沈阳化工大学本科培养方案

信息工程学院

专业名称：人工智能

专业代码：080717T

制　　定：李　凌

审　　核：孔晓光

审　　定：于三三

批　　准：金志浩

2021 年 8 月

人工智能专业培养方案

一、培养目标

本专业面向智能制造、低碳经济与绿色发展服务等新兴行业、对人工智能技术人才的日益增长需求，培养德智体美劳全面发展的社会主义事业的建设者和接班人。在德育方面，培养学生具有坚定的理想信念、健壮的人格品行、良好的人文素养、严谨的伦理规范和强烈的担当包容。在智育方面，培养学生理解相关的人工智能背景；夯实人工智能理论、方法与技术；建立试验设计、探索发现、分析综合、创新创业、协作沟通、学习适应、工程管理等系统思维的意识；熟练应用算法编程、感知建模、认知推理、碳源核算等技术手段，设计和实施人工智能系统技术应用工程。在体育方面，培养学生掌握体育健康知识和体育锻炼技艺，养成运动爱好和终身坚持的习惯。在美育方面，培养学生养成发现美、欣赏美、创造美的情操情怀，积极向上发挥正能量。在劳育方面，培养学生树立劳动光荣的观念，尊重劳动、热爱劳动、热爱公益、勤于实践。学生通过系统学习、工程实践和社会参与，成长为胜任人工智能产品或系统的工程设计、技术开发和服务、运管维护、最优决策支持等工作的新工科人才。

本专业毕业生具有如下目标预测：

(1) 知识：具有扎实的理论基础，具备新工科专业所需的技术知识和推理能力，包括数理和人文的基本基础知识、感知-认知-推理-学习等核心基础知识、人工智能-算法-深度学习-Python 程序设计等高阶基础知识；

(2) 技能：具备扎实的个人技术技能，包括数字图像建模、语音解析建模、自然语言处理建模、文本分析建模等问题表达和设计求解能力，实验观测和数据处理能力，解决复杂 AI 应用工程的系统思维能力；

(3) 素质：具有良好的职业操守，包括勇于创新实践、启发创业意识、追求终身学习、自觉自律自信、坚守工程伦理、展现大局视野等养成性品质；

(4) 职业成就（包含职业发展和职业竞争力等）：在未来 AI 时代工作及生活的社会环境中，具有承担工程界和工程师为社会创造物质财富的责任意识；在智能制造企业及 AI 工业服务商业环境中，具有凝炼企业文化、提出发展规划、开展技术创新、组织团队攻关的行为表现；初步具备构思-设计-实施-运行（CDIO）AI 制造和服务等相关系统的经历和思维意识。

二、专业方向

人工智能

三、毕业要求

根据本专业人才培养目标，从适应社会发展的需求出发，明确现阶段本专业的毕业能力要求及其指标点分解：

毕业能力要求	指标点
毕业要求 1： 工程知识：具备较扎实的数学、自然科学知识，系统掌握人工智能领域的工程基础和专业知识，	1-1.学生应理解与掌握数学、物理等自然科学的基础知识，并具有一定的现代科学与技术方法论意识。
	1-2.学生应理解与掌握人工智能的基础理论和基本方法，理解人工智能系统中的基本工程知识，并具有一定的计算思维能力

能够将各类知识用于解决人工智能领域复杂工程问题。	1-3.学生应能够在课程考核、实践环节以及毕业设计（论文）等中，应用数学与自然科学、工程基础和专业知识解决人工智能系统及应用中的复杂工程问题
毕业要求 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，进行抽象分析与识别、建模表达、并通过文献研究分析人工智能领域复杂工程问题，以获得有效结论。	2-1.学生应能够通过应用数学、自然科学、人工智能的基本理论与方法，分析与识别相关实际工程应用问题的复杂性，并进行清晰的描述与表示。
	2-2.学生应具有运用多种文献检索方式查找所需参考文献的能力，同时具有相关文献综述与分析的能力
	2-3.学生应能够在课程考核、实践环节以及毕业设计（论文）等中，应用数学、自然科学、人工智能的方法对相关复杂工程问题进行分析、表述、推理与验证等。
毕业要求 3： 设计/开发解决方案：能够设计针对人工智能领域复杂工程问题的解决方案，设计满足特定需求的软硬件系统、模块或算法流程，并能够在设计环节中体现创新意识，考虑社会、健康、安全、法律、文化以及环境等因素。	3-1.学生应掌握人工智能技术应用问题的基本设计原理与方法，能够针对相关复杂工程问题设计合理的解决方案。
	3-2.学生应能够从设计方法学上理解与掌握人工智能技术及其应用的相关复杂工程问题的解决方法，并在解决过程中体现出一定的创新思维能力。
	3-3.学生应能够在课程考核、实践环节以及毕业设计（论文）等中，树立综合考虑社会与文化、健康与安全、伦理与法律、环境与发展等诸多因素的意识。
毕业要求 4： 研究：能够基于人工智能领域科学原理并采用科学方法对复杂的人工智能软硬件及系统工程问题进行研究，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.学生应理解与掌握人工智能的基本理论与方法，并从科学技术方法论上理解本专业的基本研究方法。
	4-2. 学生应能够针对复杂计算机科学与人工智能工程问题运用相关的理论和方法建立定性或定量模型，进行分析与比较；能够掌握原始数据收集与处理方法、参数分析方法、实验结果检验方法与综合分析方法。
	4-3.学生应能够在课程考核、实践环节以及毕业设计（论文）等中，通过一定数量的设计实验、仿真实验、研究性专题或项目等，研究与开发复杂工程问题的解决方案。
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、软硬件及系统资源、现代工程研发工具和信息检索工具，包括对复杂工程问题的预测与模拟，并能够理解其局限性。	5-1.学生应能够熟练运用程序设计方法、环境与工具，包括软件开发集成环境，实验数据分析工具，模拟与仿真工具等。
	5-2.学生应能够熟练掌握人工智能系统的应用环境与开发工具等，包括 Python 与机器学习环境、人工智能计算平台、深度学习平台等。
	5-3.学生应能够选择与运用人工智能的方法、平台与工具，针对复杂工程问题的解决方案，进行分析与比较、预测与模拟，并能够理解与表述问题解决方案的局限性。
毕业要求 6： 工程与社会：能够基于人工智能工程领域相关背景知识进行合理分析，评价人工智能专业工程实践和复杂工程问题解决方案对社会、健康、安全、法律以及文化的影响，并理解应承担的社会责任。	6-1.学生应理解社会、安全、健康、伦理、法律等方面的基本知识，并理解其与人工智能应用系统的相互影响，特别是人工智能伦理。
	6-2.在解决复杂工程问题的过程中，学生应能够从人文与社会、健康与安全、伦理与法律等方面进行分析、比较与评价，能够体现应尽义务、操守与责任。
毕业要求 7： 环境和可持续发展：能够理解和评价针对人工智能领域复杂工程问题的工程实践对环境、社会可持续发展的影响。	7-1.学生应具有环境与可持续发展的基本知识与意识，能够理解人工智能及其应用对当前社会环境与自然环境，以及可持续发展的影响与重要性。
	7-2.学生能够理解复杂工程问题的任何工程实践都有可能对环境与可持续发展产生影响，针对具体问题的解决方案能够进行环境与可持续发展影响方面的分析与评价。

毕业要求 8： 职业规范：具有人文社会科学素养、社会责任感，能够在工程实践中理解并遵守工程职业道德和规范，履行责任。	8-1. 人文素养：具有科学的世界观、人生观和价值观，能正确理解个人在社会、历史以及自然环境中的地位，具有推动民族复兴和社会进步的责任感。
	8-2. 职业规范：了解工程科技人员的职业性质和责任，能在人工智能工程实践中理解并恪守工程职业道德和规范，履行相应责任。
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。	9-1.学生应理解尊重个人权利与利益的重要性，理解个人、团队、社会的关系，理解个人和团队的利益统一性，以及团队不同成员及负责人的作用。
	9-2.学生应参加一定的跨院系、跨专业的社团组织或竞赛等科技活动，或参加一定的工程实习、社会实践、公益活动、调研等，并能够在其中发挥应有的作用。
毕业要求 10： 沟通：能够就人工智能相关的复杂工程问题与业界同行及社会公众进行有效沟通和交流，包括撰写报告和设计文稿、陈述发言、清晰表达或回应指令，并具备一定的国际视野，能够在跨文化背景下进行沟通和交流。	10-1.学生应具有人工智能专业方面的外语文献阅读与文献检索能力，具有专业外语交流与写作能力，具有国际视野，能够在跨文化背景下进行沟通和交流。
	10-2.学生应能够在各种教学和实践环节中，针对复杂工程问题解决方案与同学、同行及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、清晰表达观点，准确回应提问等。
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，并能在多学科环境中应用。	11-1.学生应理解与掌握一般工程项目规划与管理、工程决策与经济的基本知识与方法，并对当前人工智能的相关产业有一定的认识。
	11-2.学生应能够在课程考核、实践环节、科技活动，以及毕业设计（论文）等中，理解并运用工程管理原理和经济决策方法等多学科知识解决相关复杂工程问题。
毕业要求 12： 终身学习：具有自主学习和终身学习的意识，有不断学习和适应人工智能相关技术发展的能力。	12-1.学生应能够理解自主学习和终身学习的重要性与必要性，掌握一定的自主学习和终身学习的方法。
	12-2.学生应能够在本专业的各种教学和实践环节中，体现出自主学习和终身学习意识，在复杂工程问题的解决方案中体现出一定的自主学习和终身学习的能力。

专业毕业要求应该能够支撑培养目标的达成。建立本专业毕业要求支撑培养目标实现的关系矩阵。

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
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：工程与社会		√	√	√
7：环境和可持续发展			√	√
8：职业规范			√	√
9：个人和团队			√	√
10：沟通			√	√
11：项目管理			√	√
12：终身学习			√	√

四、主干学科

电子信息类

五、专业核心课程

电路分析基础、数字电子技术、模拟电子技术、自动控制原理、认知心理学、神经生物学概论、人工智能基础、机器学习、自然语言处理、计算机视觉与模式识别、数字图像处理、神经网络与深度学习、智能系统设计等。

六、修业年限

本科基本学制 4 年，弹性学习年限 3-6 年，按照学分制度管理。

七、授予学位

学生应至少修满 169 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。

八、学分要求

课程类别	课程模块		课程性质	学分要求	小计	比例（%）
通识教育课	通识教育必修课	思政类	必修	17.0	41.5	24.6
		外语类		12.0		
		计算机类		2.5		
		军事安全类		2.0		
		劳动体育类		5.0		
		创新创业类		2.0		
		心理健康类		1.0		
	通识教育选修课	美育类(400)	选修	2.0	8.0	4.7
		中国与世界(500)		2.0		
		四史(600)		1.0		
		经济管理类(700)		1.0		
		传统文化(900)		2.0		
	通识教育实践课	军训	实践	2.0	2.0	1.18
学科平台课	学科基础课程	公共基础类	必修	58.5	66.0	69.52
		专业基础类				
	学科实践课程	-	实践	7.5		
专业教育课	专业核心课程	-	必修	14.5	43.5	
	专业选修课程	-	选修	4.0		
	专业实践课程	-	实践	25.0		
能力拓展课	专业特色课程	-	必修（或实践）	8.0	8.0	
课外实践环节	课外通识实践	人文社会实践	课外实践	4.0		
		身心健康实践				
		外语技能实践				
	创新创业实践	创新训练		4.0		
		创新大赛				
		创客活动				
	生涯教育	成长规划类		1.0		
总学分/比例					169	100

Undergraduate Education Program for Artificial Intelligence Major 2021

I. Educational Objectives

This major is oriented to the growing demand for artificial intelligence technical talents in emerging industries such as intelligent manufacturing, low carbon economy and greentech services, and aims to train builders and successors of the socialist cause with all-round development in moral, intellectual, physical, aesthetic and labor. In terms of moral education, students are trained to have firm ideals and beliefs, strong personality, good humanistic quality, rigorous ethical norms and strong tolerance. In terms of intellectual education, students are trained to understand the relevant background of artificial intelligence; Compact artificial intelligence theory, method and technology; Establish the consciousness of system thinking, such as experimental design, exploration and discovery, analysis and synthesis, innovation and entrepreneurship, collaboration and communication, learning and adaptation, and engineering management; Skilled application of algorithmic programming, perceptual modeling, cognitive reasoning, carbon source accounting and other technical means, design and implement artificial intelligence system technology application engineering. In the aspect of sports, students are trained to master the knowledge of physical health and physical training skills, and develop sports hobbies and lifelong habits. In terms of aesthetic education, students should be cultivated to find, appreciate and create beauty and give full play to their positive energy. In the aspect of labor education, students are trained to establish the concept of labor glory, respect for labor, love labor, love public welfare, and be diligent in practice. Through systematic learning, engineering practice and social participation, students will grow into new engineering talents qualified for engineering design, technology development and service, operation management and maintenance, optimal decision support and other work of artificial intelligence products or systems.

Graduates should obtain knowledge and competences as follows:

（1）Knowledge: Possess solid theoretical foundation and have the technical knowledge and reasoning abilities required for new engineering majors, including basic knowledge of mathematics and the humanities, perception - cognitive reasoning - learning basic knowledge, etc; perceive the advanced basic knowledge such as the core, artificial intelligence algorithm - deep learning - a Python program design.

（2）Skills: Build strong personal technical skills, including digital image modeling, speech analytical modeling, modeling of natural language processing, text analysis, modeling and solving design problems such as expression, experimental observation and data processing ability, system thinking ability to deal with complicated AI application engineering.

（3）Quality: Keep good professional ethics, including the innovation practice, inspire entrepreneurial awareness, the pursuit of life-long learning, consciously self-discipline self-confidence, sticking to engineering ethics and showing the general situation view raise integrity quality.

（4）Career accomplishments (including career development and professional competence, etc.) : Have the sense of responsibility for undertaking the engineering work and creating material wealth for the society under the

social environment of the future AI era. Have the ability to condense corporate culture, propose development plans, and develop technological innovation, organize research team work in the intelligent manufacturing enterprise and AI industrial services business environment. Preliminarily perceive such experience and awareness as conceive-design-implementation-run (CDIO) AI manufacturing and services, etc.

II. Major direction

Artificial intelligence

III. Graduation Requirements

According to the training objectives of the major and the needs of social development, the graduation ability requirements and indices decomposition of the major at the present stage are clarified:

Graduation Requirements	Indices
Requirement 1： Engineering knowledge：Students have a solid knowledge of mathematics, natural science, and systematically master the basic system control engineering foundation and professional knowledge in the field of artificial intelligence, with which to solve can be all kinds of complex knowledge problems used in such sphere. in artificial intelligence complex engineering problems.	1-1. Students should understand and grasp the basic knowledge of the natural sciences such as mathematics, physics, and have a certain sense of modern science and technology methodology.
	1-2. Students should understand and grasp the basic theory and basic method of artificial intelligence, understanding the basic engineering knowledge, the system of artificial intelligence and computational thinking ability
	1-3. In curriculum assessment, students should be able to practice and graduation design (paper), the application of mathematical and natural science, engineering, and professional knowledge to solve complex engineering problem in artificial intelligence systems and applications
Requirement 2： Problem analysis: Students can apply the basic principles of mathematics, natural science and engineering science to perform abstract analysis and identification, expression of modeling, and to analyze complex engineering problems through literature research to obtain valid conclusions.	2-1. Students should be able to pass the application of mathematics, natural science, basic theory and method of artificial intelligence, analysis and recognition of the complexity of the actual engineering application problems related to, and make clear description and presentation.
	2-2. Students should have a variety of literature retrieval ways for references of ability, have the ability of the relevant literature review and analysis at the same time
	2-3. Students are able to apply the principles of mathematics, natural science, artificial intelligence to analyze, express, reason and verify the complex engineering problems in course assessment, training practice and graduation design(thesis), etc.
Requirement 3： Design/develop solutions: Students can design solution to complex engineering problems in the field of artificial intelligence solutions, design hardware and software to meet the specific needs, module or algorithm process, and can	3-1. Students should master the basic design principle of artificial intelligence technology application problems and the method, and can design reasonable solution to complex engineering problems related.
	3-2. Students should be able to understand and master the artificial intelligence technology on the design methodology and application of complex engineering problems related to the solution of the method, and practice certain creative thinking ability in the process of solution.

reflect innovation consciousness in the design process, considering the social, health, safety, legal, cultural and environmental factors.	3-3. Students should be able to establish comprehensive considering the social and cultural, health and safety, ethics and legal consciousness, environment and development, and many other factors in course examination, practice and graduation design (paper).
Requirement 4： Scientific research: Be able to study complex problems of artificial intelligence software and hardware, based on scientific principles in the field of artificial intelligence and using the scientific method and system engineering, including designing experiments, analyzing and interpreting data, and obtaining reasonable and effective conclusion through information synthesizing.	4-1. Students should understand and master the basic theory and method of artificial intelligence, and understand the professional research method on the basis of science and technology methodology.
	4-2. Students should be able to use relevant theory and methods of complex computer science and artificial intelligence engineering problems to establish quantitative or qualitative models and perform analysis and comparison; Be able to grasp the original data collection and processing method, parameter analysis method, testing methods of the result of experiment and comprehensive analysis methods.
	4-3. Students should be able to research and develop solution of complex engineering problems. through a certain number of design experiments, simulation experiments and research project or a project in course examination, practice and graduation design (paper).
Requirement 5： Application of advanced tools: Students have ability to develop, select and use appropriate technology, software, hardware and system resources, modern engineering research and development tools and information retrieval tools to solve complex engineering problems in the field of artificial intelligence, including the prediction and simulation of complex engineering problems, and be able to understand its limitations.	5-1. Students should be able to skillfully use programming method, environment and tools, including software development of integration environment, the experimental data analysis tools, modeling and simulation tools, etc.
	5-2. Students should be able to master the application of artificial intelligence system for environment and development tools, etc., including Python, artificial intelligence and machine learning environment computing platform, deep learning platform, etc.
	5-3. Students should be able to analysis and compare, predict and simulate certain complex engineering problems by selecting and using the methods of artificial intelligence, platform and tools, and understand and describe the limitations of the solutions.
Requirement 6： Engineering and society: Students can conduct reasonable analysis based on the background knowledge of , evaluate artificial intelligence in engineering practice and complex engineering solutions to problems of social, health, safety, and legal and the influence of culture, and understand the social responsibility.	6-1. Students should understand the basic knowledge of society, safety, health, ethics, law, etc. and understand its interaction with artificial intelligence application system, especially the artificial intelligence ethics.
	6-2. Students should be able to analyze, compare and evaluate the aspects of humanities and society, health and safety, ethics and law, in the process of solving complex engineering problems, through which presenting their obligations, integrity and responsibility.
Requirement 7： Environment and sustainable development: Students have ability to understand and evaluate effects of complex engineering problems in the field of artificial intelligence on environment, and the social sustainable development.	7-1. Students should have basic knowledge of the environment and the sustainable development and consciousness and understand the artificial intelligence and its application to the current social environment and the natural environment, and the influence of sustainable development and importance.
	7-2. Students can understand complex engineering problems of any engineering practices which are likely to impact environment and sustainable development, and they can perform analysis and evaluation on the impact of the solutions for specific problems on environment and sustainable development.

Requirement 8： Professional norms: Students have humanities, social science literacy, and social sense of responsibility, be able to understand and keep professional ethics and norms, in the process of engineering practice and fulfill responsibility.	8-1. Humanistic quality: have a scientific outlook on the world, life and values, can correctly understand the individual's position in the society, history and natural environment, and have a sense of responsibility to promote national rejuvenation and social progress.
	8-2. Professional norms: Understand the professional nature and responsibilities of engineering technicians, understand and abide by engineering professional ethics and norms in the practice of artificial intelligence engineering, and fulfill corresponding responsibilities.
Requirement 9： Individual and team: Students can undertake the roles as individual, team member, and the head respectively under the multidisciplinary background.	9-1. Students should understand the importance of respecting individual rights and interests, understand the relationship between the individual, group, and society, understand the interests of the individual and team unity, and the role of the head and team members.
	9-2. Students should attend certain cross-faculty or cross-professional organizations or competitions and other activities, or participate in a certain engineering practice, social practice, public welfare activities, research, etc. and be able to play their role in them.
Requirement 10： Communication: Students have artificial intelligence related to complex engineering problems and to communicate effectively with the industry peers and the social public communication, including writing reports and designing documents, speech presentation, clear expression or responding to commands, and have a certain international vision to under the background of cross-cultural communication and exchanges.	10-1. Students should have professional foreign language literature reading and retrieval ability in artificial intelligence, have professional foreign language communication and writing skills, and with international vision, they can communicate under the cross-cultural background.
	10-2. Students should be able to communicate effectively with classmates, peers and the public on certain complex engineering solutions to problems in a variety of teaching and practice, including writing reports and designing documents, speech presentation, articulation of ideas, actuating response to questions and so on.
Requirement 11： Project management: Students are able to understand and grasp the principle of project management and methods of economic decision, applied in a multidisciplinary environment.	11-1. Students should understand and grasp the general project planning and management, project decision-making and economy, the basic knowledge and method and the current related industries have a certain understanding of artificial intelligence.
	11-2. In curriculum assessment, students should be able to understand and apply project management theory and multidisciplinary knowledge such as economic decision method to solve complex engineering problems in course assessment, practical links, scientific and technological activities, and graduation design (thesis).
Requirement 12： Independent and everlasting learning perseverance: Students have the consciousness of constant and continuous learning and the ability to adapt to the development of artificial intelligence technology.	12-1. Students should be able to understand the importance and necessity of autonomous learning and lifelong learning, to master a certain method of autonomous learning and life-long learning.
	12-2. Students should be able to demonstrate the consciousness of independent learning and lifelong learning in the professional teaching and practice, and reflect the ability of autonomous learning and life-long learning.

The relationship between graduation requirements and educational objectives

Graduation Requirements	Educational Objectives			
	Educational Objectives 1	Educational Objectives 2	Educational Objectives 3	Educational Objectives 4
1：Engineering Knowledge	√			
2：Problem Analysis	√	√		
3：Design/Development Solutions	√	√		
4：Research		√		√
5：Use Modern Tools		√		√
6：Engineering and Society		√	√	√
7：Environment and Sustainable Development			√	√
8：Career Planning			√	√
9：Individuals and Teams			√	√
10：Communication			√	√
11：Project Management			√	√
12：Lifelong Learning			√	√

IV. Major Subject

Electronic Information

V. Core Courses

Basis of circuit analysis, Digital electronic technology, Analog electronic technology, Automatic control theory, Introduction to cognitive psychology, Introduction to Neurobiology, Fundamentals of Artificial Intelligence, Machine learning, Natural language processing, Computer vision and pattern recognition, Digital image processing, Neural network and deep learning, Intelligent system design etc.

VI. Educational System

The basic undergraduate education system is 4 years, and the flexible study period is 3-6 years according to the credit system management.

VII. Confer Degrees

Students should complete at least 169 credits before graduation. Students who meet the requirement of degree granting conforming to the Bachelor's Degree Awarding Regulations of Shenyang University of Chemical Technology (revised in March 2017), can be awarded bachelor's degree in engineering.

VIII. Credit Requirements

Course Type	Course Modules		Course Nature	Credit requirement	Subtotal	Proportion（%）
General Education	General Education (Compulsory)	Ideological and Political Courses	Compulsory	17.0	41.5	24.6
		Foreign Language Courses		12.0		
		Computer Courses		2.5		
		Military and Safety Courses		2.0		
		Labor and Sport Education		5.0		
		Innovation and Entrepreneurship		2.0		
		Mental Health		1.0		
	General Education (Optional)	Aesthetic Education(400)	Optional	2.0	8.0	4.7
		China and the world(500)		2.0		
		Four Histories(600)		1.0		
		Economic Management(700)		1.0		
		Traditional Culture(900)		2.0		
	General education practice course	Military training	Practice	2.0	2.0	1.18
Discipline Education	Basic Courses	Public basic class	Compulsory	58.5	66.0	69.52
		Professional foundation				
	Basic Practice Sessions	-	Practice	7.5		
Specialized Education	Core Courses	-	Compulsory	14.5	43.5	
	Optional Courses	-	Optional	4.0		
	Specialized Practice Sessions	-	Practice	25.0		
Competency Development	Individualized Courses	-	Compulsory (or Practice)	8.0	8.0	
Extracurricular practice	Extracurricular General Education Practice	Culture and Society Practice	Extracurricular Practice	4.0		
		Mentally and Physically Practice				
		Foreign Language Proficiency Training Practice				
	Extracurricular Characteristic Practice	Innovative Training		4.0		
		Innovation Competition				
		Chuangke activities				
	Career Education	Growth Planning Courses		1.0		
Total/Proportion					169	100

九、人工智能专业教学进程表

Table of Teaching Schedule for Artificial Intelligence Major

课程类别 Course Type	课程性质 Course Nature		课程号 Course Code	课程名称 Course Name	学分 Cre.	总学时数 T. C.H.	学时分配 Credit Hour Distribution				各学期周学时分配 Weekly Hours Per Semester								备注 Notes
							讲课 Lec.	实验 Exp.	上机 Pro.	课外实践 Pra.	一 1st	二 2nd	三 3rd	四 4th	五 5th	六 6th	七 7th	八 8th	
通识教育课 General Education	必修 Compulsory	思政类 Ideological and Political Courses	0710093001	思想道德与法治 || Ideological Morality and the Rule of Law	3.0	48	32			16		2							
			0710053001	中国近现代史纲要 ||Outline of Chinese Contemporary and Modern History	3.0	48	32			16	2								
			0710123001	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					3				
			0710103001	马克思主义基本原理* ||Basic Principles of Marxism*	3.0	48	32			16				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 *	3.0	48	32			16				2					
			0710012301	形势与政策 ||Current Situation and Policies	2.0	64	64				1	1	1	1	1	1	1	1	
		外语类 Foreign Language Courses	0211003101	大学外语I ||College English I	3.0	48	48				3								
			0211003201	大学外语II* ||College English II*	3.0	48	48					3							
			0241003301	大学外语III ||College English III	3.0	48	48						3						五选一

课程类别 Course Type	课程性质 Course Nature		课程号 Course Code	课程名称 Course Name	学分 Cre.	总学时数 T. C.H.	学时分配 Credit Hour Distribution				各学期周学时分配 Weekly Hours Per Semester								备注 Notes
							讲课 Lec.	实验 Exp.	上机 Pro.	课外实践 Pra.	一 1st	二 2nd	三 3rd	四 4th	五 5th	六 6th	七 7th	八 8th	
通识教育课 General Education	必修 Compulsory	外语类 Foreign Language Courses	0241003301	大学外语III（进阶英语） ‖ College English III（Advanced English CET 6-Orientated）	3.0	48	48						3						
				大学外语III（英语口语表达与交流） ‖ College English III（English Oral Expression and Communication）	3.0	48	48						3						
				大学外语III（跨文化交际） ‖ College English III（Intercultural Communication）	3.0	48	48						3						
				大学外语III（英语写作表达与交流） ‖ College English III（English Writing Expression and Communication）	3.0	48	48						3						
			0241003401	大学外语IV* ‖College English IV*	3.0	48	48							3					五选一
				大学外语IV（进阶英语） ‖ College English IV（Advanced English CET 6-Orientated）	3.0	48	48							3					
				大学外语IV（英语口语表达与交流） ‖ College English IV（English Oral Expression and Communication）	3.0	48	48							3					
				大学外语IV（跨文化交际） ‖ College English IV（Intercultural Communication）	3.0	48	48							3					
				大学外语IV（英语写作表达与交流） ‖ College English IV（English Writing Expression and Communication）	3.0	48	48							3					
		计算机类 Computer Courses	1511372002	C 语言程序设计 |C Language Programming	2.5	44	32		12			2							
		军事安全类 Military and Safety	0710081001	军事理论 ‖Military Theory	1.0	16	16					2							

课程类别 Course Type	课程性质 Course Nature		课程号 Course Code	课程名称 Course Name	学分 Cre.	总学时数 T. C.H.	学时分配 Credit Hour Distribution				各学期周学时分配 Weekly Hours Per Semester								备注 Notes
							讲课 Lec.	实验 Exp.	上机 Pro.	课外实践 Pra.	一 1st	二 2nd	三 3rd	四 4th	五 5th	六 6th	七 7th	八 8th	
通识教育课 General Education	必修 Compulsory	Courses	1510261302	安全教育 ||Safety Education	1.0	16	16				1	1	1	1	1	1	1		
		劳动体育类 Labor and Sport Education	2640021001	劳动教育 ||Labour Education	1.0	16	16					2							
			0410011101	大学体育I ||College Physical Education I	1.0	36		36			2								
			0410021201	大学体育II ||College Physical Education II	1.0	36		36				2							
			0410031301	大学体育III ||College Physical Education III	1.0	36		36					2						
			0410041401	大学体育 IV ||College Physical EducationIV	1.0	36		36						2					
		创新创业类 Innovation and Entrepreneurship courses	1557011002	创造性思维与创新方法 ||Creative Thinking and Innovative Methods	1.0	16	16						2						
			1740011001	创业基础 ||Entrepreneurial Foundation	1.0	16	16							2					
		心理健康类 Mental Health Courses	0510041001	大学生心理与健康教育 ||Mental and Health Education for College Students	1.0	16	16				2								
		小计 Subtotal			41.5	780	552	144	12	72	11	15	9	13	5	2	2	1	
	选修 Optional	包括 5 个模块，分别是经济管理类（1 学分）、美育类（2 分）、四史（1 分）、传统文化（2 分）、中国与世界（2 分），每学期最多选修 2 门课程。It includes five modules, namely, economic management (1 credit), aesthetic education (2 credits), four history (1 credit), traditional culture (2 credits), China and the world (2 credits), and a maximum of 2 courses per semester.																	
		小计 Subtotal			8.0														
	实践 Practice		0415102011	军训 ||Military Training	2.0	48				48	+2								集中

课程类别 Course Type	课程性质 Course Nature		课程号 Course Code	课程名称 Course Name	学分 Cre.	总学时数 T. C.H.	学时分配 Credit Hour Distribution				各学期周学时分配 Weekly Hours Per Semester								备注 Notes
							讲课 Lec.	实验 Exp.	上机 Pro.	课外实践 Pra.	一 1st	二 2nd	三 3rd	四 4th	五 5th	六 6th	七 7th	八 8th	
	合计 Total				51.5														
学科平台课 Discipline Education	必修 Compulsory	数学与自然科学类 Natural Science & Mathematics	0310004101	高等数学 I* ||Advanced Mathematics I*	4.5	80	72			8	6								
			0310005201	高等数学 II* ||Advanced Mathematics II*	5.5	96	88			8		6							
			0310032001	线性代数 ||Linear Algebra	2.0	32	32				3								
			0310042001	概率论与数理统计 ||Probability and Mathematical Statistics	2.0	32	32							2					
			1510251002	复变函数 ||Function of Complex Variable	1.5	24	24					2							
			0310063101	大学物理I* ||University physicsI*	3.0	48	46	2				3							
			0310063201	大学物理II* ||University physicsII*	3.0	48	46	2					3						
		工程基础类 Foundation Engineering	1510163002	电路分析基础* ||Basis of Circuit Analysis	3.5	56	56					4							
			1510913002	模拟电子技术* ||Analog Electronic Technology*	3.5	60	48	12					3						
			1510923002	数字电子技术* ||Digital Electronic Technology*	3.5	60	48	12						3					
			1511364002	自动控制原理* ||Principle of Automatic Control*	4.0	68	56	8	4					4					
		工程基础类 Foundation Engineering	1513272002	算法与数据结构* ||Algorithms and Data Structures*	2.5	44	32		12				3						
			1526982002	计算机组成原理* ||Computer Composition Principle*	2.5	42	36	6							3				

课程类别 Course Type	课程性质 Course Nature		课程号 Course Code	课程名称 Course Name	学分 Cre.	总学时数 T. C.H.	学时分配 Credit Hour Distribution				各学期周学时分配 Weekly Hours Per Semester								备注 Notes
							讲课 Lec.	实验 Exp.	上机 Pro.	课外实践 Pra.	一 1st	二 2nd	三 3rd	四 4th	五 5th	六 6th	七 7th	八 8th	
学科平台课 Discipline Education	必修 Compulsory		1519212002	工程热力学 || Engineering Thermodynamics	2.0	32	32						2						
		专业基础类 Subject Foundation Requisite	1519011002	人工智能专业概论 ||Professional Introduction to Artificial Intelligence	1.0	16	16				2								
			1519022002	认知心理学 ||Cognitive Psychology	2.0	32	32					2							
			1519032002	神经生物学概论 ||Overview of Neurobiology	2.0	32	32						2						
			1511852002	人工智能基础 ||Fundamentals of Artificial Intelligence	2.0	34	28		6					2					
			1511872002	Python 数据分析与应用 ||Python data analysis and Application	2.0	36	24		12					2					
			1514892002	数字信号处理* ||Digital Signal Processing*	2.5	42	36	6						3					
			1519041002	人工智能专业外语 ||Artificial Intelligence Professional Foreign Language	1.0	16	16								2				
			1519052002	物联网技术概论 ||Introduction to Internet of Things Technology	2.0	32	32								2				
			1511461002	科技论文写作与文献检索 ||Science and Technology Thesis Writing and Literature Retrieval	1.0	16	16									2			
			小计 Subtotal		58.5	978	880	48	34	16	11	17	13	16	7	2	0	0	
	实践 Practice		0310081011	大学物理实验 ||University Physics Experiment	1.0	24	6	18					3						
			2110071031	金工实习 ||Metalworking Practice	1.0	24	集中	24				+1							

课程类别 Course Type	课程性质 Course Nature	课程号 Course Code	课程名称 Course Name	学分 Cre.	总学时数 T. C.H.	学时分配 Credit Hour Distribution				各学期周学时分配 Weekly Hours Per Semester								备注 Notes
						讲课 Lec.	实验 Exp.	上机 Pro.	课外实践 Pra.	一 1st	二 2nd	三 3rd	四 4th	五 5th	六 6th	七 7th	八 8th	
学科平台课 Discipline Education	实践 Practice	1512212032	电子工艺实习 ||Electronic Process Practice	2.0	48	集中	2					+2						
		1511422022	工程数学实践 ||Engineering Mathematics Practice	2.0	48	分散							4					
		1510150012	电路分析基础实验 ||Circuit Analysis Experiment	0.5	12	分散					2							
		1511261022	电子设计与制作 ||Electronic Design and Production	1.0	24	集中	1						+1					
		小计 Subtotal		7.5	180													
	合计 Total			66.0														
专业教育课 Specialized Education	必修 Compulsory	1519093002	计算机视觉与模式识别* || Computer Vision and Pattern Recognition *	3.0	52	40		12							3			
		1511862002	机器学习 |Machine Learning	2.0	34	28		6						2				
		1524852002	数字图像处理* ||Digital Image Processing*	2.5	44	32	12								3			
		1519063002	自然语言处理* ||Natural Language Processing*	3.0	52	40		12							3			
		1519071002	智能制造与低碳经济发展 || Intelligent Manufacturing and Low-carbon Economy Development	1.0	16	16								2				
		1519083002	低碳工业智能设计与管理技术 ||Low Carbon Industrial Intelligent Design and Management Technology	3.0	52	40		12							3			
		小计 Subtotal		14.5	250	196	12	42	0	0	0	0	0	4	12	0	0	
	选修	1537242002	Matlab 程序设计 ||Matlab Programming	2.0	36	24		12				2						

课程类别 Course Type	课程性质 Course Nature	课程号 Course Code	课程名称 Course Name	学分 Cre.	总学时数 T. C.H.	学时分配 Credit Hour Distribution				各学期周学时分配 Weekly Hours Per Semester								备注 Notes
						讲课 Lec.	实验 Exp.	上机 Pro.	课外实践 Pra.	一 1st	二 2nd	三 3rd	四 4th	五 5th	六 6th	七 7th	八 8th	
专业教育课 Specialized Education	Optional	1534302002	信号与系统II ||Signals and Systems II	2.0	34	28	6					2						
		1537042002	计算机网络与通信技术 ||Computer Network and Communication Technology	2.0	32	32									2			
		1538563002	ZigBee 技术应用及无线传感器网络 ||ZigBee Technology and Wireless Sensor Networks	3.0	52	40	12							3				
		1534872002	语音信号处理 ||Speech Signal Processing	2.0	36	24		12						2				
		1536972002	嵌入式系统原理 ||Embedded System Principle	2.0	36	24	12								2			
		1534863002	大数据原理与技术 ||Principle and Technology Big Data	3.0	56	32		24							4			
		1534962002	C#程序设计 ||C# Programming	2.0	36	24		12						2				
		1534932002	面向对象程序设计 ||Object-oriented Programming Design	2.0	36	24		12				2						
		小计 Subtotal		20.0	354	252	30	72	0	0	0	6	0	7	8	0	0	
		（修读要求 Fill in the Study Requirements）4.0																
	实践 Practice	1519132022	Python 数据分析实训 ||Python Training in Data Analysis	2.0	48	分散	2						2					
		1519152022	机器学习综合课程设计 ||Comprehensive Course Design of Machine Learning	2.0	48	分散	2							2				
		1519142022	人工智能专业实训 ||Artificial Intelligence Professional Training	2.0	48	分散	2						2					
		1519162002	智能系统设计 ||Intelligent System Design	2.0	48	分散	2								2			CDIO 课程

课程类别 Course Type	课程性质 Course Nature		课程号 Course Code	课程名称 Course Name	学分 Cre.	总学时数 T. C.H.	学时分配 Credit Hour Distribution				各学期周学时分配 Weekly Hours Per Semester								备注 Notes
							讲课 Lec.	实验 Exp.	上机 Pro.	课外实践 Pra.	一 1st	二 2nd	三 3rd	四 4th	五 5th	六 6th	七 7th	八 8th	
专业教育课 Specialized Education			1519111032	认识实习 ||Cognition Practice	1.0	24	分散						2						
			1519182032	生产实习 ||Production Practice	2.0	48	集中	2									+2		
			1519191042	毕业设计（论文） ||Graduation Design（Thesis)	14.0	336	集中	16										+14	
			小计 Subtotal		25.0	600													
	合计 Total				43.5														
			1519103002	神经网络与深度学习* ||Neural Network and Deep Learning*	3.0	52	40		12						3				
			1519202022	智能感知系统综合实践 ||Integrated Practice of Intelligent Perception Systems	2.0	48	分散	2									2		
			1519172022	人工智能综合课程设计 ||Comprehensive Course Design of Artificial Intelligence	2.0	48	分散	2									2		
			1519122022	情商与领导力特色实训 || EQ and Leadership Characteristics Training	1.0	24	分散					2							
			小计 Subtotal		8.0	172													
			（修读要求 Fill in the Study Requirements）8.0																
总计 Sum					169						16.5	30.5	28	33	15.5	17.5	12	17	
课外 环节 Extracurricular	课外实践 Extracurricular practice	人文社会实践 Culture and Society Practice	1511701032	社会调查 ||Social Survey	0.5	12				12								0.5	分散
		身心健康社会实践 Mentally and	0410050751	课外体育锻炼 ||Extracurricular Physical Exercise	0.5	12				12							0.5		分散

课程类别 Course Type	课程性质 Course Nature		课程号 Course Code	课程名称 Course Name	学分 Cre.	总学时数 T. C.H.	学时分配 Credit Hour Distribution				各学期周学时分配 Weekly Hours Per Semester								备注 Notes
							讲课 Lec.	实验 Exp.	上机 Pro.	课外实践 Pra.	一 1st	二 2nd	三 3rd	四 4th	五 5th	六 6th	七 7th	八 8th	
		Physically Practice	2640030011	劳动教育实践 ||Labour Education Practice	0.5	12				12		0.5							分散
			0510070311	心理健康辅导 ||Mental Health Counseling	0.5	12				12							0.5		分散
		成长规划类 Growth Planning Courses	1510271312	职业规划与就业指导 ||Career Planning and Employment Guidance	1.0	40	40					2	2	2	2				
		外语技能实践类 Foreign Language Proficiency Training Practice	0210010011	外语技能实践（初级） ||Foreign Language Proficiency Training Practice（elementary）	2.0	48				48				2					二选一
			0210020011	外语技能实践（高级） ||Foreign Language Proficiency Training Practice（advanced）	2.0	48				48				2					
		能力与创新实践 Capability and Innovation Practice	1511712022	大学生素质拓展与创新实践 ||Quality Development and Innovation Practice	4.0	96				96	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								分散
小计 Subtotal																			

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,课程名称中画*为考试课。

Note: “Cre. (Credits)”, “T.C.H. (Total Credit Hours)”, “Lec. (Lecture)”, “Exp. (Experiment)”, “Pro. (Programming)”, “Pra. (Practice)”.

十、人工智能专业学士学位课程一览表

A list of bachelor's degree programs in Artificial Intelligence

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	政治理论 Political Theory	1	0710103001	马克思主义基本原理* Elementary Theory of Marxism*	3.0	4
		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 *	3.0	4
学科平台课 Discipline Education	数学 Mathematics	3	0310014101	高等数学 I* Advanced Mathematics I*	4.5	1
	物理 Physics	4	0310063101	大学物理I* University Physics I*	3.0	2
	工程基础 Foundations of Engineer	5	1510063002	电路分析基础* Basis of Circuit Analysis*	3.5	2
		6	1510923002	数字电子技术* Digital Electronic Technology*	3.5	4
		7	1513272002	算法与数据结构* Algorithms and Data Structures*	2.5	3
		8	1511364002	自动控制原理* Principle of Automatic Control*	4.0	4
	专业基础 Professional Foundation	9	1511852002	人工智能基础 Fundamentals of Artificial Intelligence	2.0	4
		10	1519021002	人工智能专业外语 Artificial Intelligence Professional Foreign Language	1.0	5
		11	1514892002	数字信号处理* Digital Signal Processing*	2.5	4
专业教育课 Specialized Education	人工智能类 Artificial Intelligence	12	1519053002	计算机视觉与模式识别* Computer Vision and Pattern Recognition*	3.0	6
		13	1519063002	自然语言处理* Natural Language Processing*	2.5	6
		14	1519153002	神经网络与深度学习* Neural Network and Deep Learning*	3.0	5
		15	1511862002	机器学习 Machine Learning	2.0	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》

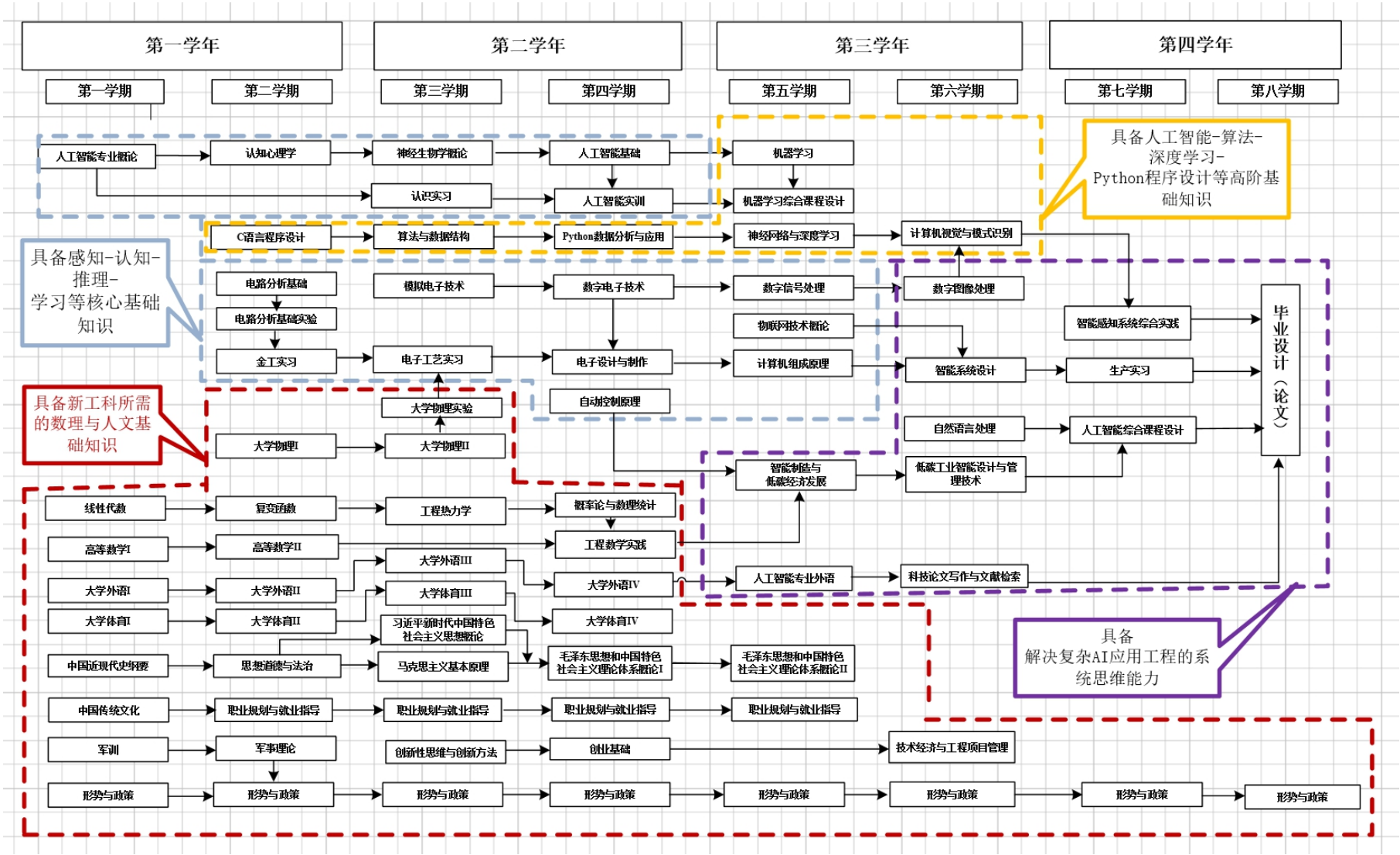
十一、全学程实践环节周历安排 Weekly Calendar of all Practice Sessions

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
一		☆	☆															::	::	·		军训
二													※					::	::	·		金工实习
三												P	P					::	::	·		电子工艺实习
四								P	P			P						::	::	·		外语技能实践；电子设计与制作
五																		::	::	·		
六																		::	::	·		
七			/	/														::	::	·		生产实习
八	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=						毕业设计

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

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



十三、主要课程与毕业能力要求关系矩阵图(相关性强 H，相关性中 M，相关性弱 L)

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

课程（Courses）	毕业能力要求（Graduation Requirements）																											
	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	7.1	7.2	8.1	8.2	9.1	9.2	10.1	10.2	11.1	11.2	12.1	12.2
思想道德与法治 || Ideological Morality and the Rule of Law																				M	H								
中国近现代史纲要 ||Outline of Chinese Contemporary and Modern History																				M									
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																				M									
马克思主义基本原理* ||Basic Principles of Marxism *																				H									
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 *																				M									
形势与政策 ||Current Situation and Policies																					M			M					
大学外语I-IV ||College EnglishI-IV														M										M					M
C 语言程序设计 ||C Language Programming													H																M
军事理论 ||Military Theory																					M								

课程 （Courses）	毕业能力要求（Graduation Requirements）																											
	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	7.1	7.2	8.1	8.2	9.1	9.2	10.1	10.2	11.1	11.2	12.1	12.2
安全教育 ||Safety Education									M								M						M						
劳动教育 ||Labour Education																					M	M							
大学体育I-IV ||College Physical EducationI-IV																							M						M
创造性思维与创新方法 ||Creative Thinking and Innovative Methods																									M			M	
创业基础 ||Entrepreneurial Foundation																						M			M	M			
职业规划与就业指导 ||Career Planning and Employment Guidance																												M	
大学生心理与健康教育 ||Mental and Health Education for College Students																				M									
军训 ||military training																				M	M		M						
高等数学I-II* ||Advanced Mathematics I-II*	H																												
线性代数 ||Linear Algebra		M		M																									
概率论与数理统计 ||Probability and Mathematical Statistics		M		M																									
复变函数 ||Complex Function		M		M																									
大学物理I-II* ||University physicsI-II*	M																												
电路分析基础* ||Basis of Circuit Analysis		M																											

课程 （Courses）	毕业能力要求（Graduation Requirements）																												
	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	7.1	7.2	8.1	8.2	9.1	9.2	10.1	10.2	11.1	11.2	12.1	12.2
模拟电子技术* ||Analog Electronic Technology	M																												
数字电子技术* ||Digital Electronic Technology		M																											
自动控制原理* ||Principle of Automatic Control			M	M						M																			
算法与数据结构 ||Algorithms and Data Structures								M					M																
计算机组成原理 ||Computer Composition Principle										M																			
工程热力学 || Engineering Thermodynamics							M											M											
数字信号处理* ||Digital Signal Processing											M																		
人工智能专业概论 ||Professional Introduction to Artificial Intelligence																M		M											M
认知心理学 ||Cognitive Psychology	M																												
神经生物学概论 ||Overview of Neurobiology	M																												
人工智能专业外语 ||Artificial Intelligence Professional Foreign Language					M																			H	H				
物联网技术概论 ||Introduction to Internet of Things Technology								M																					
科技论文写作与文献检索 ||Science and Technology Thesis Writing and Iterature Retrieval					H																			H					M

课程 （Courses）	毕业能力要求（Graduation Requirements）																												
	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	7.1	7.2	8.1	8.2	9.1	9.2	10.1	10.2	11.1	11.2	12.1	12.2
大学物理实验 ||University Physics Experiment											M		M																
金工实习 ||Metalworking Practice																					M		M						
生产实习 ||Production Practice																	M	L	M						M				M
毕业设计（论文） ||Graduation Design（Thesis)			M			M			M			M				M											M		
电子工艺实习 ||Electronic Process Practice																						M							
工程数学实践 ||Engineering Mathematics Practice						M																	M						
电路分析基础实验 ||Basis of Circuit Aanalysis Experiment			M			M																							
电子设计与制作 ||Electronic Design and Production									M																				
认识实习 ||Cognition Practice																	M	M											
Python 数据分析实训 ||Python Training in Data Analysis											M			M	M														
机器学习综合课程设计 ||Comprehensive Course Design of Machine Learning			M			M									M														
人工智能专业实训 ||Artificial Intelligence Professional Training												M																	
智能系统设计 ||Intelligent System Design												M										M				M			

课程 （Courses）	毕业能力要求（Graduation Requirements）																											
	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	7.1	7.2	8.1	8.2	9.1	9.2	10.1	10.2	11.1	11.2	12.1	12.2
计算机视觉与模式识别* ||Computer Vision and Pattern Recognition							M			M																			
机器学习 |Machine Learning							M				M			M															
人工智能基础 ||Fundamentals of Artificial Intelligence		H		M											M														
数字图像处理* ||Digital Image Processing								M																					
自然语言处理* ||Natural Language Processing											M																		
智能制造与低碳经济发展 || Intelligent manufacturing and low-carbon economy development							M																						
低碳工业智能设计与管理技术 ||Low carbon industrial intelligent design and management technology															M												M		
神经网络与深度学习* ||Neural Network and Deep Learning								M																					
智能感知系统综合实践 ||Integrated practice of intelligent perception systems						H			M			M																	
人工智能综合课程设计 ||Comprehensive Course Design of Artificial Intelligence								H							M														
情商与领导力特色实训 || EQ and Leadership Characteristics Training																			H							M			
社会调查 ||Social Survey																													M

课程 （Courses）	毕业能力要求（Graduation Requirements）																												
	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	7.1	7.2	8.1	8.2	9.1	9.2	10.1	10.2	11.1	11.2	12.1	12.2
课外体育锻炼 ||Extracurricular Physical Exercise																												M	
劳动教育实践 ||Labour Education Practice																					H								
心理健康辅导 ||Mental Health Counseling																				M									
外语技能实践 ||Foreign Language Proficiency Training Practice																				M									
大学生素质拓展与创新实践 ||Quality Development and Innovation Practice																					M								