Digital Signal Processing
		计算机视觉 Computer Vision
		机器人技术 Robot Technology
		工业互联网技术 Industrial Internet Technology
	3.3 能够对系统设计方案的合理性进行论证，根据要求设计出满足性能指标的人工智能应用系统，并体现创新意识。 Be able to demonstrate the rationality of the system schemes, design an artificial intelligence application system that meets the required performance indexes, and reflect the innovation sense.	机器学习项目设计 Design of Machine Learning Project
		信号处理项目设计 Design of Signal Processing Project
		人工智能专业综合设计 Comprehensive Design of Artificial Intelligence
		人工智能专业毕业设计 Graduation Design of Artificial Intelligence
	3.4 能够在系统方案设计环节中考虑社会、健康、安全法律、文化以及环境等因素。 Be able to consider social, health, safety laws, culture, environment, etc. in designing system solutions.	思想道德与法制 Thought Morals and Legal System
		人工智能伦理 Artificial Intelligence Ethics
		形势与政策 1 Situation and Policy 1
		形势与政策 2 Situation and Policy 2
		形势与政策 3

		Situation and Policy 3
		形势与政策 4 Situation and Policy 4
		形势与政策 5 Situation and Policy 5
		形势与政策 6 Situation and Policy 6
		形势与政策 7 Situation and Policy 7
		形势与政策 8 Situation and Policy 8
4.研究：能够基于科学原理并采用科学方法对人工智能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。 Research ： be able to study complex engineering problems in the field of artificial intelligence based on scientific principles and scientific methods, including designing experiments, analyzing and interpreting data, and obtain reasonable and effective conclusions through information synthesis.	4.1 能够对人工智能领域的核心功能模块进行理论分析和仿真。 Be able to analyze theoretically and simulate the core modules in the field of artificial intelligence.	机器学习 Machine learning
		数字信号处理 Digital Signal Processing
	4.2 能够针对人工智能领域的复杂工程问题设计实验方案，基于已构建的实验平台获取实验数据，并能够对实验结果进行合理分析、解释。 Be able to design experimental schemes for complex engineering problems in artificial intelligence, obtain experimental data from the established experimental platforms, and reasonably analyze and interpret experimental results.	数字电子技术实验 A Experiments of Digital Electronic Technology A
		计算机原理及应用实验 Experiments of Computer Principles and Applications
		数字信号处理实验 Experiments of Digital Signal Processing
		机器学习实验 Experiments on Machine learning
		计算机视觉实验 Experiments of Computer Vision
		机器人技术实验 Experiments of Robot Technology
		工业互联网技术实验 Experiments of Industrial Internet Technology
	4.3 能够针对复杂问题的多个子问题进行关联分析，找出冲突点，进行平衡，通过实验数据分析、信息综合等手段得到合理有效的结论。 By analyzing the correlation among multiple sub-problems of complex problems, be able to find conflict points, balance them, and obtain reasonable and effective conclusions	电路分析基础实验 A1 Experiments of Circuit Analysis Fundamentals A1
		电路分析基础实验 A2 Experiments of Circuit Analysis Fundamentals A2
		信号处理项目设计 Design of Signal Processing Project
		机器学习项目设计 Design of Machine Learning

	through experimental data analysis and information synthesis.	Project
		人工智能专业综合设计 Comprehensive Design of Artificial Intelligence
		人工智能专业毕业设计 Graduation Design of Artificial Intelligence
5.使用现代工具：能够针对人工智能领域复杂工程问题，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，包括对人工智能领域复杂工程问题的预测与模拟，并能够理解其局限性。 Usage of modern tools：be able to develop, select and use appropriate technologies, resources, modern engineering tools and information technology tools for dealing with complex engineering problems in the field of artificial intelligence, which includes the prediction and simulation of complex engineering problems in the field of artificial intelligence, and understand their limitations.	5.1 掌握基本的计算机操作和应用（至少掌握一种软件开发语言），并能够进行较复杂的程序设计。 Master basic operations and applications on the computer, be able to master at least one software development language and design slight complex programs.	程序设计基础 B（C 语言） C Language Programming Foundation B
		程序设计基础 B（C 语言）实验 Experiment of C Language Programming Foundation B
		数据结构与算法 Data Structure and Algorithms
		数据结构与算法实验 Experiments of Data Structure and Algorithms
	5.2 通过掌握人工智能领域专业工具和仿真软件的基本原理与操作方法，并运用现代信息工具，能够针对复杂的综合型工程设计问题进行有效的预测与模拟，并据此理解所使用工具的使用要求和局限性。 By mastering the basic principles and operating methods of professional tools and simulation softwares in the field of artificial intelligence, and using modern information tools, be able to effectively predict and simulate complex comprehensive engineering design problems, thereby understanding the usages and limitations of the tools.	计算机原理及应用 Computer Principles and Applications
		机器学习项目设计 Design of Machine Learning Project
		信号处理项目设计 Design of Signal Processing Project
6.工程与社会：能够基于工程相关背景知识进行合理分析，评价人工智能相关实践活动以及所设计的智能设备或软件系统等对人体健康、社会伦理、安全、法律以及区域文化可能产生的影响，并理解应承担的责任，配合相关部门制定权益规范。	6.1 通过经历工程实践和多种实习过程，了解复杂工程问题的解决方案对社会、健康、安全、法律以及文化的影响。 Understand the effects of solutions to complex engineering problems on society, health, safety, laws, and culture, through experiencing	习近平新时代中国特色社会主义思想概论 An Introduction to Xi Jinping New Times Theoretical System of Socialism with Chinese Characteristics
		毛泽东思想和中国特色社会主义理论体系概论

Engineering and society： based on engineering-related background knowledge, be able to analyze reasonably and evaluate artificial intelligence-related practical activities as well as the possible impacts of designed smart devices or software systems on human health, social ethics, safety, law and regional culture, understand the responsibilities, and constitute rights and interests norms by cooperating with relevant departments.	engineering practice and various internships.	An Introduction to Mao Zedong Thought and the Theoretical System of Socialism with Chinese Characteristics
		电子信息类新生研讨课 Freshman Seminar Courses of Electronic Information
		电子信息类专业认识实习 Cognition Practice of Electronic Information
		人工智能专业生产实习 Production Practice of Artificial Intelligence
		人工智能专业毕业实习 Graduation Practice of Artificial Intelligence
	6.2 能够结合相关的工程知识，通过思政、人文、社科类课程学习的知识，综合分析和评价专业工程实践和复杂工程问题的解决方案对社会、健康、安全、法律以及文化的影响，并理解应承担的责任。 By taking advantage of the relevant engineering knowledge and using the learned knowledge from ideological and political, humanistic, and social science courses, be able to comprehensively analyze and evaluate the effects of engineering practices to the speciality and solutions to complex engineering problem on society, health, safety, laws, and culture, and understand the responsibility that should be assumed.	思想道德与法制 Thought Morals and Legal System
		人工智能伦理 Artificial Intelligence Ethics
		形势与政策 1 Situation and Policy 1
		形势与政策 2 Situation and Policy 2
		形势与政策 3 Situation and Policy 3
		形势与政策 4 Situation and Policy 4
		形势与政策 5 Situation and Policy 5
		形势与政策 6 Situation and Policy 6
		形势与政策 7 Situation and Policy 7
		形势与政策 8 Situation and Policy 8
7.环境和可持续发展：能够基于环境保护、人文社会等领域的相关背景知识，理解和评价在人工智能设备或软件系统等研发或应用过程中，专业实践活动对环境、社会可持续发展的影响。 Environment and sustainable	7.1 了解环境保护和社会可持续发展的基本方针、政策及法律法规，能够正确认识针对人工智能领域复杂工程问题的专业工程实践对环境和社会的影响。 Understand the basic policies, laws, and regulations of environmental	形势与政策 1 Situation and Policy 1
		形势与政策 2 Situation and Policy 2
		形势与政策 3 Situation and Policy 3
		形势与政策 4

development： be able to understand and evaluate the impacts of professional practice activities on the sustainable development of the environment and society in the development or application of artificial intelligence equipment or software systems, according to relevant background knowledge in the fields of environmental protection, humanities and society, etc.	protection and sustainable social development, and be able to correctly understand the effects of engineering practices for complex engineering issues in artificial intelligence on the environment and society.	Situation and Policy 4
		形势与政策 5 Situation and Policy 5
		形势与政策 6 Situation and Policy 6
		形势与政策 7 Situation and Policy 7
		形势与政策 8 Situation and Policy 8
		电子信息类专业认识实习 Cognition Practice of Electronic Information
		人工智能专业毕业实习 Graduation Practice of Artificial Intelligence
	7.2 能够评价人工智能领域产品的开发和应用对环境及社会可持续发展的影响。 Be able to evaluate the effects of the development and application of artificial intelligence products on social and environmental sustainability.	人工智能伦理 Artificial Intelligence Ethics
		创新创业基础 Fundamentals of Innovation and Entrepreneurship
		人工智能专业生产实习 Production Practice of Artificial Intelligence
8.职业规范：具有人文社会科学素养、社会责任感，能够在解决人工智能领域的复杂工程问题中理解并遵守工程职业道德和规范，履行法定或社会约定的责任。 Professional norms: possessing humanistic, social science literacy, and social responsibility, be able to understand and obey engineering professional ethics and norms in solving complex engineering problems in the field of artificial intelligence, and perform statutory or socially agreed responsibilities.	8.1 具有人文社会科学素养，了解国情，理解社会主义核心价值观，树立正确的世界观、人生观和价值观。 Have humanistic, social science literacy, understand national circumstances and the core values of socialism, and establish correct outlooks on world, life and value.	中国近现代史纲要 Conspectus of Chinese Modern History
		马克思主义基本原理 The basic principles of Marxism
		习近平新时代中国特色社会主义思想概论 An Introduction to Xi Jinping New Times Theoretical System of Socialism with Chinese Characteristics
		毛泽东思想和中国特色社会主义理论体系概论 An Introduction to Mao Zedong Thought and the Theoretical System of Socialism with Chinese Characteristics
	8.2 具有健康的身体和心理，具备履行社会责任的基础。 Have a healthy body and mind,	入学教育 Entrance education
		大学生心理健康教育

	possess the foundation to fulfil the social responsibilities.	Psychological health education of college students
		军事技能训练 Military Skill Training
		体育俱乐部 Sports Club
		运动基础 Sports Fundamental
		体育选项 Sports Options
		游泳 Swimming
		团体操 Group Callisthenics
	8.3 能够在人工智能领域所涉及的实践中理解并遵守工程职业道德和规范，履行责任。 Be able to understand and follow engineering ethics and norms as well as to fulfil responsibilities in the field of artificial intelligence.	思想道德与法制 Thought Morals and Legal System
		电子信息类专业认识实习 Cognition Practice of Electronic Information
		人工智能专业生产实习 Production Practice of Artificial Intelligence
		人工智能专业毕业实习 Graduation Practice of Artificial Intelligence
9.个人和团队：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。 Individuals and teams: be able to assume the roles of the individual, team member, and leader in a multi-disciplinary group.	9.1 具备良好的团队协作意识，能主动与其他学科的成员共享信息，合作共事，独立完成团队分配的工作。 Have a good consciousness of teamwork, be able to actively share information with members in other disciplines, cooperatively work, and independently complete the assigned work in the team.	入学教育 Entrance education
		军事理论 Military Theory
		军事技能训练 Military Skill Training
		思想政治理论课实践教学 The Practical Teaching of Ideological and Political Theory
		创新创业基础 Fundamentals of Innovation and Entrepreneurship
		工程训练 D Engineering Training D
	9.2 能够胜任团队成员或负责人的角色，能在团队协作中听取其他团队成员的意见和建议，充分发挥团队协作的优势。 Be able to take the role of members or leader in a team, listen to the opinions and suggestions of other	工程训练 D Engineering Training D
		人工智能专业综合设计 Comprehensive Design of Artificial Intelligence

	members in teamwork, and give full play to the advantages of teamwork.	
10.沟通：能够就人工智能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。 Communication: be able to effectively communicate and exchange with peers and the public on complex engineering issues in the field of artificial intelligence, including writing reports and design drafts, making presentations, and clearly expressing or responding to instructions. Have a certain international perspective and be able to communicate and exchange in a cross-cultural context.	10.1 具有良好的口头表达能力，能够清晰、有条理地表达自己的观点，掌握基本的报告、设计文稿的撰写技能。 Have good oral presentation skills, be able to express own viewpoints in a clear and orderly way, and master the basic writing skills of reports and manuscripts.	电子信息类新生研讨课 Freshman Seminar Courses of Electronic Information
		信号处理项目设计 Design of Signal Processing Project
		机器学习项目设计 Design of Machine Learning Project
		人工智能专业毕业实习 Graduation Practice of Artificial Intelligence
	10.2 至少掌握一门外语，具备一定的国际视野，并了解基本的国际文化礼仪。 Master at least one foreign language, with a certain international perspective, and understand basic international cultural etiquette.	综合英语 1 Comprehensive English 1
		综合英语 2 Comprehensive English 2
		综合英语 3 Comprehensive English 3
		综合英语 4 Comprehensive English 4
	10.3 能够就复杂工程问题，综合运用口头、书面、报告、图表等多种形式与国内外业界同行及社会公众进行有效沟通和交流。 Be able to effectively communicate and exchange with peers and the public on complex engineering issues by using comprehensively oral presentation, in writing, reports, charts and other forms.	人工智能专业综合设计 Comprehensive Design of Artificial Intelligence
		人工智能专业毕业设计 Graduation Design of Artificial Intelligence
11.项目管理：理解并掌握工程管理原理与经济决策方法，并在人工智能相关项目的研发或应用过程中加以运用，具有良好的项目组织、协调和管理能力。 Project management: understanding and mastering the engineering management principles and economic decision-making methods, be able	11.1 理解工程管理与经济决策的重要性，掌握工程管理的基本原理和常用的经济决策方法。 Understand the importance of engineering management and economic decision-making, and master the basic principle of engineering management and the widely used economic decision-making methods.	马克思主义基本原理 The basic principles of Marxism
		工程管理与经济决策 Engineering Management and Economic Decision

to apply them during the development or application of the project related to artificial intelligence, with good project organization, coordination and management capabilities.	11.2 能够在多学科、跨职能环境中合理运用工程管理原理与经济决策方法。 Be able to reasonably apply the engineering management principles and economic decision-making methods in a multi-disciplinary, cross-functional environment.	人工智能专业综合设计 Comprehensive Design of Artificial Intelligence
		人工智能专业毕业设计 Graduation Design of Artificial Intelligence
12.终身学习：具有自主学习的意识，能够利用互联网、图书馆等资源，实践自主学习。同时，具备终身学习的意识，不断更新和学习与人工智能专业相关的知识，适应时代发展。 Lifelong learning: having self-learning awareness, be able to use resources such as the Internet and libraries to implement self-learning; meanwhile, having the consciousness of lifelong learning, be able to adapt to the development of the times by constantly updating and learning the knowledge related to artificial intelligence.	12.1 理解自主学习的必要性，具有自主学习和终身学习的意识。 Understand the necessity of autonomous learning, and have the consciousness of autonomous learning and lifelong learning.	马克思主义基本原理 The basic principles of Marxism
		创新创业基础 Fundamentals of Innovation and Entrepreneurship
		电子信息类新生研讨课 Freshman Seminar Courses of Electronic Information
	12.2 掌握跟踪本专业学科前沿、发展趋势的基本方法和途径，能够通过文献查询、网络培训等多种渠道进行终身学习，以适应职业发展的需求。 Master the basic approaches to track the frontiers and development trends of artificial intelligence, be able to and be able to carry out lifelong learning through various methods such as searching the literature and online training, to adapt the needs of career development.	人工智能基础 Fundamentals of Artificial Intelligence
		模式识别导论 Introduction to Pattern Recognition
		人工智能专业生产实习 Production Practice of Artificial Intelligence
		人工智能专业毕业实习 Graduation Practice of Artificial Intelligence
		人工智能专业毕业设计 Graduation Design of Artificial Intelligence

毕业要求对培养目标的支撑关系

The Support Relation between Graduation Requirements and Educational Objectives

培养目标 / 毕业要求	**培养目标 1** Educational Objectives1	**培养目标 2** Educational Objectives2	**培养目标 3** Educational Objectives3	**培养目标 4** Educational Objectives4
毕业要求 1 Graduation Requirements1		√		√
毕业要求 2 Graduation Requirements2		√		√
毕业要求 3 Graduation Requirements3		√		

毕业要求 4 Graduation Requirements4		√		
毕业要求 5 Graduation Requirements5		√		√
毕业要求 6 Graduation Requirements6	√			
毕业要求 7 Graduation Requirements7	√			
毕业要求 8 Graduation Requirements8	√			
毕业要求 9 Graduation Requirements9			√	
毕业要求 10 Graduation Requirements10			√	
毕业要求 11 Graduation Requirements11			√	
毕业要求 12 Graduation Requirements12				√

3.4.4 专业培养阶段教学进程计划表（Courses Schedule for the Major）

序号 No.	课程编号 Course Code	课程名称 Course Name	学分 Credits	学时 Hours			开课学期 Semester	学位课 Degree Course	辅修 Minor	双学位 Double Degree
				总学时 Total	理论学时 Theory	实践学时 Experiment				
通识教育平台（必修） Basic Courses in General Education (Required)										
1	MY220020	马克思主义基本原理 The basic principles of Marxism	3	48	48	0	3			
2	MY160280	思想政治理论课实践教学 The Practical Teaching of Ideological and Political Theory	2	32	0	32	3			
3	MY220030	习近平新时代中国特色社会主义思想概论 An Introduction to Xi Jinping New Times Theoretical System of Socialism with Chinese Characteristics	3	48	48	0	6			
4	MY220040	毛泽东思想和中国特	2	32	32	0	4			

		色社会主义理论体系概论 An Introduction to Mao Zedong Thought and the Theoretical System of Socialism with Chinese Characteristics								
5	MY190013	形势与政策 3 Situation and Policy 3	0.25	8	8	0	3			
6	MY190014	形势与政策 4 Situation and Policy 4	0.25	8	8	0	4			
7	MY190015	形势与政策 5 Situation and Policy 5	0.25	8	8	0	5			
8	MY190016	形势与政策 6 Situation and Policy 6	0.25	8	8	0	6			
9	MY190017	形势与政策 7 Situation and Policy 7	0.25	8	8	0	7			
10	MY190018	形势与政策 8 Situation and Policy 8	0.25	8	8	0	8			
11	WY160203	综合英语 3 Comprehensive English 3	2	32	32	0	3			
12	WY160104	综合英语 4 Comprehensive English 4	2	32	32	0	4			
13	JG192130	工程管理与经济决策 Engineering Management and Economic Decision	1	16	16	0	3			
14	JW190010	创新创业基础 Fundamentals of Innovation and Entrepreneurship	2	32	32	0	4			
15	XX200010	人工智能伦理 Artificial Intelligence Ethics	1	16	16	0	5			
小计 Subtotal			19.5	296	264	32				
学科（大类）教育平台（必修） Basic Courses in Discipline (Majors) Education (Required)										
1	LX190091	大学物理实验 A1 Experiments of College Physics A1	1.5	24	0	24	3			
2	LX190092	大学物理实验 A2	1.5	24	0	24	4			

		Experiments of College Physics A2								
3	LX190020	概率论与数理统计 Probability and Mathematical Statistics	3	48	48	0	3			
4	LX190030	复变函数与积分变换 Complex Variable Functions and Integral Transformation	3	48	48	0	3			
5	XX200020	最优化方法 Optimization Method	3	48	48	0	4		◆	▲
6	XX160032	电路分析基础 A2 Circuit Analysis Fundamentals A2	2	32	32	0	3		◆	▲
7	XX160042	电路分析基础实验 A2 Experiment of Circuit Analysis Fundamentals A2	0.5	8	0	8	3			▲
8	XX160700	模拟电子技术 Analog Electronic Technology	3.5	56	56	0	3			
9	XX160710	模拟电子技术实验 Experiments of Analog Electronic Technology	1	16	0	16	3			
10	XX160880	数字电子技术 Analog Electronic Technology	3.5	56	56	0	4	★	◆	▲
11	XX161740	数字电子技术实验 A Experiments of Digital Electronic Technology A	1	16	0	16	4			▲
12	XX200050	信号与系统分析 Signal and System Analysis	3	48	48	0	4		◆	
13	XX160610	计算机原理及应用 Computer Principles and Applications	3	48	48	0	5	★	◆	▲
14	XX160620	计算机原理及应用实验 Experiments of Computer Principles and Applications	0.5	8	0	8	5			▲
小计 Subtotal			30	480	384	96				

专业教育平台（必修） Professional Education Courses (Required)										
1	XX200060	人工智能基础 Fundamentals of Artificial Intelligence	2	32	32	0	3		◆	▲
2	XX160720	模式识别导论 Introduction to Pattern Recognition	2	32	32	0	5			
3	XX200030	数据结构与算法 Data Structure and Algorithms	3	48	48	0	4	★	◆	▲
4	XX200040	数据结构与算法实验 Experiments of Data Structure and Algorithms	1	16	0	16	4			▲
5	XX191100	自动控制理论 Automatic Control Theory	3	48	40	8	5			
6	XX200070	机器学习 Machine Learning	2.5	40	40	0	5	★		▲
7	XX200080	机器学习实验 Experiments on Machine learning	0.5	8	0	8	5			▲
8	XX160910	数字信号处理 Digital Signal Processing	2.5	40	40	0	5		◆	
9	XX190630	数字信号处理实验 Experiments of Digital Signal Processing	0.5	8	0	8	5			
10	XX200090	计算机视觉 Computer Vision	2.5	40	40	0	6	★	◆	▲
11	XX200100	计算机视觉实验 Experiments of Computer Vision	1	16	0	16	6			▲
12	XX200110	机器人技术 Robot Technology	2.5	40	40	0	6	★	◆	▲
13	XX200120	机器人技术实验 Experiments of Robot Technology	1	16	0	16	6			▲
14	XX200130	工业互联网技术 Industrial Internet Technology	2	32	32	0	6		◆	
15	XX200140	工业互联网技术实验	1	16	0	16	6			

		Experiments of Industrial Internet Technology								
16	XX200150	人工智能专业生产实习 Production Practice of Artificial Intelligence	2	32	0	0	4			
17	XX200160	信号处理项目设计 Design of Signal Processing Project	2	32	0	0	5	★		
18	XX200170	机器学习项目设计 Design of Machine Learning Project	2	32	0	0	6			
19	XX200180	人工智能专业综合设计 Comprehensive Design of Artificial Intelligence	3	48	0	0	7	★	◆	▲
20	XX200190	人工智能专业毕业实习 Graduation Practice of Artificial Intelligence	3	48	0	0	8			
21	XX200200	人工智能专业毕业设计 Graduation Design of Artificial Intelligence	12	192	0	0	8			▲
小计 Subtotal			51	816	344	88				
个性化培养平台（选修课） Customized Education Course (Elective)										
通识选修课 General Elective Course										
1	自选项目 Optional module	素质选修课 Quality Elective Course	3	48	学生需**至少选择 3 学分**		1-8			
2	自选项目 Optional module	创新创业微学分选修课 Innovation and Entrepreneurship	3	32	学术报告/科研项目/创新创业项目/科技竞赛等		1-8			
小计 Subtotal			6	80						
专业选修课 Professional Elective Course										
1	XX200210	数据工程 Data Engineering	3	48	40	8	5			
2	XX190160	传感器原理与应用	2.5	40	40	0	5			

		Sensor Principle and Application								
3	XX190170	传感器原理及应用实验 Experiments of Sensor Principle and Application	0.5	8	0	8	5			
4	XX190590	数据库技术 Database Technology	1	16	16	0	5			
5	XX190600	数据库技术实践 Database Technology Practice	1	16	0	16	5			
6	XX200220	数字图像处理与应用 Digital Image Processing and Application	3	48	40	8	5			
7	XX200230	脑科学导论 Introduction to Brain Science	2	32	32	0	6			
8	XX190380	计算机操作系统 Computer Operation System	2	32	32	0	6			
9	XX190030	DSP 技术 DSP Technology	2 选 1 Choosing any one	2.5	40	24	16	6			
10	XX190490	嵌入式系统设计 B Embedded System Design B		1.5	24	24	0	6		
11	XX190500	嵌入式系统设计 B 实验 Experiments of Embedded System Design B		1.5	24	0	24	6		
12	XX200240	神经网络与深度学习 Neural Network and Deep Learning		3	48	24	24	6		
13	XX160540	智能控制 Intelligent control		2	32	32	0	6		
14	XX200250	语音信号处理 Speech Signal		3	48	32	16	7		

		Processing								
15	XX200260	自然语言处理 Natural language Processing	2.5	40	32	8	7			
16	XX200270	虚拟现实技术 Virtual Reality Technology	2.5	40	32	8	7			
17	XX200280	高性能计算 High Performance Computing	2.5	40	24	16	7			
小计 Subtotal			36	576	424	152				

注：标注★的为“学位课程”,标注◆的为“辅修课程”，标注▲的为“双学位课程”。
Note：★ denotes the degree courses, ◆ denotes the minor courses, and ▲ denotes the double degree courses

3.4.5 集中实践环节（Intensive Practical Training Courses）

序号 No.	课程编号 Course Code	课程名称 Course Name	学分 Credits	实践学时 Practice Hours	开课学期 Semester	学位课 Degree Course	辅修 Minor	双学位 Double Degree
1	BW190010	军事技能训练 Military Skill Training	0.5	112	1			
2	TY190010	运动基础 Sports Fundamental	1	28	1			
3	JK160170	程序设计基础 B（C 语言）实验 C Language Programming Foundation B	1	16	1			
4	LX160011	大学物理实验 A1 Experiments of University Physics A1	1.5	24	1			
5	XX190350	电子信息类专业认识实习 Cognition Practice of Electronic Information	1	16	1			
6	自选项目	体育俱乐部 Sports Club	2	64	1-7			
7	GC160040	工程训练 D Engineering Training D	2	32	2			
8	XX160041	电路分析基础实验 A1 Experiment of Circuit Analysis Fundamentals A1	0.5	8	2			
9	LX160012	大学物理实验 A2 Experiments of University Physics A2	1.5	24	2			
10		体育选修 Sports Elective	2	64	2-7			
11	MY160280	思想政治理论课实践教学 The Practice Teaching of Ideological and Political Theory	2	32	1-8			
12	XX160042	电路分析基础实验 A2 Experiment of Circuit Analysis Fundamentals A2	0.5	8	3			
13	XX160710	模拟电子技术实验 Experiment of Analog Electronic Technology	1	16	3			

序号 No.	课程编号 Course Code	课程名称 Course Name	学分 Credits	实践学时 Practice Hours	开课学期 Semester	学位课 Degree Course	辅修 Minor	双学位 Double Degree
14	XX161740	数字电子技术实验 A Experiment of Digital Electronic Technology A	1	16	4			
15	XX160620	计算机原理及应用实验 Experiment of Computer Principles and Applications	0.5	8	5			
16	XX200040	数据结构与算法实验 Experiments of Data Structure and Algorithms	1	16	0			
17	XX190630	数字信号处理实验 Experiment of Digital Signal Processing	0.5	8	5			
18	XX200080	机器学习实验 Experiments on Machine learning	0.5	8	5			
19	XX200100	计算机视觉实验 Experiments of Computer Vision	1	16	6			
20	XX200120	机器人技术实验 Experiments of Robot Technology	1	16	6			
21	XX200140	工业互联网技术实验 Experiments of Industrial Internet Technology	1	16	6			
22	XX200150	人工智能专业生产实习 Production Practice of Artificial Intelligence	2	32	4			
23	XX200160	信号处理项目设计 Design of Signal Processing Project	2	32	5			
24	XX200170	机器学习项目设计 Design of Machine Learning Project	2	32	6			
25	XX200180	人工智能专业综合设计 Comprehensive Design of Artificial Intelligence	3	48	7			
26	XX200190	人工智能专业毕业实习 Graduation Practice of Artificial Intelligence	3	48	8			
27	XX200200	人工智能专业毕业设计 Graduation Design of Artificial Intelligence	12	192	8			
小计 Subtotal			47	932				

注：标注★的为“学位课程”,标注◆的为“辅修课程”，标注▲的为“双学位课程”。
Note：★ denotes the degree courses, ◆ denotes the minor courses, and ▲ denotes the double degree courses

3.4.6 核心课程和学位课程（Core Courses and Diploma Courses）

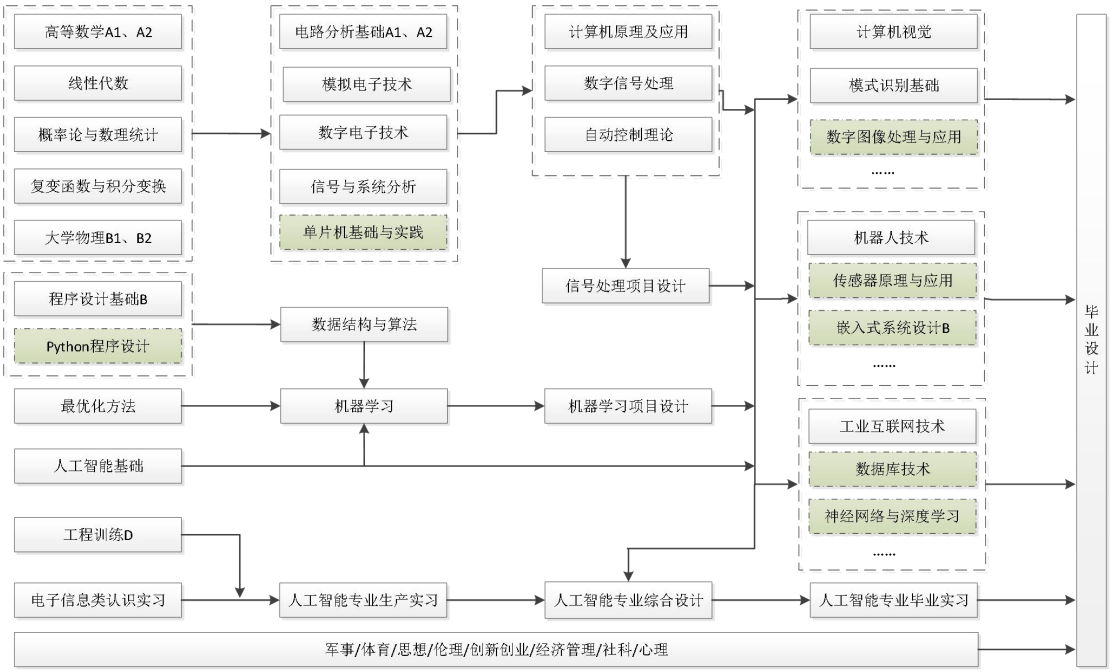
核心课程：程序设计基础 B（C 语言），人工智能基础，数据结构与算法，电路分析基础 A1，数字电子技术，自动控制理论，数字信号处理，计算机原理及应用，机器学习，计算机视觉，机器人技术。

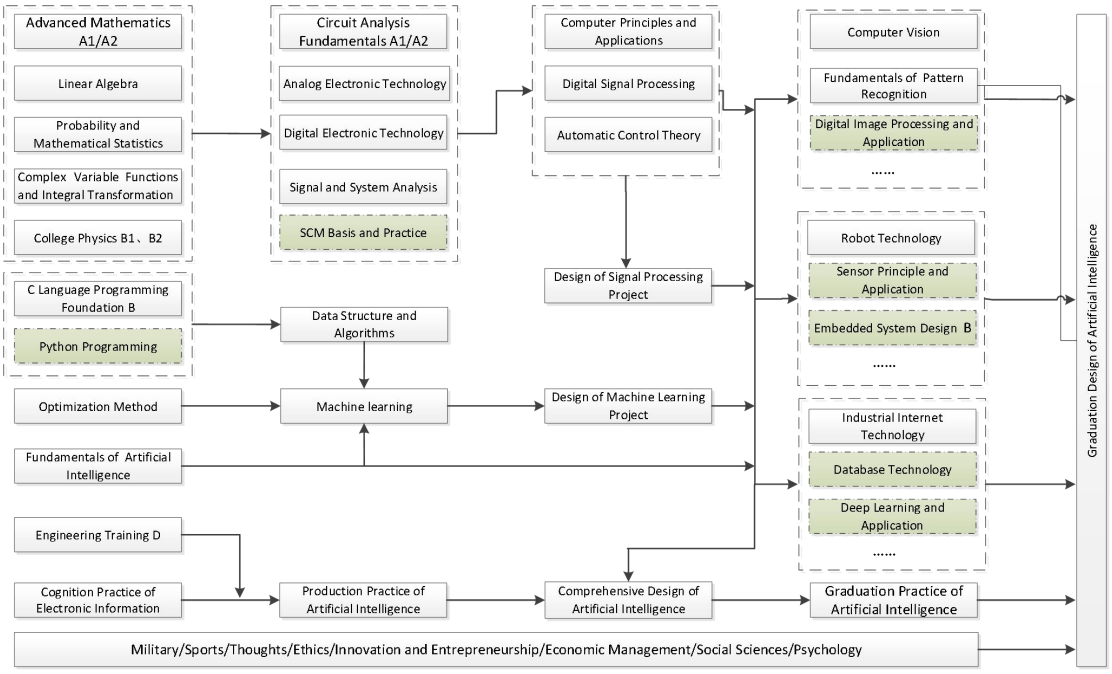
学位课程：综合英语 1，高等数学 A2，数据结构与算法，数字电子技术，计算机原理及应用，机器学习，计算机视觉，机器人技术，信号处理项目设计，人工智能专业综合设计。

Core Courses: C Language Programming Foundation B, Introduction to Artificial Intelligence, Data Structure and Algorithms, Circuit Analysis Fundamentals A1, Digital Electronic Technology, Automatic Control Theory, Digital Signal Processing, Computer Principles and Applications, Machine Learning, Computer Vision, Robot Technology.

Diploma Courses: Comprehensive English 1, Advanced Mathematics A2, Data Structure and Algorithms, Digital Electronic Technology, Computer Principles and Applications, Machine Learning, Computer Vision, Robot Technology, Design of Signal Processing Project, Comprehensive Design of Artificial Intelligence.

3.4.7 课程体系结构图（The Curriculum Chart）





3.4.8 学制及学分要求（Duration of Schooling and Credit Requirements）

1. **学制（Length of Schooling）：**4 年（Four years）

2. **学分要求（Required credits）：**学生在校期间必须修满本方案规定的 170 学分方能毕业，其中，各环节的具体学分要求如下表。The students must complete 170 credits stipulated in this program before they can graduate from this major. Among them, the specific credit requirements for each link are as follows.

	通识教育平台 General Education Courses	学科（大类）教育平台 Discipline Courses	专业教育平台 Major Courses	个性化培养平台 Customized Education Courses	总学分 Total Credits
必修课 Required Courses	38.5	60.5	51	/	170
选修课 Selective Courses	/	/	/	20/48	

3.4.9 授予学位（Degree Conferred）

毕业时符合学位授予条件的学生，授予工学学士学位。A bachelor's degree in engineering shall be awarded to those students who meet the conditions for conferring degrees upon graduation.

3.4.10 说明（Notes）

1.各学期应修学分建议(Credit Allotment for Each Semester)

学期 Semester	一 1st	二 2nd	三 3rd	四 4th	五 5th	六 6th	七 7th	八 8th	学分合计 Total
建议应修学分 Credits	21.75	26.75	25.75	26.25	24.25	18.75	11.25	15.25	170

2.实验不能脱离理论单独选，项目训练必须在课程和实验的基础上选择(Experimental courses cannot be selected independent on theoretical courses, and project training must be selected on the basis of courses and experiments)。