人工智能

Artificial Intelligence

专业代码：080717T　　学　制：4 年

Program Code:080717T　　Duration：4 years

培养目标（Educational Objectives）：

本专业面向国家人工智能重大发展战略，依托全球人工智能发展历史机遇和粤港澳大湾区信息产业发展需求，培养德智体美劳全面发展，具有扎实的人工智能专业知识及综合能力、家国情怀和全球视野兼备、“三力”（学习力、思想力、行动力）卓越、胜任国际化合作与竞争的“三创型”（创新、创造、创业）的人工智能领军人才，具体包括以下四个目标：

培养目标 1：践行社会主义核心价值观，具有良好的人文科学素养和社会责任感，正确理解和评价所从事的人工智能技术实践活动对社会带来的潜在影响，熟悉人工智能领域的法律法规，坚守职业道德规范。（道德素养）

培养目标 2：具备人工智能领域的基础知识、基本技能和科学研究的基本素质，具有应用人工智能理论和方法以学科交叉方式解决行业关键技术问题的综合能力，具有源头创新和引领行业技术发展的潜质。（专业素养）

培养目标 3：具有团队合作精神，能够在人工智能技术和多学科交叉背景下的团队中展现独立工作、团结协作和组织领导能力；能够针对人工智能领域的复杂技术应用问题与业界同行及社会公众进行有效沟通和交流。（沟通协作能力）

培养目标 4：具有国际视野，能够不断拓展、提升人工智能相关的专业素养与专业应用能力，能够跟踪人工智能领域发展动态，获取知识和更新知识，具有终身学习的能力。（终身学习能力）

通过四年的学业，毕业生能够在企业、科研部门、高等院校、事业单位等从事人工智能研究、设计、开发及管理等工作，推动人工智能技术在互联网、健康、金融、教育、交通、能源等相关行业的创新应用。毕业五年左右成为人工智能相关领域的创新技术引领者、重要工程管理者和专业市场开拓者。

Overview of educational objectives

The Artificial Intelligence (AI) program aligns with the national AI development strategy, drawing on the historical opportunities in global AI advancement and the information industry development needs of the Guangdong-Hong Kong-Macao Greater Bay Area. Its goal is to

cultivate AI leaders who excel in all aspects of character development with solid professional knowledge, including moral, intellectual, physical, aesthetic, and labor skills, as well as instilling a sense of national pride and a global perspective. These leaders possess outstanding "three powers" (learning power, thinking power, and action power) and are capable of international cooperation and competition, embodying the "three creative abilities" (innovation, creation, and entrepreneurship). The specific objectives include the following four goals:

Educational Objective 1: To uphold the core values of socialism, cultivate a strong foundation in humanities and social sciences, and foster a sense of social responsibility. Students will accurately comprehend and evaluate the potential impact of their AI technological practices on society. They will also be familiar with the laws and regulations in the field of artificial intelligence and adhere to professional ethical standards. (Moral literacy)

Educational Objective 2: To develop a solid foundation in the fundamentals, basic skills, and scientific research qualities of the field of artificial intelligence. Students will possess the ability to apply AI theories and methods in an interdisciplinary manner to solve key technological issues in various industries. They will also demonstrate comprehensive skills in innovation and have the potential to lead technological advancements in the industry. (Professional literacy)

Educational Objective 3: To cultivate individuals who possess a team-oriented mindset and can work independently, collaborate effectively, and provide leadership within teams in professional and multidisciplinary contexts related to artificial intelligence. They will have the ability to communicate and exchange ideas with industry peers and the general public on complex technology application issues in the field of AI. (Communication and collaboration ability)

Educational Objective 4: To cultivate individuals with an international perspective, who constantly expand and enhance their professional literacy and application abilities in the field of artificial intelligence. They will be able to stay updated with the latest developments in the AI field, acquire and update knowledge, and possess the ability for lifelong learning. (Lifelong learning ability)

Upon completion of the four-year program, graduates will be equipped to work in various sectors such as enterprises, research institutions, higher education institutions, and public organizations. They will be capable of engaging in AI research, design, development, and management, driving innovative applications of AI technology in industries such as the internet, healthcare, finance, education, transportation, and energy. Within approximately five years after graduation, they will emerge as innovative technology leaders, key engineering managers, and professional market pioneers in the field of artificial intelligence.

毕业要求（**Student Outcomes**）：

№1.工程知识：运用数学、自然科学、计算和工程基础知识以及工程专业知识，制定人工智能领域相关的复杂工程问题中的相关解决方案。

№1.1 能够应用数学、自然科学、工程基础和专业知识表述人工智能领域工程问题，并建立具体对象的数学模型；

№1.2 能够应用数学、自然科学、工程基础和专业知识解释模型的物理含义，对模型进行正确的推理和解答；

№1.3 能够将数学、自然科学、工程基础和专业知识用于人工智能领域工程问题的分析、计算和设计。

№1.4 能够将数学、自然科学、工程基础和专业知识用于人工智能领域工程问题的解决方案的比较与综合。

№2.问题分析：利用数学、自然科学和工程科学的第一原理，识别、制定、研究并分析人工智能领域相关的复杂工程问题，得出有根据的结论，对可持续发展进行整体考虑。

№2.1 对人工智能领域的相关工程问题，能分析其需求，给出任务目标的需求描述，并识别其面临的各种制约条件。

№2.2 对人工智能领域的相关工程问题，能根据需求描述，建立解决问题的抽象模型。

№2.3 对人工智能领域的相关工程问题，能根据所建立的抽象模型，通过文献检索与资料查询等方式获取知识和方法，对问题进行分析，并得出有效结论。

№3.设计/开发解决方案：为人工智能领域相关的复杂工程问题设计创造性的解决方案，并设计系统、部件或流程，以满足确定的需求，同时适当考虑公共健康和安全、整个生命周期的成本、净零碳以及资源、文化、社会和环境因素。

№3.1 针对特定需求，能对人工智能领域中的相关工程问题进行分解和细化，能够进行软、硬件模块的设计与开发。

№3.2 了解人工智能领域技术发展的现状与趋势，能够在方案设计中体现创新意识。

№3.3 结合社会、健康、安全、法律、文化及环境等因素，综合考虑复杂工程问题的应用背景、系统特性、器件指标、设计流程等因素，分析对比候选方案的可行性和性能，确定解决方案。

№4.研究：使用研究方法对人工智能领域相关的复杂工程问题和系统进行研究，包括基于研究的知识、设计实验、分析和解释数据，以及综合信息以提供有效结论。

№4.1 能够基于科学原理并采用科学方法进行人工智能领域的相关复杂工程问题的系统分析和建模。

№4.2 能够针对复杂工程系统进行实验方案设计、实验平台搭建、实验数据获取。

№4.3 能够对实验数据进行信息综合分析，并得到合理有效的结论，反馈到工程设计实践中。

№5.工具的使用：创造、选择、应用适当的人工智能技术、资源以及现代工程和信息技术工具，包括预测和建模，认识其局限性，以解决人工智能领域相关的复杂工程问题。

№5.1 能恰当使用计算机软、硬件技术，通信协议及算法仿真工具，完成人工智能系统中的

复杂工程问题的模拟与仿真分析，能理解其局限性。

№5.2 能熟练使用电子仪器仪表观察分析人工智能系统性能，能运用图表、公式等手段表达和解决人工智能的设计问题，能理解其局限性。

№6.工程师与世界：分析和评估可持续发展的成果，社会、经济、可持续性和健康与安全、法律和环境在解决人工智能领域相关的复杂工程问题中的影响。

№6.1 具备社会、健康、法律、安全以及文化的基本知识和素养。

№6.2 能够合理评价人工智能领域相关工程实践和复杂工程问题解决方案对社会、健康、安全、法律以及文化的影响，并理解应承担的责任。

№7.品德修养与伦理：理解并掌握科学的世界观和方法论，具备良好的思想品德和社会公德，具有家国情怀和社会责任感；运用伦理原则，致力于人工智能领域职业伦理工程实践和规范；并遵守相关的国家和国际法律。表现出理解多元化和包容性的必要性。

№7.1 具有良好的思想品德和社会公德，具有家国情怀与社会责任感，能够践行社会主义核心价值观。

№7.2 通过应用伦理原则，理解并能遵循人工智能领域的伦理准则、道德原则和工程实践规范。

№7.3 能够在人工智能领域相关研究、开发和生产过程中遵守相关的国家和国际法律，尊重和包容不同的价值观、文化差异和个体差异，以确保合法性、合规性和公正性。

№8.个人和协作的团队工作：在多元化和包容性的团队中，以及多学科、远程和分布式的环境中，作为具备人工智能背景的个人、成员或领导有效地发挥作用。

№8.1 能够在人工智能领域相关研究、开发和生产的团队中承担个体和成员角色，具有团队合作精神或意识；

№8.2 能够在多学科背景下充分理解和消化其他学科的知识和方法，掌握团队合作的组织管理方式，具有团队负责人意识。

№9.沟通：在人工智能领域相关的复杂工程活动中与工程界和整个社会进行有效和包容的沟通，包括撰写和理解有效的报告和设计文件，并进行有效的介绍；考虑到文化、语言和学习差异。

№9.1 具有良好的表达能力，能够就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。

№9.2 具备运用外语的能力和一定的国际视野，能够在跨文化背景下进行沟通和交流。

№10.项目管理和财务：应用对人工智能领域相关的工程管理原则和经济决策的知识和理解，并将其应用于自己的工作，作为团队的成员和领导者，管理项目和多学科环境。

№10.1 理解并掌握工程管理原理与经济决策方法，能够识别人工智能领域相关工程项目管理与经济决策中的关键因素。

№10.2 能够将工程管理原理和经济决策方法运用于跨学科的复杂工程项目中。

№11.持续的终身学习：认识到需要并有准备和能力从事：i)独立和终身学习 ii) 适应人工

智能新技术和新兴技术，以及 iii) 在最广泛的人工智能技术变革背景下进行批判性思考。

№11.1 理解不断探索和学习的必要性，具有自主学习的方法，了解拓展知识和能力的途径。

№11.2 具有自主学习意识和终身学习的意识，能够根据社会环境和个人角色变化有不断学习和适应发展的能力。

№1.Engineering Knowledge: An ability to use basic knowledge of mathematics, natural science, calculation and engineering as well as engineering expertise to develop solutions to AI-related complex engineering problems.

№1.1 Being able to apply knowledge in mathematics, natural sciences, engineering fundamentals and Artificial Intelligence to describe AI-related engineering problems, and to establish mathematical models of related subjects;

№1.2 Being able to explain the physical meaning of said models using knowledge in mathematics, natural sciences, engineering fundamentals and Artificial Intelligence, and to make proper reasoning and explanation to the models.

№1.3 Being able to analyze, compute and design AI-related problems using knowledge in mathematics, natural sciences, engineering fundamentals and Artificial Intelligence.

№1.4 Being able to compare and combine solutions using knowledge in mathematics, natural sciences, engineering fundamentals and Artificial Intelligence.

№2. Problem Analysis: An ability to use the first principle of mathematics, natural science and engineering science to identify, formulate, study and analyze AI-related complex engineering problems, draw valid conclusions and consider sustainable development as a whole.

№2.1 Being able to analyze what is required to solve a particular AI-related engineering problem, describe detailed requirements and identify potential constrains before reaching target outcomes

№2.2 Being able to build abstract models according to the descriptions of detailed requirements of a particular AI-related engineering problem

№2.3 Being able acquire knowledge and methodology through literature retrieval and material searching, analyze problems and reach effective conclusions according to the abstract model established to solve a particular AI-related engineering problem.

№3. Design/Development of Solutions: An ability to design creative solutions for AI-related complex engineering problems, and design systems, components or processes to meet identified needs, taking due account of public health and safety, the cost of the entire life cycle, net zero carbon, and resource, cultural, social and environmental factors.

№3.1 Being able to design and develop software and hardware modules after careful disintegration and division of AI-related engineering problems according to specific needs.

№3.2 Being able to catch up with the current status and trends in AI-related technological

development and to demonstrate innovation in the solution design.

№3.3 Being able to compare the feasibility and performance of different solutions and choose the better ones taking into consideration the background of said complex engineering problems, systematic characters, indicators of devices used and procedures of designing etc. with an overall assessment on social, health, safety, legal, cultural and environmental concerns.

№4. Research: An ability to use research methods to study AI-related complex engineering problems and systems, including research based knowledge, design experiments, analysis and interpretation of data, and synthesis of information to provide effective conclusions.

№4.1 Being able to perform systematic analysis and build models on AI-related complex engineering problems based on scientific principles and using scientific methods.

№4.2 Being able to design experiments, build experimental platforms, and acquire data for complex engineering systems.

№4.3 Being able to conduct comprehensive information analysis on the data acquired, and to reach reasonable and effective conclusion that in turn guides solution design.

№5. Use of Tools: An ability to create, select, and apply appropriate technologies of Artificial Intelligence, resources, and modern engineering and information technology tools, including prediction and modeling, and recognize their limitations to solve AI-related complex engineering problems.

№5.1 Being able to develop, choose and use proper technology, resources, modern engineering and information technology tools to predict and simulate complex AI-related engineering problems and understand its constrains.

№5.2 Being able to use electronic instruments well to observe and analyze the performance of AI systems, and to use diagrams, formulas and others to express and solve AI design problems with awareness of its limitations.

№6. Engineers and The World: An ability to analyze and evaluate the results of sustainable development, and the impact of society, economy, sustainability, health and safety, law and environment in solving AI-related complex engineering problems.

№6.1 Being well-equipped with basic knowledge of society, health, law, safety and culture.

№6.2 Being able to give a reasonable evaluation on the impact of AI-related engineering practices and complex engineering problem solutions on society, health, safety, law, and culture, with an understanding of duties that needs to be undertaken.

№7. Ethics: An ability to apply ethical principles to the practice and standardization of professional ethics projects in the field of Artificial Intelligence; and comply with relevant national and international laws. Demonstrate the need to understand diversity and inclusion.

№7.1 Being able to understand and follow good moral character and social ethics, having a sense

of patriotism and social responsibility, and being able to uphold the core values of socialism.

№7.2 Being able to understand and follow ethical guidelines, moral principles, and engineering practices in the field of Artificial Intelligence by applying ethical principles.

№7.3 Being able to comply with relevant national and international laws in the research, development, and production processes in the field of Artificial Intelligence, while respecting and accommodating different values, cultural differences, and individual variations to ensure legality, compliance, and fairness.

№8. Individual and Collaborative Team Work: An ability to Effectively play a role as an individual, member or leader with a background in Artificial Intelligence in a diverse and inclusive team, as well as in a multidisciplinary, remote and distributed environment.

№8.1 Being able to work well with team members in AI-related research, development and production projects;

№8.2 Being able to understand and learn knowledge and methods of other disciplines in a multi-disciplinary team, to engage in the management of the team and act with good leadership skills.

№9. Communication: An ability to effective and inclusive communication with the engineering community and the whole society in AI-related complex engineering activities, including writing and understanding effective reports and design documents, and effective introduction; Consider cultural, language and learning differences.

№9.1 Being able to express oneself well and conduct effective communication with peers and the public on complex engineering problems by ways of report-writing, designing, public speech, instruction responding etc.

№9.2 Having a good command of foreign languages and global outlook, and being able to communicate in a cross-cultural context.

№10. Project Management and Finance: An ability to apply the knowledge and understanding of AI-related engineering management principles and economic decisions, and apply them to their own work. As a team member and leader, manage projects and multidisciplinary environments.

№10.1 Being able to understand and master management fundamental in engineering and economic decision-making methods, and to identify key factors in the managing and economic decision-making of AI related projects.

№10.2 Being able to apply knowledge in engineering management and economics in complex interdisciplinary engineering projects.

№11. Continuous Lifelong Learning: An ability to recognizing the need and being prepared and able to engage in: i) independent and lifelong learning, ii) adapting to new and emerging AI-related technologies, and iii) critical thinking in the broadest context of AI-related technological change.

№11.1 Understanding the need of continuous study, being able to study independently and

knowing ways to expand knowledge and improve oneself.

№11.2 Having a good sense of independent learning and lifelong learning, and being able to learn continuously and adapt to the surroundings.

培养目标与毕业要求关系矩阵：

培养目标 / 毕业要求	培养目标 1	培养目标 2	培养目标 3	培养目标 4
毕业要求 1.1		●		●
毕业要求 1.2		●	●	●
毕业要求 1.3		●		●
毕业要求 1.4		●	●	●
毕业要求 2.1		●		●
毕业要求 2.2		●		●
毕业要求 2.3		●		●
毕业要求 3.1		●	●	
毕业要求 3.2		●	●	●
毕业要求 3.3		●	●	●
毕业要求 4.1		●		●
毕业要求 4.2		●		
毕业要求 4.3		●		●
毕业要求 5.1		●		●
毕业要求 5.2		●	●	●
毕业要求 6.1	●		●	●
毕业要求 6.2	●		●	●
毕业要求 7.1	●		●	
毕业要求 7.2	●		●	
毕业要求 7.3	●		●	●
毕业要求 8.1	●		●	
毕业要求 8.2	●	●	●	
毕业要求 9.1	●	●	●	●
毕业要求 9.2	●		●	
毕业要求 10.1		●		●
毕业要求 10.2		●	●	●
毕业要求 11.1	●			●

培养目标 毕业要求	培养目标 1	培养目标 2	培养目标 3	培养目标 4
毕业要求 11.2	●			●

Relationship Matrix between Educational Objectives and Student Outcomes：

Educational Objectives Student Outcomes	Educational Objective 1	Educational Objective 2	Educational Objective 3	Educational Objective 4
Student Outcome 1.1		●		●
Student Outcome 1.2		●	●	●
Student Outcome 1.3		●		●
Student Outcome 1.4		●	●	●
Student Outcome 2.1		●		●
Student Outcome 2.2		●		●
Student Outcome 2.3		●		●
Student Outcome 3.1		●	●	
Student Outcome 3.2		●	●	●
Student Outcome 3.3		●	●	●
Student Outcome 4.1		●		●
Student Outcome 4.2		●		
Student Outcome 4.3		●		●
Student Outcome 5.1		●		●
Student Outcome 5.2		●	●	●
Student Outcome 6.1	●		●	●
Student Outcome 6.2	●		●	●
Student Outcome 7.1	●		●	
Student Outcome 7.2	●		●	
Student Outcome 7.3	●		●	●
Student Outcome 8.1	●		●	
Student Outcome 8.2	●	●	●	
Student Outcome 9.1	●	●	●	●
Student Outcome 9.2	●		●	
Student Outcome 10.1		●		●
Student Outcome 10.2		●	●	●

Educational Objectives / Student Outcomes	Educational Objective 1	Educational Objective 2	Educational Objective 3	Educational Objective 4
Student Outcome 11.1	●			●
Student Outcome 11.2	●			●

专业简介（Program Profile）：

发展人工智能技术是国家重大战略部署。粤港澳大湾区是世界电子信息产业基地，对人工智能人才需求巨大。

人工智能专业依托粤港澳大湾区电子信息产业优势，紧密围绕产业需求，着眼行业发展前沿，深入推进学科交叉，融入产业创新生态，贯通人工智能人才培养与产业知识价值链条的联系通道，提供丰富的实验和实训课程，面向人工智能未来技术发展培养具有创新能力和国际视野的高层次拔尖人才。本专业课程体系注重数学基础（微积分、线性代数与解析几何、概率论与数理统计等）和计算机基础（数据结构、高级语言程序设计等）；在此基础上开设专业课加深人工智能专业理论和技术学习（机器学习、深度学习与计算机视觉、3D 视觉智能技术等），并增加智能硬件与学科交叉特色课程（电路分析与电子线路基础、数字逻辑电路、智能硬件与交互设计、人工智能芯片设计等）。

本专业涉及包括自然科学、工程技术、信息技术的大量理论知识与技术方法，聚焦行业需求，注重前沿交叉，深耕产学合作，推进产学融合。学生毕业后可以继续攻读相关领域的硕士及博士，也可以在人工智能+行业，诸如智慧医疗、智慧教育、智慧金融、智慧城市、智慧交通、智慧能源等行业从事研发、管理等工作。

As an international base of electronic industries, the Guangdong-Hong Kong-Macau Greater Bay are in huge demands for AI-related talents.

The program of Artificial Intelligence takes advantage of the local industrial resources in electrics and information, pivots around industrial needs to develop an inter-disciplinary education approach. With an eye on the latest of the industry and introducing innovation from industry into university, we aim to build a channel between talent-cultivation and industrial knowledge creation. Through the provision of rich experiment courses and hands-on practice courses, we are dedicated to producing top talents with innovation skills and global outlook that caters to the needs of future AI technology developments. The curriculum system of this program emphasizes solid math foundation (with course such as Calculus, Linear Algebra & Analytic Geometry, Probability & Mathematical Statistics, etc.) and computational sills (with course such as Data Structure, Advanced Language Programming, etc.). With these foundations, we then add AI theory and technology courses (such as Machine Learning, Deep Learning and Computer Vision, 3D Vision Intelligence， etc.) and on top of that, provide

intelligent hardware and inter-disciplinary courses (such as Circuit Analysis and Fundamentals of Electronic Circuits, Digital Logic Circuits, Intelligent Hardware and Interactive Design, AI Chip Design, etc.).

This program involves courses that introduce rich theoretical knowledge and technical methods in natural science, engineering technology, and information technology. With particular focus on industrial needs and emphasis on an inter-disciplinary approach, we are constantly deepening the industry-university link. Upon graduation, students can choose between pursuing master or doctoral level study and finding technical and managerial jobs in AI+ industries, such as smart healthcare, smart education, smart finance, smart cities, smart transportation, and smart power.

专业特色（Program Features）：

人工智能专业以国家人工智能重大战略为引领，依托粤港澳大湾区电子信息产业优势，聚焦前沿技术，紧密围绕产业需求，深入推进跨学科交叉与跨系统产学融合，面向未来培养具有创新能力和国际视野的高层次创新领军人才。

The AI program is guided by the national strategic development of artificial intelligence and leverages the advantages of the electronics and information industry in the Guangdong-Hong Kong-Macao Greater Bay Area. It focuses on cutting-edge technologies and closely aligns with industrial demands. It promotes interdisciplinary integration and industry-university collaboration, aiming to cultivate highly innovative leaders with the ability to think creatively and possess a global perspective for the future.

授予学位（Degree Conferred）：

工学学士学位 Bachelor of Engineering

核心课程（Core Courses）：

人工智能III：人工智能导论、离散数学、高级语言程序设计、数据结构、机器学习、数字逻辑电路、信号与系统、数字信号处理、深度学习与计算机视觉、3D 视觉智能技术、人工智能系统综合设计

Artificial IntelligenceIII：Introduction to Artificial Intelligence, Discrete Mathematics，Advanced Language Programming, Data Structures, Machine Learning, Digital Logic Circuits, Signals & Systems, Digital Signal Processing, Deep Learning and Computer Vision, 3D Vision Intelligence，Synthetic Design of Artificial Intelligence System

大学分专业核心课 Integrated Core Courses:人工智能 I：大学计算机基础、人工智能 II：C++编程基础、人工智能III：人工智能导论

Artificial IntelligenceⅠ：Fundamentals of Compute, Artificial IntelligenceⅡ：Fundamentals of C++ Programming ,Artificial IntelligenceⅢ：Introduction to Artificial Intelligence

特色课程（Featured Courses）：

新生研讨课：工程导论 I

基于项目（设计、案例）的课程：工程导论实践 I

国际化特色课程：人工智能导论、人工智能应用专题

专题研讨课：人工智能系统综合设计

学科前沿课：强化学习、自然语言处理、区块链

跨学科交叉课程：智能硬件与交互设计、智能传感及穿戴计算、人工智能芯片设计

本研贯通课：随机过程

本研共享课：强化学习

校企合作课：3D 视觉智能技术、工程导论 I、元宇宙导论与实践、大语言模型与人工智能工程设计

创新实践课：设计思维创新与实践（“三个一”课程）

创业教育课：设计思维创新与实践（“三个一”课程）

工作坊：智能硬件与交互设计、设计思维创新与实践

专题设计课：智能硬件与交互设计、人工智能系统综合设计、工程导论 I

竞教结合课：人工智能系统综合设计、3D 视觉智能技术

劳动教育课：工程创新训练II、毕业实习、工程导论实践 I、3D 视觉智能技术

Freshmen Seminars: Introduction to Engineering I

Project-based Courses: Practice of Introduction to Engineering I

Global Education Courses: Introduction to Artificial Intelligence， Special Topic for Artificial Intelligence Application

Special Topics: Synthetic Design of Artificial Intelligence System

Subject Frontiers Courses: Reinforcement Learning, Natural Language Processing, Blockchain

Interdisciplinary Courses: Intelligent Hardware and Interaction Design, Intelligent Sensor and Wearable Computing, AI Chip Design

Baccalaureate-Master’s Integrated Courses: Stochastic Process

Baccalaureate-Master’s Sharing Courses: Reinforcement Learning

Cooperative Courses with Enterprises: 3D Vision Intelligence, Introduction to Engineering I , Metaverse Introduction and Practice, Large Language Model and Artificial Intelligence Engineering Design

Innovation Practice: Design Thinking Innovation and Practice ("Three ones" Courses)

Entrepreneurship Courses: Design Thinking Innovation and Practice ("Three ones" Courses)

Workshops: Intelligent Hardware and Interaction Design, Design Thinking Innovation and Practice

Special Designs: Intelligent Hardware and Interaction Design, Synthetic Design of Artificial Intelligence System，Introduction to Engineering I

Contest-Teaching Integrated Courses: Synthetic Design of Artificial Intelligence System， 3D Vision Intelligence

Education on The Hard-Working Spirit: Engineering Innovation Training II, Practice on Diploma Project, Practice of Introduction to Engineering I, 3D Vision Intelligence

修读指引（Study Guidance）：

本专业设有四个选修课程模块，包括智能计算、智能硬件、计算机与网络及 AI+跨学科。学生可根据自身需要选修四个模块中的任意课程以达到最低的选修学分需求。建议学生在每个所选修的课程模块中至少选修完成 6 学分，从而在特定领域建立更完整的知识体系。

The program offers four elective course modules, including Intelligent Computing, Intelligent Hardware, Computer and Network, and AI+ Inter-disciplinary. Students can choose any courses from the four modules according to their needs to fulfill the minimum elective credit requirements. It is recommended that students complete at least 6 credits in each selected course module to establish a more comprehensive knowledge system in a specific field.

一、各类课程学分登记表（Registration Form of Curriculum Credits）

1.学分统计表（Credits Registration Form）

课程类别 Course Category	课程要求 Requirement	学分 Credits	学时 Academic Hours	备注 Remarks
公共基础课 General Basic Courses	必修 Compulsory	58.5	1124	
	通识 General Education	10	160	
专业基础课 Specialty Basic Courses	必修 Compulsory	40	742	
选修课 Elective Courses	选修 Elective	17	328	
合　计 Total		125.5	2354	
集中实践教学环节 Practice Training	必修 Compulsory	34	38 周 38Weeks	
毕业学分要求 Credits Required for Graduation	125+34 =159.5			

建议每学期修读学分 Suggested Credits for Each Semester	1	2	3	4	5	6	7	8
	26	27.5	29.5	22	16.5	16	10	12

备注：学生毕业时须修满专业教学计划规定学分，并取得第二课堂 5 个人文素质教育学分和 4 个创新能力培养学分。

2.类别统计表（Category Registration Form）

学时 Academic Hours					学分 Credits						
总学时数 Total	其中 Include		其中 Include		总学分数 Total	其中 Include		其中 Include			其中 Include
	必修学时 Compulsory	选修学时 Elective	理论教学学时 Theory Course	实验教学学时 Lab		必修学分 Compulsory	选修学分 Elective	集中实践教学环节学分 Practice	理论教学学分 Theory Course	实验教学学分 Lab	创新创业教育学分 Innovation and Entrepreneurship Education
2354	1866	488	1742	612	159.5	132.5	27	34	106.5	19	4

备注：1.通识课计入选修一项中；

2.实验教学包括“专业教学计划表”中的实验、实习和其它；

3.创新创业教育学分：培养计划中的课程，由各院系教学指导委员会认定，包括竞教结合课程、创新实践课程、创业教育课程等学分；

4.必修学时＋选修学时=总学时数；理论教学学时＋实验教学学时=总学时数；必修学分＋选修学分=总学分数；集中实践教学环节学分＋理论教学学分＋实验教学学分=总学分数。

二、课程设置表（Courses Schedule）

类别 Course Category	课程代码 Course No.	课程名称 Course Title	是否必修 C/E	学时数 Total Curriculum Hours					学分数 Credits	开课学期 Semester
				总学时 Class Hours	理论 Theoretical class hours	实验 Lab Hours	实习 Practice Hours	其它 Other Hours		
公共基础课 General Basic Courses	031101761	习近平新时代中国特色社会主义思想概论 The Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era	必/C	48	36			12	3.0	1
	031101661	思想道德与法治 Ethics and Rule of Law		40	36			4	2.5	2
	031101371	中国近现代史纲要 Skeleton of Chinese Modern History		40	36			4	2.5	3
	031101424	毛泽东思想和中国特色社会主义理论体系概论 Thought of Mao ZeDong and Theory of Socialism with Chinese Characteristics		40	36			4	2.5	4
	031101522	马克思主义基本原理 Analysis of the Situation & Policy		40	36			4	2.5	4
	031101331	形势与政策 Analysis of the Situation & Policy		64	64				2.0	1-8
	EMP040100011	工程数学：微积分 II (一) Engineering Math: Calculus (1)		80	80				5.0	1
	EMP040100021	工程数学：线性代数与解析几何 Engineering Math:Linear Algebra & Analytic Geometry		48	48				3.0	1
	EMP040100012	工程数学：微积分 II (二) Engineering Math:Calculus (2)		80	80				5.0	2
	EMP040100031	工程数学：概率论与数理统计 Engineering Math：Probability & Mathematical Statistics		48	48				3.0	2
	040101731	复变函数Ⅰ Complex Variable Ⅰ		32	32				2.0	3
	AIP045100011	人工智能 I：大学计算机基础 Artificial IntelligenceⅠ：Fundamentals of Compute		32				32	0	1
	AIP045100021	人工智能 II：C++编程基础 Artificial IntelligenceII：Fundamentals of C++ Programming		48	32			16	2.5	1
	044104182	学术英语与科技交流（一） EAP and Technical Communication (1)		32	32				2.0	1
	044104192	学术英语与科技交流（二） EAP and Technical Communication (2)		32	32				2.0	2
	052100332	体育（一） Physical Education (1)		36				36	1.0	1
	052100012	体育（二） Physical Education (2)		36				36	1.0	2
	052100842	体育（三）		36				36	1.0	3

		Physical Education (3)								
	052100062	体育（四） Physical Education (4)		36				36	1.0	4
	006100112	军事理论 Military Principle		36	18			18	2.0	2
	074102992	工程制图 Engineering Drawing		48	48				3.0	1
	041101155	大学物理III（一） General Physics Ⅲ (1)		64	64				4.0	2
	041100671	大学物理实验（一） Physics Experiment (1)		32		32			1.0	2
	041100344	大学物理III（二） General Physics Ⅲ (2)		64	64				4.0	3
	041101051	大学物理实验(二) General Physics (2)		32		32			1.0	3
		人文科学、社会科学领域 Humanities, Social Science	通识/E	128	128				8.0	
		科学技术领域 Science and Technology		32	32				2.0	
	合 计 Total			1284	982	64		238	68.5	

备注：学时中其它可以为上机和实践学时。

通识课要求：

1.开设党史、新中国史、改革开放史、社会主义发展史等“四史”通识课程，全校本科生从“四史”中选择一门必修；

2.学生不能修读本学院开设的通识课程（除在本学院跨学科修读外）；

3.除艺术类的学生外，每位学生须修满 2 学分的公共艺术通识课程，其中美学和艺术史论类、艺术鉴赏和评论类课程至少取得 1 个学分。

二、课程设置表（续）（Courses Schedule）

类别 Course Category	课程代码 Course No.	课程名称 Course Title	是否必修 C/E	学时数 Total Curriculum Hours					学分数 Credits	开课学期 Semester
				总学时 Class Hours	理论 Theoretical class hours	实验 Lab Hours	实习 Practice Hours	其它 Other Hours		
专业基础课 Specialty Basic Courses	084100101	工程导论 I Introduction to Engineering I	必/C	16	16				1.0	1
	084100011	Python 语言程序设计 Introduction to Programming Using Python		32	16	16			1.5	1
	AIS084100011	人工智能III：人工智能导论 Artificial IntelligenceIII：Introduction to Artificial Intelligence		32	32				2.0	2
	084100122	人工智能导论实验 Experiment of Introduction to Artificial Intelligence		32		32			1.0	2
	084100142	高级语言程序设计 Advanced Language Programming		38	32			6	2.0	2
	084100132	数据结构 Data Structures		56	56				3.5	3
	084100041	电路分析与电子线路基础实验 Circuit Analysis and Fundamentals of		16		16			0.5	3

		Electronic Circuits Experiment								
	084100081	电路分析与电子线路基础 Circuit Analysis and Fundamentals of Electronic Circuits		48	48				3.0	3
	084100031	信号与系统 Signals & Systems		48	48				3.0	3
	084100091	信号与系统实验 Experiment of Signals and Systems		16		16			0.5	3
	084100111	机器学习 Machine Learning		48	32	16			2.5	3
	084100631	计算机组成与体系结构 Computer Organization and Architecture		64	48	16			3.5	4
	084100021	数字逻辑电路 Digital Logic Circuits		48	48				3.0	4
	084100061	数字逻辑电路实验 Digital Logic Circuit Experiment		16		16			0.5	4
	084100161	数字信号处理 Digital Signal Processing		32	32				2.0	4
	084100471	数字信号处理实验 Experiment of Digital Signal Processing		16		16			0.5	4
	084100461	深度学习与计算机视觉 Deep Learning and Computer Vision		48	32	16			2.5	4
	084100481	数字系统设计 Digital System Design		64	48	16			3.5	5
	084101011	3D 视觉智能技术 3D Vision Intelligence		40	24	16			2.0	5
	084100151	人工智能系统综合设计 Synthetic Design of Artificial Intelligence System		32	32				2.0	6
	合 计 Total		必 /C	742	544	192		6	40	
选修课 Elective Courses	**智能计算课程模块 Intelligent Computing Module**									
	084100544	离散数学 Discrete Mathematics	选 /E	48	48				3.0	3、5、7
	084100531	统计学 Statistics	选 /E	32	32				2.0	3、5、7
	084100501	随机过程 Stochastic Process	选 /E	32	32				2.0	4、6
	084100171	数字图像处理 Digital Image Processing	选 /E	32	32				2.0	4、6
	084100551	优化方法 Optimization Method	选 /E	32	32				2.0	5、7
	084100291	矩阵分析与计算 Matrix Analysis and Computation	选 /E	32	32				2.0	6
	084100251	强化学习 Reinforcement Learning	选 /E	32	32				2.0	6
	084100491	自然语言处理 Natural Language Processing	选 /E	32	32				2.0	7

	智能硬件课程模块 **Intelligent Hardware Module**									
	084100191	虚拟现实与增强现实 Virtual Reality (VR) and Augmented Reality (AR)	选/E	32	32				2.0	6
	084100301	人工智能芯片设计 AI Chip Design	选/E	32	32				2.0	6
	084100311	智能传感与穿戴计算 Intelligent Sensor and Wearable Computing	选/E	32	32				2.0	6
	084100261	智能硬件与交互设计 Intelligent Hardware and Interaction Design	选/E	32	32				2.0	7
	084100512	Linux 与嵌入式开发 Linux and Embedded Development	选/E	32	32				2.0	7
	计算机与网络课程模块 Computer and Network Module									
	084100681	Java 程序设计 Java Programming	选/E	48	32	16			2.5	3、5、7
	084100671	计算机网络 Computer Network	选/E	64	48	16			3.5	4、6
	084100641	数据库系统 Database System	选/E	64	48	16			3.5	4、6
	084100661	操作系统 Operating System	选/E	64	48	16			3.5	5、7
	084100181	大数据及数据挖掘 Big Data and Data Mining	选/E	40	40				2.5	5、7
	084100561	网络空间体系结构 Architecture of Cyberspace	选/E	32	32				2.0	6
	084100271	新一代移动通信 Next Generation Mobile Communication	选/E	32	32				2.0	6
	084100381	区块链 Blockchain	选/E	32	32				2.0	6
	084100321	多媒体信息安全 Multimedia Information Security	选/E	32	32				2.0	7
	084100331	智能搜索和推荐系统 Smart Search and Recommendation System	选/E	32	32				2.0	7
	AI＋跨学科课程模块 **AI＋Inter-disciplinary Module**									
	084101021	人工智能应用专题 Special Topic for Artificial Intelligence Application	选/E	48	32	16			2.5	4、6
	084100221	神经科学 Introduction to Neuroscience	选/E	32	32				2.0	5、7
	084100982	设计思维创新与实践 Design Thinking Innovation and	选	32	32				2.0	5、7

		Practice	/E							
	084100991	元宇宙导论与实践 Metaverse Introduction and Practice	选/E	48	32	16			2.5	5、7
	084100971	大语言模型与人工智能工程设计 Large Language Model and Artificial Intelligence Engineering Design	选/E	32	16	16			1.5	5、7
	084100211	认知心理学 Cognitive Psychology	选/E	32	32				2.0	6
	084100521	机器人学 Introduction to Robotics	选/E	32	32				2.0	6
	084100231	生物医学图像处理 Biomedical Image Processing	选/E	32	32				2.0	7
	创新创业学分认定 Innovation and Entrepreneurial Practice									
	084100571	IT 商业模式与创业 IT Business Model and Entrepreneurship	选/E	16	16				1.0	7
	020100051	创新研究训练 Innovation Research Training	选/E	32	32				2.0	7
	020100041	创新研究实践 I Innovation Research Practice I	选/E	32	32				2.0	7
	020100031	创新研究实践 II Innovation Research Practice II	选/E	32	32				2.0	7
	020100061	创业实践 Entrepreneurial Practice	选/E	32	32				2.0	7
	跨学院选修课 Interdisciplinary Elective Courses									
	084101041	跨学院选修课 I Interdisciplinary Elective Course I	选/E	32	32				2.0	
	084101051	跨学院选修课 II Interdisciplinary Elective Course II	选/E	32	32				2.0	
	跨专业选修课 Cross-program Elective Courses									
	084101061	跨专业选修课 I Cross-program Elective Course I	选/E	32	32				2.0	
	084101071	跨专业选修课 II Cross-program Elective Course II	选/E	32	32				2.0	
	合 计 Total		选/E	选修课修读最低要求 17.0 学分 Minimum elective course credits required:17.0						

备注：学时中其它可以为上机和实践学时。

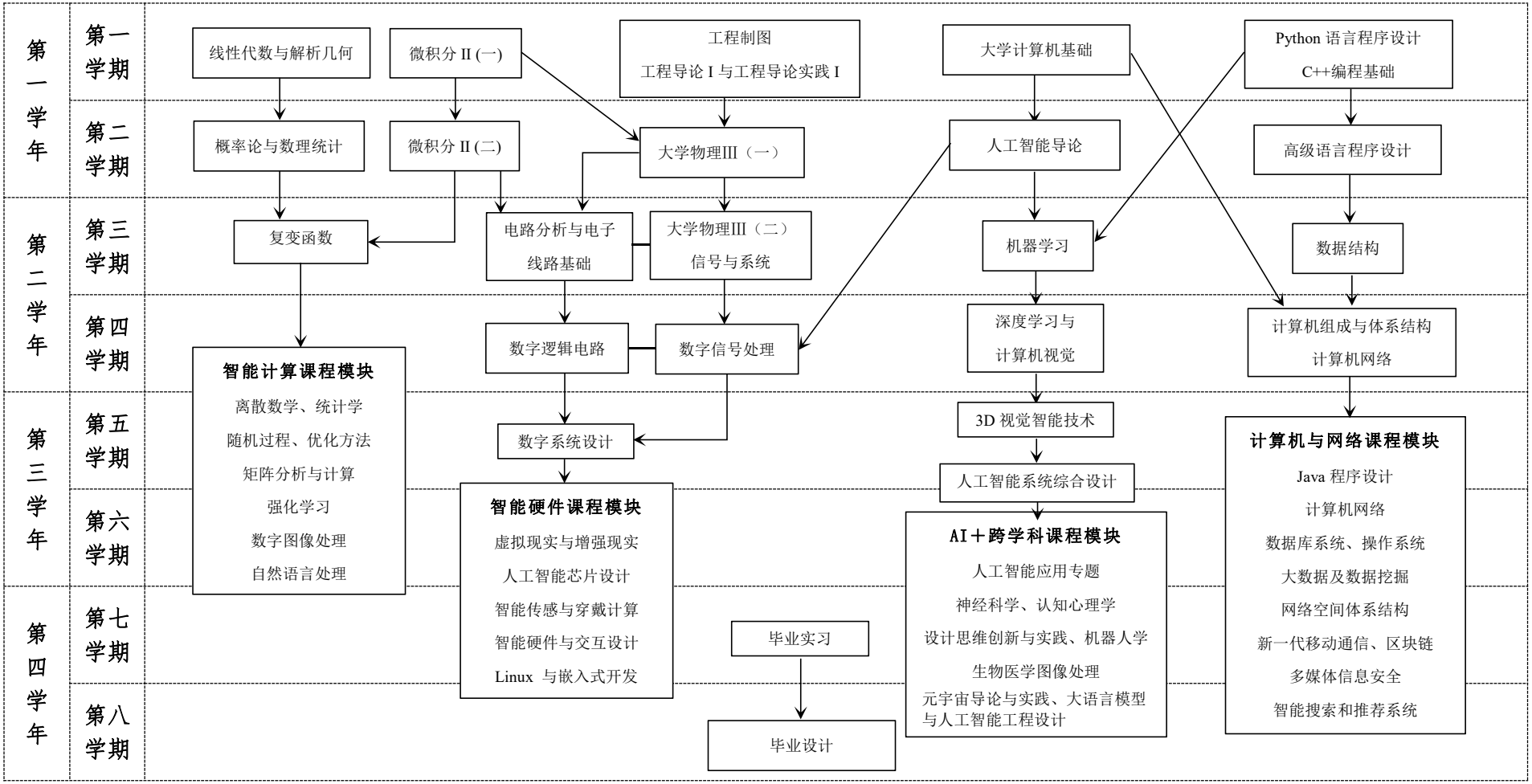
学生根据自己开展科研训练项目、学科竞赛、发表论文、获得专利和自主创业等情况申请折算为一定的专业选修课学分（创新研究训练、创新研究实践 I、创新研究实践 II、创业实践等创新创业课程）。每个学生累计申请为专业选修课总学分不超过 4 个学分。经学校批准认定为选修课学分的项目、竞赛等不再获得对应第二课堂的创新学分。

学生修读其他学院或本院跨专业开设的课程，已修读课程学分等于或高于 2 学分的，可以折算为一定的专业选修课学分。

三、集中实践教学环节（Practice-concentrated Training）

课 程 代 码 Course No.	课 程 名 称 Course Title	是否必修 C/E	学 时 数 Total Curriculum Hours		学分数 Credits	开课学期 Semester
			实践 Practice weeks	授课 Lecture Hours		
006100151	军事技能 Military Training	必/C	2 周 2 weeks		2.0	1
084100341	工程导论实践 I Practice of Introduction to Engineering I	必/C	2 周 2 weeks		2.0	1
084100241	高级语言程序设计实训 Advanced Language Programming Training	必/C	2 周 2 weeks		2.0	2
031101551	马克思主义理论与实践 Marxism Theory and Practice	必/C	2 周 2 weeks		2.0	3
067101781	工程创新训练 II Engineering Innovation Training II	必/C	2 周 2 weeks		2.0	3
084100581	机器学习课程设计 Course Design of Machine Learning	必/C	2 周 2 weeks		2.0	3
084100841	数据结构课程实训 Data Structure Course Training	必/C	2 周 2 weeks		2.0	4
084100351	深度学习与计算机视觉课程设计 Course Design of Deep Learning and Computer Vision	必/C	2 周 2 weeks		2.0	4
084100361	人工智能系统综合设计课程设计 Synthetic Design of Artificial Intelligence System	必/C	2 周 2 weeks		2.0	6
084100371	毕业实习 Practice on Diploma Project	必/C	4 周 4weeks		4.0	7
084100411	毕业设计 Diploma Project	必/C	16 周 16 weeks		12.0	8
合 计		必/C	38 周 38 weeks		34.0	

四、课程地图（Curriculum Mapping）



五、课程体系与毕业要求关系矩阵（Relation Matrix between Curriculum System and Student Outcomes）

课程名 Course Title	人工智能专业毕业要求 Artificial Intelligence Program Student Outcomes																											
	1.1	1.2	1.3	1.4	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3	5.1	5.2	6.1	6.2	7.1	7.2	7.3	8.1	8.2	9.1	9.2	10.1	10.2	11.1	11.2
习近平新时代中国特色社会主义思想概论 The Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era	●		●		●		●											●										
思想道德与法治 Ethics and Rule of Law										●							●	●	●	●								
中国近现代史纲要 Skeleton of Chinese Modern History																		●	●	●			●					
毛泽东思想和中国特色社会主义理论体系概论 Thought of Mao ZeDong and Theory of Socialism with Chinese Characteristics	●		●		●		●											●										
马克思主义基本原理 Analysis of the Situation & Policy																			●	●			●	●				
形势与政策 Analysis of the Situation & Policy																			●	●			●	●				●
工程数学：微积分 II (一) Engineering Math: Calculus (1)	●	●	●			●	●				●																	
工程数学：线性代数与解析几何 Engineering Math:Linear Algebra & Analytic Geometry	●	●	●			●	●				●																	
工程数学：微积分 II (二) Engineering Math:Calculus (2)	●	●	●			●	●				●																	
工程数学：概率论与数理统计 Engineering Math：Probability & Mathematical Statistics	●	●	●		●	●	●						●															

复变函数I Complex VariableI	●	●			●	●																						
人工智能 I：大学计算机基础 Artificial IntelligenceI：Fundamentals of Compute														●	●													
人工智能 II：C++编程基础 Artificial IntelligenceII：Fundamentals of C++ Programming			●	●	●	●								●														
学术英语与科技交流（一） EAP and Technical Communication (1)																							●	●			●	
学术英语与科技交流（二） EAP and Technical Communication (2)																			●				●	●				●
体育（一） Physical Education (1)																●											●	●
体育（二） Physical Education (2)																●											●	●
体育（三） Physical Education (3)																●											●	●
体育（四） Physical Education (4)																●											●	●
军事理论 Military Principle																●											●	●
工程制图 Engineering Drawing	●	●													●			●	●									
大学物理III（一） General Physics III (1)		●			●	●																						
大学物理实验（一） Physics Experiment (1)		●		●	●	●					●	●	●		●													
大学物理III (二) General Physics III (2)		●			●	●																						

大学物理实验(二) General Physics (2)		●		●	●	●					●	●	●		●													
工程导论 I Introduction to Engineering I						●			●								●							●				●	
Python 语言程序设计 Introduction to Programming Using Python		●												●														
人工智能Ⅲ：人工智能导论 Artificial IntelligenceⅢ：Introduction to Artificial Intelligence						●		●	●	●							●	●						●	●			●
人工智能导论实验 Experiment of Introduction to Artificial Intelligence											●		●															
高级语言程序设计 Advanced Language Programming		●												●														
数据结构 Data Structures		●												●														
电路分析与电子线路基础实验 Circuit Analysis and Fundamentals of Electronic Circuits Experiment								●			●		●															
电路分析与电子线路基础 Circuit Analysis and Fundamentals of Electronic Circuits			●		●																							
信号与系统 Signals & Systems			●	●			●																					
信号与系统实验 Experiment of Signals and Systems											●	●																
机器学习 Machine Learning			●	●			●																					
计算机组成与体系结构 Computer Organization and Architecture							●		●			●	●															

数字逻辑电路 Digital Logic Circuits			●		●																						
数字逻辑电路实验 Digital Logic Circuit Experiment										●				●													
数字信号处理 Digital Signal Processing			●			●																					
数字信号处理实验 Experiment of Digital Signal Processing										●	●	●															
深度学习与计算机视觉 Deep Learning and Computer Vision			●	●			●																				
数字系统设计 Digital System Design			●		●																						
3D 视觉智能技术 3D Vision Intelligence				●			●																●				
人工智能系统综合设计 Synthetic Design of Artificial Intelligence System						●			●													●			●		
军事技能 Military Training															●								●			●	●
工程导论实践 I Practice of Introduction to Engineering I								●	●											●	●			●	●	●	
高级语言程序设计实训 Advanced Language Programming Training									●											●				●	●		
马克思主义理论与实践 Marxism Theory and Practice																	●	●				●	●				
工程创新训练II Engineering Innovation Training II									●											●	●			●		●	●
机器学习课程设计 Course Design of Machine Learning									●											●				●	●		
数据结构课程实训 Data Structure Course Training									●				●								●						

深度学习与计算机视觉课程设计 Course Design of Deep Learning and Computer Vision									●												●				●	●		
人工智能系统综合设计课程设计 Synthetic Design of Artificial Intelligence System									●												●				●	●		
毕业实习 Practice on Diploma Project										●				●		●											●	●
毕业设计 Diploma Project				●		●		●	●	●					●		●			●				●			●	●	●

六、第二课堂

第二课堂由人文素质教育和创新能力培养两部分组成。

1.人文素质教育基本要求

学生在取得专业教学计划规定学分的同时，还应结合自己的兴趣适当参加课外人文素质教育活动，参加活动的学分累计不少于 5 个学分。其中，大学体育教学团队开设课外体育课程，高年级本科生必修，72 学时，1 学分，纳入第二课堂人文素质教育学分。大学生心理健康教育，2 学分，虚拟第三学期开设，纳入第二课堂人文素质教育学分。

2.创新能力培养基本要求

学生在取得本专业教学计划规定学分的同时，还必须参加国家创新创业训练计划、广东省创新创业训练计划、SRP（学生研究计划）、百步梯攀登计划或各类课外创新能力培养活动（如学科竞赛等）。学生参加上述活动及创新能力培养相关学术讲座所获学分累计不少于 4 个学分。

6.“Second Classroom” Activities

“Second Classroom” Activities are comprised of two parts, Humanities Quality Education and Innovative Ability Cultivation.

(1)Basic Requirements of Humanities Quality Education

Besides gaining course credits listed in one’s subject teaching curriculum, a student is required to participate in extracurricular activities of Humanities Quality Education based on one’s interest, acquiring no less than five credits. The advanced undergraduates must complete one of courses of Humanities Quality Education which has seventy two class hours (it's equivalent to one credit which belongs to Humanities Quality Education Credit of Extracurricular Class) offered by the College Physical Education Teaching Group.Mental Health Education for College Students(2 credits) is opened in virtual third semester which belongs to Humanities Quality Education Credit of Extracurricular Class.

(2)Basic Requirements of Innovative Ability Cultivation

Besides gaining course credits listed in one’s subject teaching curriculum, a student is required to participate in any one of the following activities: National Undergraduate Training Programs for Innovation and Entrepreneurship, Guangdong Undergraduate Training Programs for Innovation and Entrepreneurship, Student Research Program (SRP), One-hundred-steps Innovative Program, or any other extracurricular activities of Innovative Ability Cultivation that last a certain period of time (e.g. subject contests, academic lectures), acquiring no less than four credits.