机器人工程

Robotics Engineering

专业代码：080803T　　学　制：4 年

Program Code: 080803T　　Duration：4 years

培养目标（Educational Objectives）：

机器人工程专业面向国家重大需求与全球技术前沿，依托华南理工大学新工科人才培养体系，致力于培养具有家国情怀、全球视野和“三力三创”（学习力、思想力、行动力，创新、创造、创业）型的新工科人才。学生将系统掌握智能机器人系统的设计与建模、感知、控制与决策能力，具备扎实的数理基础、卓越的工程实践能力和良好的社会责任感。培养具有家国情怀和优良品德，具有解决机器人系统的设计制造、研究开发、工程应用、运行管理问题的能力，在机器人及智能装备领域引领未来发展的拔尖创新人才。

本专业学生毕业 5 年左右预期达到的具体目标：

1. 拥有积极的社会主义核心价值观，具备健全人格、高尚品格和社会责任感，在工程实践中能够关注伦理规范与人文关怀；

2. 系统掌握机器人领域核心理论与跨机械、控制、计算机、人工智能等多学科知识，并能综合应用于机器人的设计、建模、优化与控制；

3. 拥有发现、分析与解决复杂工程问题的能力，具备跨学科、跨文化背景下的表达与沟通能力；

4. 能在多元团队中高效协作，承担系统集成、项目组织与工程实施等关键角色；

5. 保持技术敏锐与终身学习意识，制定清晰的职业发展路径，持续拓展知识与技能，实现行业内的长期发展。

The Robotics Engineering program is oriented toward national strategic needs and global technological frontiers. It is embedded within South China University of Technology’s New Engineering Education framework and is dedicated to cultivating next-generation engineering talents with patriotism, global vision, and “three core competencies and three innovation attributes” (i.e., the abilities to learn, think, and act, as well as to innovate, create, and initiate ventures). Students will acquire systematic knowledge and capabilities in the design, modeling, perception, control, and decision-making of intelligent robotic systems, underpinned by solid foundations in mathematics and science, strong engineering practice, and a strong sense of social responsibility. The program aims to

nurture high-caliber and innovative talents who are equipped with noble character and patriotism, and who are capable of addressing challenges in robotic system design, development, application, and operation—thus leading the advancement of the robotics and intelligent equipment industry.

The specific objectives expected to be achieved by graduates approximately five years after graduation are:

1. Possessing a positive outlook grounded in the core values of socialism, with sound personal integrity, high moral standards, and a strong sense of social responsibility; demonstrating concern for ethical standards and humanistic care in engineering practice;
2. Having a solid grasp of fundamental theories in robotics and a broad knowledge base across multiple disciplines, including mechanics, control, computer science, and artificial intelligence, and being able to apply this knowledge in robot design, modeling, optimization, and control;
3. Being able to identify, analyze, and solve complex engineering problems, with effective communication and expression skills across interdisciplinary and multicultural contexts;
4. Working efficiently in diverse teams and taking key roles in system integration, project management, and engineering implementation;
5. Maintaining technical acuity and a mindset for lifelong learning, formulating clear career development plans, continuously expanding knowledge and skills, and achieving sustained professional growth in the robotics industry.

毕业要求（Student Outcomes）：

№1.工程知识：能够将数学、自然科学、计算、工程基础和专业知识用于解决复杂工程问题。

№1.1　掌握数学、自然科学、工程基础和机器人工程专业知识，并能够运用这些知识对机器人工程问题进行描述和建模，并找到解决问题的方法和途径；

№1.2　能够应用机器人工程基础和专业知识来解释模型的数理含义，对模型进行正确的推理，对专业工程问题进行专业分析；

№1.3　能够将相关知识和数学模型方法用于机器人工程专业工程问题解决方案的比较与综合。

№2.问题分析：能够掌握数学、自然科学和工程科学的基本原理，灵活运用文献研究分析复杂工程问题，综合考虑可持续发展的要求，以获得有效结论。

№2.1　能够应用数学、自然科学和工程科学的第一原理，识别和判断机器人工程专业的复杂工程问题的关键环节，将机器人工程的复杂工程问题构建为数学/物理模型；

№2.2　能够熟练运用数学、自然科学和工程科学的原理和模型，结合文献研究分析机器人工程专业复杂工程问题的特性；

№2.3　能深入认识解决复杂工程问题的多种方案可行性，并能通过查阅和分析文献寻求创新的解决方案，对可持续发展进行整体考虑。

№3.设计/开发解决方案：能够针对复杂工程问题设计和开发解决方案，设计满足特定需求的系统、单元（部件）或工艺流程，体现创新性，并从健康、安全与环境、全生命周期成本与净零碳要求、法律与伦理、社会与文化等角度考虑可行性。

№3.1　能够设计满足机器人复杂工程问题特定需求的系统、部件和流程；

№3.2　能够在设计环节中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。

№4.研究：能够基于科学原理并采用科学方法对复杂工程问题进行研究，包括设计实验、分析与解释数据、并通过信息综合得到合理有效的结论。

№4.1　能够使用研究方法，研究和分析机器人复杂工程问题的解决方案；

№4.2　能够针对机器人工程相关的各种控制规律、环节和系统，设计和实施实验方案；

№4.3　能够基于科学原理和科学方法对实验结果进行分析与解释数据,并通过信息综合得到有效的结论。

№5.使用现代工具：能够针对复杂工程问题，开发、选择与使用恰当的技术、资源、现代工程工具和信息技术工具，包括对复杂工程问题的预测与模拟，并能够理解其局限性。

№5.1　能使用机械工程技术、自动化控制系统，计算机软、硬件技术等，并能理解其局限性，分析机器人工程系统规律、典型环节和系统特性；

№5.2　能够选择与使用恰当的数据信息资源、现代工程、信息技术、编程算法等工具对机器人相关复杂工程问题进行分析、计算，设计和开发计算机系统；

№5.3　能够开发或者选用满足特定需求的现代工具，仿真和模拟机器人工程问题，并能够分析其局限性。

№6.工程与可持续发展：在解决复杂工程问题时，能够基于工程相关背景知识，分析和评价工程实践对健康、安全、环境、法律以及经济和社会可持续发展的影响，并理解应承担的责任。

№6.1　了解机器人领域相关的技术标准、知识产权、产业政策和法律法规，了解企业的管理体系；理解工程师应承担的责任；

№6.2　能够基于工程背景知识进行合理分析,评估机器人工程领域相关工程实践和复杂工程问题解决方案对社会、经济、可持续性、健康与安全、法律、环境的影响，并理解应承担的责任；

№7.工程伦理和职业规范：有工程报国、为民造福的意识，具有人文社会科学素养和社会责任感，能够理解和践行工程伦理，在工程实践中遵守工程职业道德、规范和相关法律，履行责任。

№7.1　能够在机器人工程的工程项目实践中用伦理原则来指导行为和决策；

№7.2　能够在机器人工程项目实践中遵守相关的国家和国际法律,理解和尊重多元化并包容。

№8.个人与团队：能够在多样化、多学科背景下的团队中承担个体、团队成员以及负责人的角色。

№8.1　在多元化和包容性的团队中，能够根据阶段及整体目标，主动与他人沟通、合作，实施团队的组建、协调、指挥能力，提高团队积极性和凝聚力；

№8.2　能够在多学科、远程和分布式的环境中，独立或合作开展工作，完成团队中分配的任务。

№9.沟通：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；能够在跨文化背景下进行沟通和交流，理解、尊重语言和文化差异。

№9.1　能够对机器人复杂工程、新技术、新产品与工业界及社会进行有效和包容的沟通，通过与团队成员的讨论撰有效的报告，并能对报告内容进行有效介绍；

№9.2　能够跟进专业领域的国际发展趋势、研究热点，具备跨文化交流的语言和书面表达能力，能就专业问题进行基本沟通和交流。

№10.项目管理：理解并掌握与工程项目相关的管理原理与经济决策方法，并能够在多学科环境中应用。

№10.1　掌握工程项目管理原理与经济决策的基本原理和方法；

№10.2　能够将管理原理、经济决策应用于机器人系统的开发、系统设计和生产过程控制等；

№10.3　能够作为团队成员或领导，管理项目和多学科环境。

№11.终身学习：具有自主学习、终身学习和批判性思维的意识和能力，能够理解广泛的技术变革对工程和社会的影响，适应新技术变革。

№11.1　能够理解技术进步和发展对于知识和能力的影响和要求，具有终身学习的意识；

№11.2　能够针对个人和职业发展需求，采用合适的方法，独立学习，能适应机器人工程相关技术的不断发展；

№11.3　面对技术变革能够具备批判性思维，并对其进行深入思考和评估。

№1. Engineering Knowledge：be capable of applying mathematics, natural sciences, computing, engineering fundamentals and professional knowledge to solve complex engineering problems.

№1.1. Mastering the knowledge of mathematics, natural sciences, engineering fundamentals, and robotics engineering, and being able to use this knowledge to describe and model robotics engineering problems, as well as find methods and approaches to solve them.

№1.2. Being able to apply the fundamentals and professional knowledge of robotics engineering to explain the mathematical and logical meanings of models, reason correctly about models, and analyze professional engineering problems.

№1.3.　Being able to compare and synthesize relevant knowledge and mathematical modeling methods for the solution of complex engineering problems in the field of robotics engineering.

№2. Problem Analysis: being able to master the fundamental principles of mathematics, natural sciences, and engineering sciences; apply literature research to analyze complex engineering problems;

and comprehensively consider the requirements of sustainable development to obtain effective conclusions.

№2.1. Being able to apply the first principles of mathematics, natural sciences, and engineering sciences to identify and determine the key aspects of complex engineering problems in robotics engineering, and to formulate such problems as mathematical or physical models.

№2.2. Being able to skillfully apply principles and models from mathematics, natural sciences, and engineering sciences, in combination with literature research, to analyze the characteristics of complex engineering problems in robotics engineering.

№2.3. Being able to thoroughly recognize the feasibility of multiple solutions to complex engineering problems, explore innovative solutions through literature review and analysis, and consider sustainability in a holistic manner.

№3. Design/Development of Solutions: be capable of designing and developing solutions for complex engineering problems, designing systems, units (components) or processes that meet specific needs, demonstrating innovation, and considering feasibility from the perspectives of health, safety and environment, life cycle cost and net zero carbon requirements, law and ethics, society and culture.

№3.1. Being able to design systems, components, and processes that meet the specific requirements of complex engineering problems in the field of robotics engineering.

№3.2. Being able to consider public health and safety, the life-cycle cost, net-zero carbon, as well as resource, cultural, social, and environmental factors appropriately during the design process.

№4. Research: be able to conduct research on complex engineering problems based on scientific principles and using scientific methods, including designing experiments, analyzing and interpreting data, and synthesizing information to reach reasonable and effective conclusions.

№4.1. Being able to use research methods to study and analyze solutions for complex engineering problems in robotics.

№4.2. Being able to design and implement experimental plans for various control laws, processes, and systems related to robotics engineering.

№4.3. Being able to analyze and interpret data from experiments based on scientific principles and scientific methods, and draw effective conclusions through information synthesis.

№5. Use of Modern Tools: be capable of developing, selecting and using appropriate technologies, resources, modern engineering tools and information technology tools for complex engineering problems, including prediction and simulation, and understanding their limitations.

№5.1. Being able to use mechanical engineering technology, automation control systems, computer software and hardware technologies, etc., and understand their limitations, analyze the laws, typical aspects, and system characteristics of robotics engineering.

№5.2. Being able to select and use appropriate tools such as data information resources, modern

engineering and information technology, programming algorithms, etc., to analyze, calculate, design, and develop computer systems for complex engineering problems related to robotics.

№5.3. Being able to develop or select modern tools that meet specific requirements, simulate and model robotics engineering problems, and analyze their limitations.

№6.Engineering and Sustainable Development: be able to analyze and evaluate the impact of engineering practices on health, safety, environment, law and economic and social sustainable development when solving complex engineering problems, and understand the responsibilities to be assumed.

№6.1. Understanding technical standards, intellectual property rights, industrial policies, and laws and regulations related to the field of robotics engineering, as well as understanding the management systems of enterprises; understanding the responsibilities that engineers should undertake.

№6.2. Being able to analyze and evaluate the impact of engineering practices and solutions to complex engineering problems in the field of robotics on social, economic, sustainability, health and safety, legal, and environmental aspects based on engineering background knowledge, and understanding the responsibilities that should be undertaken.

№7.Engineering Ethics and Professional Norms: have the awareness of serving the country and the people through engineering, possess humanistic and social science literacy and social responsibility, be able to understand and practice engineering ethics, and abide by engineering professional ethics, norms and relevant laws in engineering practice, fulfilling responsibilities.

№7.1. Being able to use ethical principles to guide behavior and decision-making in engineering project practices related to robotics.

№7.2. Being able to comply with relevant national and international laws in engineering project practices related to robotics, understanding and respecting diversity and inclusiveness.

№8.Individual and Team: be capable of taking on the roles of individual, team member and leader in diverse and multidisciplinary teams.

№8.1. Being able to communicate and collaborate proactively with others in diverse and inclusive teams, according to the stage and overall goals, to establish, coordinate, and command the team, and enhance team motivation and cohesion.

№8.2. Being able to work independently or collaboratively in multidisciplinary, remote, and distributed environments and complete tasks assigned within the team.

№9. Communication: be able to effectively communicate and exchange with industry peers and the public on complex engineering problems, including writing reports and design documents, making presentations, clearly expressing or responding to instructions; be able to communicate and exchange in a cross-cultural context, understanding and respecting language and cultural differences.

№9.1. Being able to communicate effectively and inclusively with the industry and society about complex engineering problems, new technologies, and new products related to robotics, writing effective reports through discussions with team members, and delivering effective presentations on report contents.

№9.2. Being able to follow international trends and research hotspots in the professional field, possessing language and written expression skills for cross-cultural communication, and being able to engage in basic communication and exchange on professional issues.

№10. Project Management: understand and master the management principles and economic decision-making methods related to engineering projects, and be able to apply them in a multidisciplinary environment.

№10.1. Mastering the basic principles and methods of engineering project management and economic decision-making.

№10.2. Being able to apply management principles and economic decision-making to the development, system design, and production process control of robotics systems.

№10.3. Being able to manage projects and multidisciplinary environments as a member or leader of a team.

№11.Lifelong Learning: have the awareness and ability of self-directed learning, lifelong learning and critical thinking, be able to understand the impact of broad technological changes on engineering and society, and adapt to new technological changes.

№11.1 Ability to understand the impact and requirements of technological progress and development on knowledge and abilities, and have a consciousness of lifelong learning.

№11.2 Ability to independently learn using appropriate methods for personal and career development needs, and adapt to the continuous development of robotics engineering-related technologies.

№11.3 Ability to have critical thinking in the face of technological change, and to deeply think about and evaluate it.

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	培养目标 5
毕业要求 1.1		●	●		
毕业要求 1.2		●	●		
毕业要求 1.3		●	●		
毕业要求 2.1		●	●		

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	培养目标 5
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 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 5.3		●		●	
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 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 10.3	●	●	●		
毕业要求 11.1			●	●	●
毕业要求 11.2			●	●	●
毕业要求 11.3			●	●	●

Relationship Matrix between Educational Objectives and Student Outcomes:

Educational Objective / Student Outcome	Educational Objective 1	Educational Objective 2	Educational Objective 3	Educational Objective 4	Educational Objective 5
Student Outcome 1.1		●	●		

Educational Objective / Student Outcome	Educational Objective 1	Educational Objective 2	Educational Objective 3	Educational Objective 4	Educational Objective 5
Student Outcome 1.2		●	●		
Student Outcome 1.3		●	●		
Student Outcome 2.1		●	●		
Student Outcome 2.2		●	●		
Student Outcome 2.3		●	●		
Student Outcome 3.1		●	●	●	
Student Outcome 3.2		●	●	●	
Student Outcome 4.1		●	●	●	
Student Outcome 4.2		●	●	●	
Student Outcome 4.3		●	●	●	
Student Outcome 5.1		●		●	
Student Outcome 5.2		●		●	
Student Outcome 5.3		●		●	
Student Outcome 6.1	●		●	●	●
Student Outcome 6.2	●		●	●	●
Student Outcome 7.1	●		●		
Student Outcome 7.2	●		●		
Student Outcome 8.1			●	●	
Student Outcome 8.2			●	●	
Student Outcome 9.1	●		●	●	
Student Outcome 9.2	●		●	●	
Student Outcome 10.1	●	●	●		
Student Outcome 10.2	●	●	●		
Student Outcome 10.3	●	●	●		
Student Outcome 11.1			●	●	●
Student Outcome 11.2			●	●	●
Student Outcome 11.3			●	●	●

专业简介（Program Profile）：

机器人工程专业设立于国家推进智能制造与科技自立自强的战略背景下，紧扣粤港澳大湾区智能产业发展需求。作为华南理工大学国际校区重点建设的新兴交叉专业，本专业依托学校

在机械、控制、计算机与人工智能等领域的深厚积淀，融合“智能+机器人”的教学与科研资源，于 2019 年正式设立，是国内最早系统布局机器人技术本科教育的专业之一。

本专业聚焦机器人系统的设计与集成、感知、控制与智能决策等关键技术，强调多学科融合与系统集成能力培养。通过“强基础、重实践、促交叉”的课程体系建设，结合项目驱动、校企协同和国际化育人平台，致力于培养具备扎实工程素养、创新精神与全球视野的高水平复合型人才。毕业生可在机器人、自动化系统、无人装备等领域从事研发、设计、工程实施及技术管理等工作。

The Robotics Engineering program was established in the context of China’s strategic initiatives to promote intelligent manufacturing and technological self-reliance, addressing the growing demand for advanced talent in the intelligent industries of the Guangdong-Hong Kong-Macao Greater Bay Area. As a key interdisciplinary program of the Guangzhou International Campus of South China University of Technology, it builds upon the university’s strong foundations in mechanical engineering, control, computer science, and artificial intelligence. Integrating educational and research resources under the “Intelligence + Robotics” framework, the program was officially launched in 2019 and is among the earliest in China to systematically implement undergraduate education in robotics technologies.

The program focuses on core technologies such as robotic system design and integration, sensing, control, and intelligent decision-making, with an emphasis on multidisciplinary fusion and systems integration capabilities. Through a curriculum that strengthens fundamentals, emphasizes hands-on practice, and promotes interdisciplinary learning, and supported by project-driven learning, university-industry collaboration, and international education platforms, the program is committed to cultivating high-caliber, well-rounded talents with solid engineering foundations, innovative thinking, and a global outlook. Graduates are well-prepared for careers in research, design, engineering implementation, and technical management in fields such as robotics, automation systems, and unmanned equipment.

专业特色（Program Features）：

1. 聚焦“智能+机器人”定位，构建融合机械、控制、计算机与人工智能的多学科交叉融合培养体系；
2. 依托多个高水平平台实施项目驱动、实践贯穿的工程教学，提升学生解决实际问题的能力，激发创新思维与沟通协作能力；
3. 院士领衔，师资 100%具备海外经历，开展国际化教学与企业协同育人，培养具有全球视野的复合型人才。

1. Centered on the “Intelligence + Robotics” vision, the program establishes an interdisciplinary training system that integrates mechanics, control, computer science, and artificial intelligence.
2. Supported by multiple high-level platforms, the program adopts project-driven and practice-oriented engineering education to enhance students’ problem-solving abilities and foster innovative thinking and collaborative communication skills.
3. Led by academicians, the faculty team is 100% internationally trained, delivering globalized education and industry-linked talent development to cultivate versatile professionals with a global perspective.

授予学位（Degree Conferred）：

工学学士学位 Bachelor of Engineering

核心课程（Core Courses）：

智能工程：智能工程导论
智能工程：设计与制造 I
智能工程：设计与制造 II
控制工程：信号与系统
控制工程：反馈控制理论
电工电子技术基础
嵌入式系统与设计
人工智能III：智能工程中的人工智能

Core Courses

Intelligence Engineering: Introduction to Intelligent Engineering
Intelligence Engineering: Design and Manufacturing I
Intelligence Engineering: Design and Manufacturing II
Control Engineering: Signals and Systems
Control Engineering: Feedback Control Theory
Fundamentals of Electronics and Electrical Technologies
Embedded Systems and Design
Artificial Intelligence Ⅲ: Artificial Intelligence for Intelligent Engineering

特色课程（Featured Courses）：

新生研讨课：

智能制造工程研讨课

基于项目（设计、案例）的课程：

智能工程：智能工程导论实践

智能工程：工程创新训练 III

智能工程：设计与制造实践 I

智能工程：设计与制造实践 II（机器人工程）

控制实践

国际化特色课程：

机器人智能

专题研讨课：

机器人工程研讨课

学科前沿课：

智能控制

工程创新

跨学科课程：

智能工程：智能工程导论

智能工程：设计与制造 I

智能工程：设计与制造 II

具身智能

校企合作课：

机器人工程研讨课

创新实践课

智能工程：智能工程导论实践 （“三个一”）

智能工程：工程创新训练 III （“三个一”）

智能工程：设计与制造实践 I （“三个一”）

智能工程：设计与制造实践 II（机器人工程） （“三个一”）

工程管理导论 （“三个一”）

工程创新 （“三个一”）

专题设计课:

智能工程：智能工程导论实践

智能工程：设计与制造实践 I

智能工程：设计与制造实践 II（机器人工程）

控制实践

劳动教育课：

智能工程：设计与制造实践 II（机器人工程）

毕业实习

实践研习：

毕业实习

Project-based Courses:

Intelligence Engineering: Practice of Introduction to Intelligent Engineering

Intelligence Engineering: Engineering Innovation Training III

Intelligence Engineering: Practice of Design and Manufacturing I

Intelligence Engineering: Practice of Design and Manufacturing II(RE)

Global Education Courses:

Robotic Intelligence

Special Topics:

Robotics Engineering Seminar

Subject Frontiers Courses:

Intelligent Control

Innovation in Engineering

Interdisciplinary Courses:

Intelligence Engineering: Introduction to Intelligent Engineering

Intelligence Engineering: Design and Manufacturing I

Intelligence Engineering: Design and Manufacturing II

Embodied Artificial Intelligence

Cooperative Courses with Enterprises:

Robotics Engineering Seminar

Innovation Practice（Three “ones”）：

Intelligence Engineering: Practice of Introduction to Intelligent Engineering (Three “ones”)

Intelligence Engineering: Engineering Innovation Training III (Three “ones”)

Intelligence Engineering: Practice of Design and Manufacturing I (Three “ones”)

Intelligence Engineering: Practice of Design and Manufacturing II(RE) (Three “ones”)

Introduction to Engineering Management (Three “ones”)

Product Development, Innovation in Engineering (Three “ones”)

Special Designs:

Intelligence Engineering: Practice of Introduction to Intelligent Engineering

Intelligence Engineering: Practice of Design and Manufacturing I

Intelligence Engineering: Practice of Design and Manufacturing II(RE)

Education on The Hard-Working Spirit:

Intelligence Engineering: Practice of Design and Manufacturing II(RE)

Internship

Practical Training:

Internship

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	53.5	1044	
	通识 General Education	10.0	160	
专业基础课 Specialty Basic Courses	必修 Compulsory	44.5	784	
选修课 Elective Courses	选修 Elective	12.0	258	
合　计 Total		120.0	2246	
集中实践教学环节 Practice Training	必修 Compulsory	32.0	40 周 Weeks	
毕业学分要求 Credits Required for Graduation	120.0+32.0 =152.0			

建议每学期修读学分 Suggested Credits for Each Semester	1	2	3	4	5	6	7	8
	24	24	24	24	18	16	12	10

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 7 个人文素质教育学分和 4 个“三创”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
2246	1828	418	1668	578	152.0	130	22.0	32.0	102	18	4.0

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	必修/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 Introduction of the Marxism Basic Principle		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 II(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 II(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
	AIP045100011	人工智能 I：大学计算机基础 Artificial Intelligence I: Foundations of Computer		32				32	0	1
	041101155	大学物理III（一） General PhysicsIII(1)		64	64				4	2
	041100344	大学物理III（二） General Physics III(2)		64	64				4	3
	041100671	大学物理实验（一）		32		32			1	2

		Physics Experiment (1)								
	041101051	大学物理实验（二） Physics Experiment (2)		32		32			1	3
	037102786	大学化学 General Chemistry		32	32				2	1
	037101943	大学化学实验 General Chemistry Experiment		16		16			0.5	2
	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） Physical Education (3)		36				36	1.0	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
		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**			1204	902	80		222	63.5	

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。

4.学生可在虚拟第三学期修读通识课程，最多可认定 4 学分通识课程学分。

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	IES082100051	智能工程：智能工程导论 Intelligence Engineering: Introduction to Intelligent Engineering	必/C	48	48				3.0	1
	082101551	面向智能工程的 Python 编程技术 Python Programming for Intelligent Engineering	必/C	64	32			32	3.0	1
	082100851	机器人工程研讨课 Robotics Engineering Seminar	必/C	16	16				1.0	2
	AIS082100021	人工智能III：智能工程中的人工智能 Artificial IntelligenceIII: Artificial Intelligence for Intelligent Engineering	必/C	56	40			16	3.0	3
	082100602	工程力学 Engineering Mechanics	必/C	64	48	16			3.5	3
	082100871	智能工程数学基础 Mathematical Foundations for Intelligent Engineering	必/C	48	48				3.0	3
	082101541	电工电子技术基础 Fundamentals of Electronics and Electrical Technologies	必/C	80	48			32	4.0	3
	CES082100031	控制工程：信号与系统 Control Engineering: Signals and Systems	必/C	80	48			32	4.0	4
	082100811	动力学与振动导论 Introduction to Dynamics and Vibration	必/C	48	48				3.0	4
	IES082100021	智能工程：设计与制造 I Intelligence Engineering: Design and Manufacturing I	必/C	48	48				3.0	4
	IES082100022	智能工程：设计与制造 II Intelligence Engineering: Design and Manufacturing II	必/C	48	48				3.0	5
	CES082100021	控制工程：反馈控制理论 Control Engineering: Feedback Control Theory	必/C	48	48				3.0	5
	082100711	嵌入式系统与设计	必	48	48				3.0	5

		Embedded Systems and Design	/C							
	082100831	工程管理导论 Introduction to Engineering Management	必 /C	32	32				2.0	5
	082100192	机器人理论及技术 Theory and Technology of Robotics	必 /C	56	40	16			3.0	6
	合 计 Total		必 /C	784	640	32		112	44.5	
选修课 Elective Courses	专业核心选修课 (最少选修 5 学分) Major Core Elective Course (A minimum of 5 credits is required)									
	082101801	自动驾驶系统 Autonomous Driving Systems	选 /E	56	40	16			3.0	4
	082100981	人形与四足机器人 Humanoid and Quadruped Robot	选 /E	64	32	32			3.0	5/7
	082100222	机电一体化 Mechatronics	选 /E	64	32	32			3.0	5/7
	082100582	工业机器人及应用 Industrial Robot and its Applications	选 /E	32	32				2.0	6/8
	082100951	计算机辅助工程与机器人优化设计 CAE and Robot Design Optimization	选 /E	48	16	32			2.0	6/8
	082100941	机器人智能 Robotic Intelligence	选 /E	32	32				2.0	5/6/7/8
	专业基础选修课 Major General Elective Course									
	082100092	数据分析建模 Data Analysis and Modeling	选 /E	56	40	16			3.0	4
	082100991	深度学习 Deep Learning	选 /E	48	48				3.0	4
	082101531	具身智能 Embodied Artificial Intelligence	选 /E	48	16	32			2.0	4
	082100292	动力系统建模、分析与控制 Modeling Analysis and Control of Dynamic System	选 /E	48	48				3.0	5/7
	082100481	传感器技术及应用 Sensor and its Applications	选 /E	48	48				3.0	5/7
	082100541	经典控制理论 Classical Control Theory	选 /E	48	48				3.0	5/7
	082101561	数据结构与算法 Data Structures and Algorithms	选 /E	56	40	16			3.0	6/8
	082101011	智能控制 Intelligent Control	选 /E	48	48				3.0	6/8
	082100931	工程创新 Innovation in Engineering	选 /E	34	30	4			2.0	6/8

	个性化选修课 Personalized Electives									
	082101081	跨学院选修课Ⅰ Interdisciplinary Elective Courses Ⅰ	选/E	32	32				2.0	1-8
	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
	合 计 Total		选/E	选修课修读最低要求 12 学分 Minimum elective course credits required: 12						

备注：

1.学时中其它可以为上机和实践学时。

2.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。

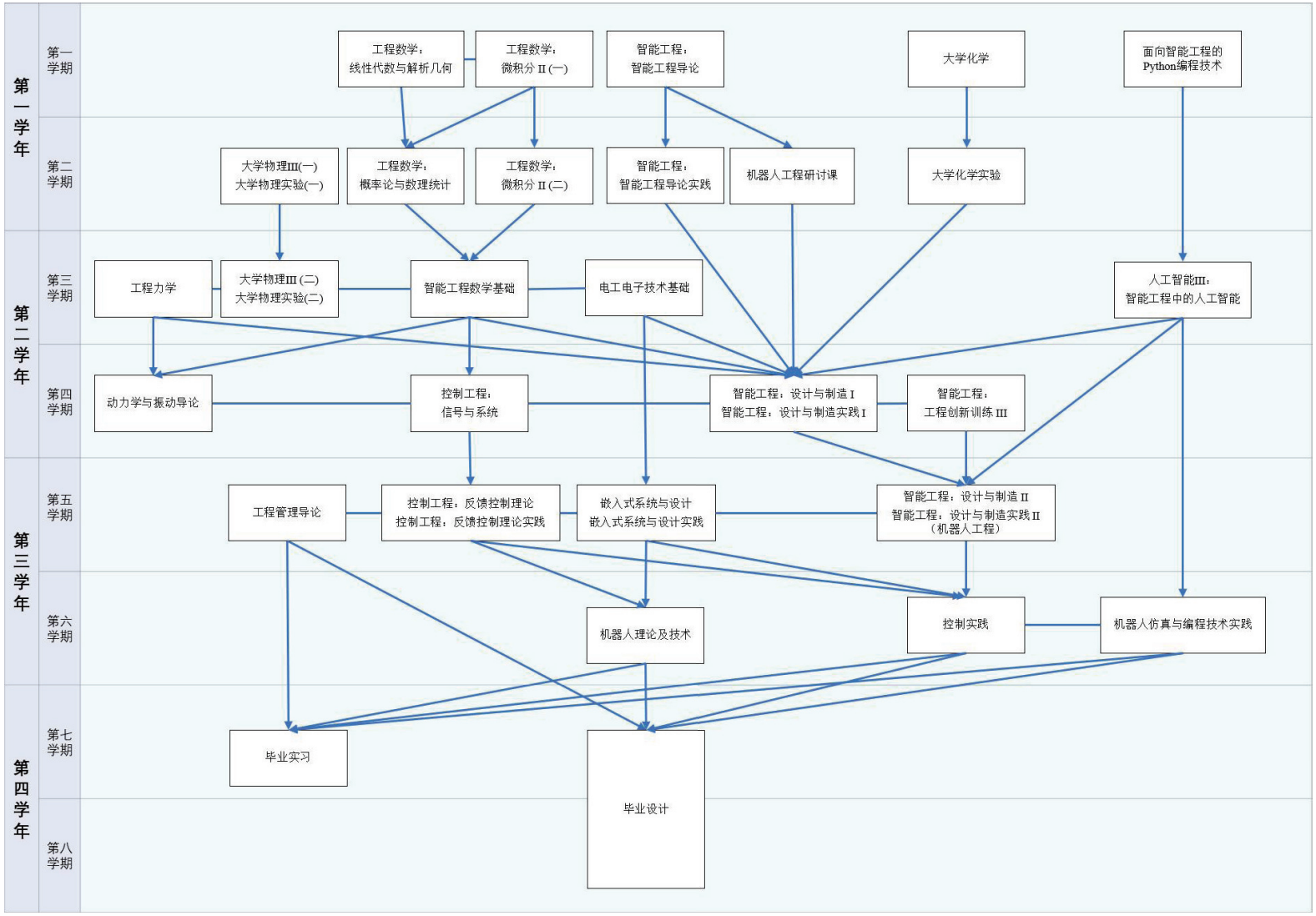
3.学生修读跨学院课程（以教务处公布名单为准），已修读课程学分等于或高于 2 学分的，可以申请认定为一定的专业选修课学分。每个学生累计申请为专业选修课总学分不超过 2 个学分。

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
031101551	马克思主义理论与实践 Marxism Theory and Practice	必/C	2 周 2 weeks		2.0	3
IES082100012	智能工程：智能工程导论实践 Intelligence Engineering: Practice of Introduction to Intelligent Engineering	必/C	2 周 2 weeks		2.0	2
082101521	嵌入式系统与设计实践 Practice of Embedded Systems and Design	必/C	1 周 1 week		1.0	5

IES067100012	智能工程：工程创新训练 III Intelligence Engineering: Engineering Innovation Training III	必/C	4 周 4 weeks		4.0	4
IES082100031	智能工程：设计与制造实践 I Intelligence Engineering: Practice of Design and Manufacturing I	必/C	1 周 1 week		1.0	4
CES082100022	控制工程：反馈控制理论实践 Control Engineering: Practice of Feedback Control Theory	必/C	1 周 1 week		1.0	5
IES082100032	智能工程：设计与制造实践 II（机器人工程） Intelligence Engineering: Practice of Design and Manufacturing II(RE)	必/C	2 周 2 weeks		2.0	5
082101511	控制实践 Practice of Control	必/C	1 周 1 week		1.0	6
082101051	机器人仿真与编程技术实践 Practice of Robot Simulation and Programming	必/C	2 周 2 weeks		2.0	6
082101061	毕业实习 Internship	必/C	4 周 4 weeks		4.0	7
082100501	毕业设计（论文） Capstone (Thesis)	必/C	18 周 18 weeks		10.0	7-8
合 计		必/C	40 周 40 weeks		32	

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）

序号 No	课程名 Course Title	机器人工程专业毕业要求 Robotics Engineering Major Student Outcomes																										
		1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	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	10.3	11.1	11.2	11.3
1	思想道德与法治 Ethics and Rule of Law																●	●	●				●						
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																●						●						
3	中国近现代史纲要 Skeleton of Chinese Modern History																	●					●						
4	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																	●	●				●						
5	马克思主义基本原理 Fundamentals of Marxism Principle																	●	●										

6	形势与政策 Analysis of the Situation & Policy																	●	●								●		●
7	工程数学：微积分 II (一) Engineering Math: Calculus (1)	●			●	●																							
8	工程数学：线性代数与解析几何 Engineering Math: Linear Algebra & Analytic Geometry	●			●	●																							
9	工程数学：微积分 II (二) Engineering Math: Calculus (2)	●			●	●																							
10	工程数学：概率论与数理统计 Engineering Math: Probability & Mathematical Statistics	●			●	●																							
11	人工智能 I：大学计算机基础 Artificial Intelligence I: Fundamentals of Compute			●				●					●																
12	大学物理III（一） General Physics (1)	●			●								●																
13	大学物理III（二） General Physics (2)	●			●								●																
14	大学物理实验（一）	●			●																								

	Physics Experiment (1)																											
15	大学物理实验（二） Physics Experiment (2)	●			●																							
16	大学化学 General Chemistry	●			●																					●		
17	大学化学实验 General Chemistry Experiment	●			●																					●		
18	学术英语与科技交流（一） EAP and Technical Communication (1)																				●							
19	学术英语与科技交流（二） EAP and Technical Communication (2)																				●							
20	体育（一） Physical Education (1)																		●	●						●		
21	体育（二） Physical Education (2)																		●	●						●		
22	体育（三） Physical Education (3)																		●	●						●		
23	体育（四） Physical Education (4)																		●	●						●		

24	军事理论 Military Principle																	●	●	●	●								
25	智能工程：智能工程导论 Intelligence Engineering: Introduction to Intelligent Engineering	●						●								●		●		●									
26	面向智能工程的 Python 编程 技术 Python Programming for Intelligent Engineering	●											●							●									
27	机器人工程研讨课 Robotics Engineering Seminar						●		●													●							
28	人工智能III：智能工程中的人 工智能 Artificial IntelligenceIII: Artificial Intelligence for Intelligent Engineering						●			●				●					●										
29	工程力学 Engineering Mechanics	●	●		●	●				●		●																	
30	智能工程数学基础 Mathematical Foundations for Intelligent Engineering	●			●							●		●														●		●

31	电工电子技术基础 Fundamentals of Electronics and Electrical Technologies	●	●					●	●						●				●									
32	控制工程：信号与系统 Control Engineering: Signals and Systems	●			●					●			●			●												
33	动力学与振动导论 Introduction to Dynamics and Vibration	●				●				●				●						●		●						
34	智能工程：设计与制造 I Intelligence Engineering: Design and Manufacturing I						●	●		●												●						
35	智能工程：设计与制造 II Intelligence Engineering: Design and Manufacturing II	●			●								●														●	
36	控制工程：反馈控制理论 Control Engineering: Feedback Control Theory	●			●					●						●		●										
37	嵌入式系统与设计 Embedded Systems and Design		●			●						●		●														
38	工程管理导论 Introduction to Engineering																					●		●	●	●		

	Management																												
39	机器人理论及技术 Theory and Technology of Robotics	●				●					●		●							●									
40	自动驾驶系统 Autonomous Driving Systems	●				●		●			●				●														
41	人形与四足机器人 Humanoid and Quadruped Robot	●				●														●									●
42	机电一体化 Mechatronics						●			●				●					●										
43	工业机器人及应用 Industrial Robot and its Applications			●		●														●								●	
44	计算机辅助工程与机器人优化设计 CAE and Robot Design Optimization				●					●			●							●							●		
45	机器人智能 Robotic Intelligence	●				●											●												
46	数据分析建模 Data Analysis and Modeling	●										●		●							●								

47	深度学习 Deep Learning	●											●								●									
48	具身智能 Embodied Artificial Intelligence							●					●								●		●							
49	动力系统建模、分析与控制 Modeling Analysis and Control of Dynamic System	●				●									●															
50	传感器技术及应用 Sensor and its Applications	●	●					●																						●
51	经典控制理论 Classical Control Theory	●			●								●						●		●							●		
52	数据结构与算法 Data Structures and Algorithms	●			●									●															●	
53	智能控制 Intelligent Control		●	●		●					●	●		●																
54	工程创新 Innovation in Engineering																							●	●	●	●			
55	智能工程：智能工程导论实践 Intelligence Engineering: Practice of Introduction to Intelligent Engineering	●			●					●					●								●					●		

56	嵌入式系统与设计实践 Practice of Embedded Systems and Design		●			●						●		●														
57	智能工程：工程创新训练 III Intelligence Engineering: Engineering Innovation Training III											●	●							●	●						●	
58	智能工程：设计与制造实践 I Intelligence Engineering: Practice of Design and Manufacturing I						●	●		●												●						
59	控制工程：反馈控制理论实践 Control Engineering: Practice of Feedback Control Theory			●			●	●				●			●							●						
60	智能工程：设计与制造实践 II（机器人工程） Intelligence Engineering: Practice of Design and Manufacturing II(RE)						●	●												●		●				●		
61	控制实践 Practice of Control				●								●				●						●			●		●	
62	机器人仿真与编程技术实践			●											●					●							●		

	Practice of Robot Simulation and Programming																												
63	毕业实习 Internship															●	●	●	●	●	●	●	●	●	●	●	●	●	●
64	毕业设计（论文） Capstone (Thesis)	●	●	●	●	●	●	●	●	●	●	●	●	●	●							●	●		●		●	●	●

六、第二课堂

第二课堂由人文素质教育和“三创”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 7 个学分。其中，大学生心理健康教育 2 学分、国家安全教育 1 学分、大学生职业生涯规划 2 学分，纳入人文素质教育学分。

2.“三创”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）、百步梯攀登计划或一定时间的各类课外创新能力培养活动（如学科竞赛、学术讲座等），参加活动的学分累计不少于 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 seven credits. Mental Health Education for College Students (2 credits), National Security Education (1 credit), and Career Planning for College Students (2 credits) are included in the second-classroom credits for Humanities Quality Education.

(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.