# 过程装备与控制工程

# Process Equipment & Control Engineering

**专业代码：080206　　学　制：4 年**

**Program Code: 080206　　Duration：four years**

## 培养目标：

本专业培养适应经济、科技和社会发展需要，德、智、体、美、劳全面发展，系统掌握数学、物理、化学等自然科学原理及化学工程、机械工程、控制工程和材料工程等相关工程知识，具备国际视野、人文素质和社会责任感，满足石油、化工、能源动力、轻工机械、制药等相关行业发展需求，能使用现代工具开展过程装备设计、研发和工程管理等工作，培养高素质、高层次、国际化的“三创型”人才。

## Educational Objectives:

The specialty fosters the graduates adapt the development of economy, science and society, and it aims to let the graduates master various natural science-based and engineering-related knowledge, including math, physics, chemistry, chemical engineering, control engineering and materials engineering, etc. The major offers professional graduate degrees with an international focus, humanistic quality and social responsibilities, and makes the graduates fit for the various industries development demand, including chemical engineering, petroleum, energy, light industry and pharmacy, etc. The specialty fosters the graduates' practice skills to cope with design, development, integrated innovation, and production management in the process equipment field, and train the graduates have a stronger teamwork spirits and creative minds.

## 毕业要求：

**№1.工程知识：**能够应用数学、自然科学、工程基础知识和专业知识，以解决过程装备与控制工程专业的复杂工程问题。

№1.1 能够应用数学、自然科学、工程基础和专业知识建立正确的数学、力学模型，解释过程装备与控制工程专业的复杂工程问题。

№1.2 能够应用工程基础和专业知识对模型的正确性进行推理和解答。

№1.3 能够应用工程基础和专业知识解决过程装备与控制工程专业的复杂工程问题。

**№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，识别、表达、并通过文献解释、研究分析过程装备与控制工程专业的复杂工程问题，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基本原理，识别过程装备与控制工程专业的复杂工程问题，以获得有效结论。

№2.2 能够应用数学、自然科学和工程科学的基本原理，表达过程装备与控制工程专业的复杂工程问题，以获得有效结论。

№2.3 能够应用数学、自然科学和工程科学的基本原理，并运用文献、规范、标准等对过程装备与控制工程工程专业的复杂工程问题进行分析并获得有效的结论；了解国际相关专业规范和标准。

**№3.解决方案：**能够综合考虑社会、健康、安全、法律、文化以及环境等因素，设计（开发）满足过程装备与控制工程特殊需求的方案；提出复杂工程问题的解决方案时应具有创新意识。

№3.1 能够设计（开发）满足过程装备与控制工程特殊需求的方案。

№3.2 能够根据过程装备与控制工程特殊需求，在设计中考虑社会、健康、安全、法律、文化以及环境等因素的影响。

№3.3 能够对工程设计进行比较、优化和开发，提出复杂工程问题的解决方案时具有整体意识和创新意识。

**№4.研究能力：**能够基于科学原理并采用科学方法对过程装备与控制工程专业的复杂工程问题进行研究，包括通过设计实验、分析与解释数据、信息综合等得到合理有效的结论，并应用于工程实践。

№4.1 针对过程装备与控制工程专业的复杂工程问题，具有设计和实施实验的能力。

№4.2 能够基于科学原理并采用科学方法分析与解释实验结果，通过信息综合获得合理有效的结论并应用于工程实践。

**№5.使用现代工具：**能够选择、使用与开发恰当的技术、资源、现代工程工具（设备）和信息技术以解决复杂工程问题，包括对复杂工程问题进行模拟、分析与预测，并能够理解其局限性。

№5.1 针对复杂工程问题，能够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。

№5.2 针对复杂工程问题，能够开发恰当的技术、资源、现代工程工具和信息技术工具。

№5.3 能够使用现代工程工具和信息技术工具正确预测与模拟复杂工程问题，并能够理解其局限性。

**№6.工程与社会：**能够基于过程装备与控制工程相关背景知识和标准，合理分析、评价过程装备与控制工程项目的设计、施工和运行等方案以及复杂工程问题的解决方案，包括对社会、健康、安全、法律以及文化的影响，并理解过程装备与控制工程工程师应承担的责任。

№6.1 能够基于过程装备与控制工程相关背景知识进行合理分析，评价土木工程项目的设计、施工和运行的方案，以及复杂工程问题的解决方案。

№6.2 能够合理分析和评价复杂工程问题的工程实践对社会、健康、安全、法律、文化的影响；了解相关行业的政策法规；理解过程装备与控制工程工程师应承担的责任。

**№7.环境和可持续发展：**能够理解和评价过程装备与控制工程专业的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 能够理解和评价过程装备与控制工程复杂工程问题的工程实践对环境、社会可持续发展的影响，在设计中理解环境对工程的制约。

№7.2 理解过程装备与控制工程的新材料、新工艺、新方法，重视节能减排，注重使用节能环保的技术方案；理解社会发展对过程装备与控制工程工程师的新要求。

**№8.职业规范：**能够了解中国国情并具备人文社会科学素养和社会责任感，能够在工程实践中理解并遵守工程职业道德和行为规范，做到责任担当、贡献国家、服务社会。

№8.1 具有必要的人文社会科学知识与素养，正确的价值观与社会责任感，健康的体魄与心理。

№8.2 能够在过程装备与控制工程工程项目实践中理解并遵守工程职业道德和规范，具有法律意识，做到责任担当、贡献国家、服务社会。

**№9.个人和团队：**能够在解决过程装备与控制工程专业的复杂工程问题时、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 在解决过程装备与控制工程专业的复杂工程问题时，能够在多学科环境中具有主动与他人合作和配合的意识，能独立完成团队分配的任务。

№9.2 能够在多学科背景下的团队中承担团队成员或负责人的角色，具有组织和协调能力。

**№10.沟通能力：**能够就过程装备与控制工程专业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；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 能够就过程装备与控制工程专业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。

№10.2 具备一定的国际视野，了解国际发展现状，掌握一门外语，具备听、说、读、写能力，能够在跨文化背景下进行沟通和交流。

**№11.项目管理：**能够在与过程装备与控制工程专业相关的多学科环境中理解、掌握、应用工程管理原理与经济决策方法，具有一定的组织、协调、管理和领导能力。

№11.1 理解并掌握工程管理原理与经济决策方法。

№11.2 能够将所掌握的工程管理原理和经济决策方法在多学科环境下应用于过程装备与控制工程项目中，具有一定的组织、管理和领导能力。

**№12.终身学习：**能够针对个人和职业发展的需求，自主学习和终身学习，具有自主学习和终身学习的意识以及适应过程装备与控制工程新发展的能力。

№12.1 能认识自主学习的重要性和追踪新知识的意识，具有终身学习并适应过程装备与控制工程新发展的意识。

№12.2 针对个人和职业发展需求，具有终身学习和适应过程装备与控制工程新发展的能力。

## Student Outcomes:

№1. Engineering knowledge: The students can apply mathematics, natural science, engineering basic knowledge and professional knowledge to solve complex engineering problems of process equipment and control engineering.

№1.1 The students can apply mathematics, natural science, engineering foundation and professional knowledge to establish correct mathematical and mechanical models to explain complex engineering problems of process equipment and control engineering specialty.

№1.2 The students can use engineering foundation and professional knowledge to reasoning and answer the correctness of the model.

№1.3 The students can solve complex engineering problems of process equipment and control engineering by applying engineering foundation and professional knowledge.

№2. Problem analysis: The students can apply the basic principles of mathematics, natural sciences and engineering to identify, express, and analyze complex engineering problems of process equipment and control engineering specialty through literature interpretation, so as to obtain effective conclusions.

№2.1 The students can apply the basic principles of mathematics, natural science and engineering science to identify complex engineering problems of process equipment and control engineering specialty in order to obtain effective conclusions.

№2.2 The students can apply the basic principles of mathematics, natural science and engineering science to express complex engineering problems of process equipment and control engineering specialty in order to obtain effective conclusions.

№2.3 The students can apply the basic principles of mathematics, natural sciences and engineering sciences and the complex engineering problems of process equipment and control engineering specialty to analyze and obtain effective conclusions by using literature, norms and standards, and understand the relevant international professional norms and standards.

№3. Solutions: The students can design (develop) solutions to meet the special needs of process equipment and control engineering, taking into account social, health, safety, legal, cultural and environmental factors; to propose solutions to complex engineering problems should be innovative.

№3.1 The students can design (develop) solutions to meet the special needs of process equipment and control engineering.

№3.2 The students can consider the social, health, safety, legal, cultural and environmental factors in the design according to the special requirements of process equipment and control engineering.

№3.3 The students can compare, optimize and develop engineering design, and have overall and innovative consciousness when proposing solutions to complex engineering problems.

№4. Research ability: Based on scientific principles and using scientific methods, the students can study complex engineering problems of process equipment and control engineering specialty, including

design experiments, analysis and interpretation of data, information synthesis, etc. to obtain reasonable and effective conclusions, and apply them to engineering practice.

№4.1 For complex engineering problems of process equipment and control engineering, The students have the ability to design and implement experiments.

№4.2 The students can analyze and interpret the experimental results based on scientific principles and scientific methods, obtain reasonable and effective conclusions through information synthesis and apply them to engineering practice.

№5. Use modern tools: The students can select, use and develop appropriate technologies, resources, modern engineering tools (equipment) and information technology to solve complex engineering problems, including simulation, analysis and prediction of complex engineering problems, and be able to understand their limitations.

№5.1 For complex engineering problems, the students can choose and use appropriate technology, resources, modern engineering tools and information technology tools.

№5.2 For complex engineering problems, the students can develop appropriate technology, resources, modern engineering tools and information technology tools.

№5.3 The students can correctly predict and simulate complex engineering problems using modern engineering tools and information technology tools, and can understand their limitations.

№6. Engineering and Society: Based on the relevant background knowledge and standards of process equipment and control engineering, the students can reasonably analyze and evaluate the design, construction and operation of process equipment and control engineering projects and solutions to complex engineering problems, including the impact on society, health, safety, law and culture, and understand the responsibilities of process equipment and control engineering engineers. Responsibility.

№6.1 The students can make reasonable analysis based on the background knowledge of process equipment and control engineering, evaluate the design, construction and operation of civil engineering projects, as well as the solutions of complex engineering problems.

№6.2 The students can reasonably analyze and evaluate the impact of engineering practice on society, health, safety, law and culture of complex engineering problems; understand relevant industry policies and regulations; understand the responsibilities of process equipment and control engineering engineers.

№7. Environment and Sustainable Development: The students can understand and evaluate the impact of engineering practice on environmental and social sustainable development of complex engineering problems in process equipment and control engineering.

№7.1 The students can understand and evaluate the impact of engineering practice on environmental and social sustainable development of complex engineering problems of process equipment and control engineering, and understand the constraints of environment on Engineering in design.

№7.2 The students can understand the new materials, new processes and new methods of process

equipment and control engineering, pay attention to energy saving and emission reduction, pay attention to the use of energy saving and environmental protection technology programs, and understand the new requirements of social development for process equipment and control engineering engineers.

№8. Professional norms: The students can understand China's national conditions and have humanities and Social Sciences literacy and social responsibility, to understand and abide by engineering professional ethics and codes of conduct in engineering practice, so as to assume responsibility, contribute to the country and serve the society.

№8.1 The students have the necessary knowledge and accomplishment of Humanities and social sciences, correct values and social responsibility, healthy body and mind.

№8.2 The students have ability to understand and abide by engineering professional ethics and norms in the practice of process equipment and control engineering projects, with legal awareness, and to assume responsibility, contribute to the country and serve the society.

№9. Individuals and teams: The students can play the roles of individuals, team members and leaders in solving complex engineering problems of process equipment and control engineering in a multidisciplinary team.

№9.1 The students can solve the complex engineering problems of process equipment and control engineering, we can have the consciousness of active cooperation and cooperation with others in a multidisciplinary environment, and can independently complete the tasks assigned by the team.

№9.2 The students can play the role of team member or leader in a multidisciplinary team, and have the ability of organization and coordination.

№10. Communication skills: The students have ability to effectively communicate and communicate with industry counterparts and the public on complex engineering issues of process equipment and control engineering, including writing reports and designing manuscripts, presenting statements, clearly expressing or responding instructions; with a certain international perspective, able to communicate and communicate across cultural backgrounds.

№10.1 The students can effectively communicate and communicate with industry counterparts and the public on complex engineering issues of process equipment and control engineering, including writing reports and designing manuscripts, presenting statements, expressing or responding to instructions clearly.

№10.2 The students have a certain international vision, understand the current international development situation, master a foreign language, have the ability to listen, speak, read and write, and be able to communicate and communicate in cross-cultural context.

№11. Project management: The students can understand, master and apply engineering management principles and economic decision-making methods in a multi-disciplinary environment related to process equipment and control engineering. It has certain organizational, coordination, management and leadership abilities.

№11.1 The students can understand and master engineering management principles and economic decision-making methods.

№11.2 The students can apply the engineering management principles and economic decision-making methods to process equipment and control engineering projects under multidisciplinary environment, and has certain organizational, managerial and leadership abilities.

№12. Lifelong learning: The students have ability to learn independently and lifelong according to the needs of personal and professional development, awareness of self-learning and lifelong learning, and ability to adapt to the new development of process equipment and control engineering.

№12.1 The students can recognize the importance of autonomous learning and the awareness of tracking new knowledge, and have the awareness of lifelong learning and adapting to the new development of process equipment and control engineering.

№12.2 For personal and professional development needs, the students have the ability of lifelong learning and adapting to the new development of process equipment and control engineering.

**专业简介：**（限 500 字以内）

过程装备与控制工程专业前身为化工设备与机械，创建于 1958 年，华南理工大学是我国最早开设该专业的六所学校之一。1996 年，在广泛调研的基础上，了解到社会急需综合素质高的装备类人才，在全国率先将原来的化工设备与机械、塑料机械、橡胶机械、造纸机械等专业融入计算机控制技术并调整为一个综合性专业：工业装备与控制工程，拓宽了专业口径。1999 年起，根据全国统一的专业目录，改名为过程装备与控制工程。面向国家战略型新兴产业先进装备制造、节能环保等流程型工业发展需求，通过扎实的专业教育，使学生熟悉流体动力过程、传热传质过程、热力过程等基础理论，掌握过程装备设计、轻工机械及模具设计、过程系统智能化控制，以及增材智造与 3D 打印、互联网+、人工智能、大数据等新技术应用，培养高素质、国际化、三创型人才。

深造就业：可在过程装备智能控制与制造、高分子材料加工、智能轻工装备与模具制造等领域，在石油化工、生物制药、海洋装备、航空航天、核电、汽车等企事业单位，在高校、科研院所以及质监、安监、节能监察、环保等政府部门从事科学研究、技术开发、项目管理以及教学等相关工作。

**Program Profile：**

The specialty of process equipment and control engineering, formerly chemical equipment and machinery, was founded in 1958. South China University of Technology is one of the first six schools to open this specialty in China. In 1996, on the basis of extensive research, we learned that the society urgently needed equipment talents with high comprehensive quality. We took the lead in integrating the original chemical equipment and

machinery, plastic machinery, rubber machinery and paper machinery into computer control technology and adjusting them to a comprehensive specialty: industrial equipment and control engineering, which broadened the scope of specialty. Since 1999, according to the national unified professional catalogue, it has been renamed process equipment and control engineering. Facing the development needs of the national strategic emerging industries such as advanced equipment manufacturing, energy saving and environmental protection, through the solid professional education, the students are familiar with the basic theory of fluid dynamic process, heat and mass transfer process, thermal process and so on, and grasp the process equipment design, light industry machinery and die design, intelligent control of process system, and intelligent manufacturing and 3D printing, Internet +. New technologies such as artificial intelligence and big data are applied to train high-quality, internationalized and innovative talents.

Profound employment: In the fields of process equipment intelligent control and manufacturing, polymer material processing, intelligent light industry equipment and mould manufacturing, in enterprises and institutions such as petrochemical industry, biopharmaceuticals, marine equipment, aerospace, nuclear power, automobile, etc., in universities, scientific research institutes and government departments such as quality supervision, safety supervision, energy saving supervision, environmental protection, etc., we can engage in scientific research, technological development and projects. Project management, teaching and other related work.

**专业特色：**（限 100 字以内）

本专业覆盖过程装备设计及过程装备控制等领域，培养学生掌握过程装备与控制工程领域的技术理论基础知识，基于“厚基础，宽适应”的指导思想，通过丰富的创新性实验、实习实践以及科研活动，使学生受到电工电子、过程控制及计算机技术方面的基本训练，以及过程装备与控制工程领域的专业训练，锻炼创新思维，围绕过程装备设计、过程装备控制、流体力学与传热、轻工装备及模具设计等方向开展教学，对于在过程装备与控制工程领域从事工程设计、生产制造、技术开发、科学研究、生产组织和管理等工作具有宽广适应性。

**Program Features:**

This major covers the fields of process equipment design and process equipment control. It trains students to grasp the basic technical and theoretical knowledge in the field of process equipment and control engineering. Based on the guiding ideology of “thick foundation, wide adaptability”, and through abundant innovative experiments, practice and scientific research activities, students are trained in basic aspects of electronics, process control and computer technology, as well as professional training in the field of process equipment and control engineering. They are trained in innovative thinking, focusing on process equipment design, process equipment control, hydrodynamics and heat transfer, light industrial equipment and die design. They have wide adaptability for engineering design, manufacturing, technology development, scientific research, production organization and management in the field of process equipment and control engineering.

**授予学位： 工学学士学位**

**Degree Conferred: Bachelor of Engineering**

**核心课程：**

流体力学与传热 II、传质与分离工程 II、控制工程基础、机电传动控制、过程装备控制、过程设备设计、高分子材料成型加工设备、轻工装备控制

**Core Courses:**

Fluid Mechanics and Heat Transfer, Mass Transfer and Separation Processes, Control Engineering Foundation, Mechanical & Electrical Transmission Control, Process and Equipment Control, Process Equipment Design, Polymer Processing Machinery, Light Industrial Equipment Control,

**特色课程：**

新生研讨课：太阳能电池制造技术与应用实践、轻工自动装备的未来与挑战、增材制造（3D 打印）及精密连接技术、高端产品及其先进制造、自动驾驶与智能网联汽车技术、城市公共安全与人文精神、内燃机结构创新设计

专题研讨课：机器人学导论、材料加工成型新装备与新技术

双语/全英课程：过程装备控制、工程流变学、过程装备、控制工程基础、数字信号处理与应用、轻工装备控制

MOOC：马克思主义理论与实践、大学计算机基础

学科前沿课：压力容器应力分析与可靠性设计、3D 打印技术概论、量子材料

校企合作课：过程装备与控制工程产业模式与创业、轻工装备产业模式与创业

创新实践课：生产实习、专业综合实验

创业教育课：过程装备与控制工程产业模式与创业、轻工装备产业模式与创业

专题设计课：专业课程设计

等等

**Featured Courses:**

Freshmen Seminars: Solar Cell Manufacture Technology and Application Practice, Opportunity and Challenge for Automatic Equipment in Light Industry, Additive Manufacturing (3D Printing) and Precision Joining Technology, High-end Products and Advanced Manufacturing, An Introduction to Unmanned Vehicle and Intelligent Connected Vehicle, City Public Security and Humanistic Spirit, Innovating Design on Structure of Internal-Combustion Engine

Special Topics: Light Industrial Equipment Intelligence Robot, New Equipment and Technology for Material Processing and Forming

Courses Taught in English: Process Equipment Control, Process Equipment, Engineering Rheology, Control Engineering Foundation, Digital Signal Processing & Applications, Light Industrial Equipment Control

MOOC: Marxism Theory and Practice, University Computer Foundation

Subject Frontiers Courses: Reliability Design and Stress Analysis of Pressure Vessels, 3D Printing Technology on Light Industrial Equipment, Quantum Materials

Innovation Practice: Graduation Project, Specialized Comprehensive Experiment

Entrepreneurship Courses: Process Equipment & Control Engineering Entrepreneurship, Process Equipment & Control Engineering Entrepreneurship

Special Designs: Specialty Course Design

## 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<br>Course Category | 课程要求<br>Requirement | 学分<br>Credits | 学时<br>Academic Hours | 备注<br>Remarks |
|---|---|---|---|---|
| 公共基础课<br>General Basic Courses | 必修<br>Compulsory | 67.5 | 948 | |
| | 通识<br>General Education | 10 | 160 | |
| 专业基础课<br>Specialty Basic Courses | 必修<br>Compulsory | 41 | 656 | |
| 选修课<br>Elective Courses | 选修<br>Elective | 17.5 | 280 | |
| 合　计<br>Total | | 136 | 2052 | |
| 集中实践教学环节（周）<br>Practice Training (Weeks) | 必修<br>Compulsory | 34 | 41 周 | |
| 毕业学分要求<br>Credits Required for Graduation | 170 | | | |

备注：毕业学分要求格式：合计学分+集中实践教学环节学分=毕业学分要求

### 2.类别统计表（Category Registration Form）

| 学时<br>Academic Hours | | | | | 学分<br>Credits | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 总学时数<br>Total | 其中<br>Include | | 其中<br>Include | | 总学分数<br>Total | 其中<br>Include | | 其中<br>Include | | | 其中<br>Include |
| | 必修学时<br>Compulsory | 选修学时<br>Elective | 理论教学学时<br>Theory Course | 实验教学学时<br>Lab | | 必修学分<br>Compulsory | 选修学分<br>Elective | 集中实践教学环节学分<br>Practice-concentrated Training | 理论教学学分<br>Theory Course Credits | 实验教学学分<br>Lab | 创新创业教育学分<br>Innovation and Entrepreneurship Education |
| 2052 | 1612 | 440 | 1668 | 384 | 170 | 152.5 | 17.5 | 34 | 124 | 12 | 11.5 |

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、实习和其他；

3.创新创业教育学分：培养计划中的课程，由各学院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 | 毕业要求 Student Outcomes |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 总学时 Class Hours | 实验 Lab Hours | 实习 Practice Hours | 其他 Other Hours | | | |
| 公共基础课 General Basic Courses | 043100413 | 思想道德修养与法律基础<br>Cultivation of Thought and Morals & Fundamental of Law | 必 C | 40 | | | 4 | 2.5 | 1 | |
| | 031101371 | 中国近现代史纲要<br>Skeleton of Chinese Modern History | | 40 | | | 4 | 2.5 | 2 | |
| | 031101423 | 毛泽东思想和中国特色社会主义理论体系概论<br>Thought of Mao ZeDong and Theory of Socialism with Chinese Characteristics | | 72 | | | 24 | 4.5 | 3 | |
| | 031101621 | 马克思主义基本原理概论<br>Fundamentals of Marxism Principle | | 40 | | | 4 | 2.5 | 4 | |
| | 044103681 | 大学英语（一）<br>College English(1) | | 48 | | | | 3.0 | 1 | |
| | 044103691 | 大学英语（二）<br>College English(2) | | 48 | | | | 3.0 | 2 | |
| | 045101644 | 大学计算机基础<br>Foundations of Computer | | 32 | | | 32 | 1.0 | 1 | |
| | 045100772 | C++程序设计基础<br>C++ Programming Foundations | | 40 | | | 8 | 2.0 | 2 | |
| | 052100332 | 体育（一）<br>Physical Education (1) | | 32 | | | 32 | 1.0 | 1 | |
| | 052100012 | 体育（二）<br>Physical Education (2) | | 32 | | | 32 | 1.0 | 2 | |
| | 052100842 | 体育（三）<br>Physical Education (3) | | 32 | | | 32 | 1.0 | 3 | |
| | 052100062 | 体育（四）<br>Physical Education (4) | | 32 | | | 32 | 1.0 | 4 | |
| | 006100112 | 军事理论<br>Military Principle | | 36 | | | 18 | 2.0 | 2 | |
| | 040100051 | 微积分Ⅱ(一)<br>Calculus(1) | | 80 | | | | 5.0 | 1 | |
| | 040100411 | 微积分Ⅱ(二)<br>Calculus(2) | | 80 | | | | 5.0 | 2 | |
| | 040100401 | 线性代数与解析几何<br>Linear Algebra & Analytic Geometry | | 48 | | | | 3.0 | 1 | |
| | 040100023 | 概率论与数理统计<br>Probability & Mathematical Statistics | | 48 | | | | 3.0 | 2 | |
| | 041101151 | 大学物理Ⅲ（一）<br>General Physics (1) | | 64 | | | | 4.0 | 2 | |
| | 041100341 | 大学物理III（二）<br>General Physics (2) | | 64 | | | | 4.0 | 3 | |
| | 041100671 | 大学物理实验（一）<br>Physics Experiment(1) | | 32 | 32 | | | 1.0 | 3 | |
| | 041101051 | 大学物理实验（二）<br>Physics Experiment(2) | | 32 | 32 | | | 1.0 | 4 | |
| | 074102352 | 画法几何及机械制图（一）<br>Descriptive Geometry & Machine Drawing (1) | | 48 | | | | 3.0 | 1 | |
| | 074102781 | 画法几何及机械制图（二）<br>Descriptive Geometry & Machine Drawing (2) | | 64 | | | | 4.0 | 2 | |
| | 037102783 | 大学化学<br>General Chemistry | | 32 | | | | 2.0 | 1 | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 037101943 | 大学化学实验<br>General Chemistry Experiment | | 16 | 16 | | | 0.5 | 2 | |
| | 031101331 | 形势与政策<br>Analysis of the Situation & Policy | | 128 | | | | 2.0 | 1-8 | |
| | 040100471 | 积分变换<br>Integral Transformation | | 16 | | | | 1.0 | 3 | |
| | 045101693 | 计算方法<br>Computing method | | 32 | | | | 2.0 | 3 | |
| | | 人文科学领域<br>Humanities | 通识课E | 96 | | | | 6.0 | | №8 |
| | | 社会科学领域<br>Social Science | | 64 | | | | 4.0 | | №8 |
| | | 科学技术领域<br>Science and Technology | | | | | | | | №8 |
| | **合 计<br>Total** | | | 1108 | 80 | | 222 | 77.5 | | |

备注：学时中其他可以为上机和实践学时。

## 二、课程设置表（续）（Courses Schedule）

| 类别<br>Course Category | 课程代码<br>Course No. | 课程名称<br>Course Title | 是否必修<br>C/E | 学时数<br>Total Curriculum Hours | | | | 学分数<br>Credits | 开课学期<br>Semester | 毕业要求<br>Student Outcomes |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 总学时<br>Class Hours | 实验<br>Lab Hours | 实习<br>Practice Hours | 其他<br>Other Hours | | | |
| 专业基础课 Specialty Basic Courses | 030102522 | 机械工程概论<br>Introduction to Mechanical Engineering | 必C | 16 | | | | 1.0 | 2 | |
| | 024100152 | 电路与电子技术<br>ElectricCircuitandElectronics | 必C | 64 | | | | 4.0 | 4 | №3 |
| | 024100162 | 电路与电子技术实验<br>ExperimentofElectricCircuitsandElectronics | 必C | 32 | 32 | | | 1.0 | 5 | №3 |
| | 030100143 | 机械设计基础 Basis of Mechanical Design | 必C | 64 | | | | 4.0 | 4 | №3 |
| | 030101782 | 互换性与技术测量<br>Interchange Ability and Technical Measurement | 必C | 24 | | | | 1.5 | 4 | №1 |
| | 033100341 | 工程力学III<br>Engineering Mechanics | 必C | 80 | 6 | | 4 | 5.0 | 3 | №1 |
| | 067101301 | 工程材料及金属工艺学<br>Engineering Materials and Metal Technics | 必C | 40 | | | | 2.5 | 3 | №1 |
| | 031100233 | 单片机设计技术<br>Singlechip Design Technique | 必C | 32 | | | | 2.0 | 5 | №3 |
| | 067101451 | 工程热力学与传热学基础<br>Foundation of Engineering Thermodynamics and Heat Transfer | 必C | 32 | | | | 2.0 | 5 | №1 |
| | 067100532 | 流体力学<br>Fluid Mechanics | 必C | 24 | | | | 1.5 | 5 | №1 |
| | 031100303 | 液压与气动<br>Hydraulic and Pneumatic | 必C | 32 | | | | 2.0 | 5 | №1 |
| | 031100023 | 机械制造工艺学<br>Mechanical Manufacture Technology | 必C | 40 | | | | 2.5 | 5 | №1 |
| | 030101503 | 机电传动控制<br>Mechanical & Electrical Transmission Control | 必C | 32 | | | | 2.0 | 5 | №3 |
| | 037100303 | 流体力学与传热Ⅱ Fluid Mechanics and Heat Transfer | 必C | 48 | | | | 3.0 | 5 | №1 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 037100411 | 化工原理实验（一）Experiment of Chemical Engineering Principles(1) | 必C | 16 | 16 | | | 0.5 | 5 | №1 |
| | 037100423 | 传质与分离工程Ⅱ Mass Transfer and Separation Processes | 必C | 40 | | | | 2.5 | 6 | №1 |
| | 037100202 | 化工原理实验（二）Experiment of Chemical Engineering Principles(2) | 必C | 16 | 16 | | | 0.5 | 6 | №1 |
| | 067101081 | 控制工程基础 Foundation of Control Engineering | 必C | 40 | 4 | | | 2.5 | 4 | №3 |
| | 067101172 | 特种设备安全技术与管理 Safety Technology and Management of Special Equipment | 必C | 16 | | | | 1.0 | 7 | №1 |
| | **合 计 Total** | | 必C | 656 | 78 | | 4 | 41 | | |
| 选修课 Elective Courses | **模块化课程一（必选 8 学分）** | | | | | | | | | |
| | 030104602 | 过程设备设计 Process Equipment Design | 选E | 48 | | | | 3.0 | 6 | №4 |
| | 030103813 | 过程装备控制 Process and Equipment Control | 选E | 48 | | | | 3.0 | 6 | №3 |
| | 030105842 | 过程流体机械 Process Fluid Machinery | 选E | 32 | | | | 2.0 | 5 | №3 |
| | **模块化课程二（必选 8 学分）** | | | | | | | | | |
| | 030104421 | 高分子材料成型加工设备 Polymer Processing Machinery | 选E | 48 | | | | 3.0 | 6 | №3 |
| | 067101321 | 轻工装备控制 Process and Equipment Control | 选E | 48 | | | | 3.0 | 6 | №3 |
| | 030102042 | 塑料成型模具 Mould for Plastics | 选E | 32 | | | | 2.0 | 6 | №3 |
| | **以下为任选课程** | | | | | | | | | |
| | 030105572 | 过程装备与控制工程产业模式与创业 Process Equipment & Control Engineering Entrepreneurship | 选E | 16 | | | | 1.0 | 7 | №6 |
| | 030105831 | 可编程控制器及其应用 Programmable logic controller and its application | 选E | 32 | | | | 2.0 | 7 | №3 |
| | 067101311 | 过程装备 Process Equipment | 选E | 32 | | | | 2.0 | 7 | №3 |
| | 030103772 | 过程装备计算机辅助 CAD/CAE 技术基础 Fundamentals of Computer-Aided CAD/CAE for Processing Equipment | 选E | 32 | | | | 2.0 | 7 | №5 |
| | 067101201 | 数值流体力学 Numerical Fluid Dynamics | 选E | 32 | | | | 2.0 | 5 | №3 |
| | 030103561 | 设备腐蚀与防护 Corrosion and Protection of Industry Equipment | 选E | 32 | | | | 2.0 | 7 | №3 |
| | 030106481 | 制冷与空调技术 Refrigeration Principle and Air Conditioning Technology | 选E | 32 | | | | 2.0 | 7 | №3 |
| | 030103401 | 油气安全技术 Oil & Gas Safety Technology | 选E | 32 | | | | 2.0 | 7 | №3 |
| | 030103582 | 压力容器应力分析与可靠性设计 Reliability Design and Stress Analysis of Pressure Vessels | 选E | 24 | | | | 1.5 | 7 | №5 |
| | 030103642 | 断裂与失效分析 Material Failure Analysis | 选E | 24 | | | | 1.5 | 7 | №3 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 067101331 | 热交换器原理与设计<br>Heat Exchanger Design Technology | 选<br>E | 32 | | | | 2.0 | 7 | №3 |
| | 067101221 | 现代机械设计方法<br>Engineering Design | 选<br>E | 32 | | | | 2.0 | 6 | №4 |
| | 067101291 | 高分子结构与性能<br>Polymer Physics | 选<br>E | 32 | | | | 2.0 | 4 | №1 |
| | 067101191 | 高分子结构与性能实验<br>Polymer Physics Experiment | 选<br>E | 32 | | 32 | | 1.0 | 4 | №1 |
| | 030103871 | 工程流变学<br>Engineering Rheology | 选<br>E | 32 | | | | 2.0 | 4 | №2 |
| | 030105411 | 机械创新设计<br>Machinery Innovation Design | 选<br>E | 32 | | | | 2.0 | 6 | №3 |
| | 067101351 | 轻工装备产业模式与创业<br>Process Equipment & Control Engineering Entrepreneurship | 选<br>E | 16 | | | | 1.0 | 7 | №6 |
| | 030106071 | CAD/CAE/CAM 在轻工装备设计中的应用<br>The Application of CAD/CAE/CAM in Light Industrial Equipment Design | 选<br>E | 32 | | | | 2.0 | 5 | №5 |
| | 030106081 | 轻工包装装备<br>Light Industrial Packaging Equipment | 选<br>E | 32 | | | | 2.0 | 7 | №1 |
| | 030105344 | 高分子材料成型工艺学<br>Polymer processing | 选<br>E | 32 | | | | 2.0 | 5 | №3 |
| | 067101441 | 食品机械装备<br>Food Machinery and Equipment | 选<br>E | 32 | | | | 2.0 | 7 | №3 |
| | 030101721 | 材料加工成型新装备与新技术<br>New Equipment and Technology for Material Processing and Forming | 选<br>E | 8 | | | | 0.5 | 7 | №12 |
| | 067101281 | 高分子材料加工过程建模与仿真<br>Polymer Processing Process Modeling and Simulation | 选<br>E | 32 | | | | 2.0 | 7 | №4 |
| | 067101341 | 塑料制品设计<br>Plastic product design | 选<br>E | 24 | | | | 1.5 | 6 | №4 |
| | 030105171 | 发泡成型技术<br>Foam Molding Technology | 选<br>E | 24 | | | | 1.5 | 7 | №3 |
| | 030102211 | 机器人学导论<br>Introduction to Robotics | 选<br>E | 24 | | | | 1.5 | 7 | №3 |
| | 030106091 | 3D 打印技术概论<br>3D Printing Technology | 选<br>E | 24 | | | | 1.5 | 7 | №3 |
| | 06710168 | 数字信号处理与应用<br>Digital Signal Processing & Applications | 选<br>E | 32 | | | | 2.0 | 7 | №3 |
| | 067101231 | 量子材料<br>Quantum Materials | 选<br>E | 24 | | | | 1.5 | 7 | №1 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 067101211 | 科技论文检索与写作<br>Science and Literature Retrieval | 选E | 16 | | | | 1.0 | 4 | №5 |
| | 030102361 | 太阳能电池制造技术与应用实践<br>Solar Cell Manufacture Technology and Application Practice | 选E（新生研讨课） | 16 | | | | 1.0 | 2 | №6,8,9 |
| | 030103262 | 城市公共安全与人文精神<br>City Public Security and Humanistic Spirit | | | | | | 1.0 | 2 | №6,8,9 |
| | 067101021 | 内燃机结构创新设计<br>Innovating Design on Structure of Internal-Combustion Engine | | | | | | 1.0 | 1 | №6,8,9 |
| | 067101031 | 高端产品及其先进制造<br>High-end Products and Advanced Manufacturing | | | | | | 1.0 | 2 | №6,8,9 |
| | 067101041 | 增材制造（3D 打印）及精密连接技术<br>Additive Manufacturing (3D Printing) and Precision Joining Technology | | | | | | 1.0 | 1 | №6,8,9 |
| | 067101051 | 自动驾驶与智能网联汽车技术<br>Technologies for Unmanned and Intelligent Connected Vehicles | | | | | | 1.0 | 2 | №6,8,9 |
| | 067101011 | 轻工自动装备的未来与挑战 Future and Challenge for Automatic Equipment in Light Industry | | | | | | 1.0 | 1 | №6,8,9 |
| | 020100051 | 创新研究训练<br>Innovation Research Training | 选E | 32 | | | | 2.0 | 7 | |
| | 020100041 | 创新研究实践 I<br>Innovation Research Practice I | 选E | 32 | | | | 2.0 | 7 | |
| | 020100031 | 创新研究实践 II<br>Innovation Research Practice II | 选E | 32 | | | | 2.0 | 7 | |
| | 020100061 | 创业实践<br>Entrepreneurial Practice | 选E | 32 | | | | 2.0 | 7 | |
| | **合 计**<br>**Total** | | 选E | 选修课最低要求 17.5 学分，其中模块化课程二选一 | | | | | | |

备注：学时中其他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。

## 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 | 毕业要求 Student Outcomes |
|---|---|---|---|---|---|---|---|
| | | | 实践 Practice weeks | 授课 Lecture Hours | | | |
| 006100151 | 军事技能<br>Military Training | 必<br>C | 2 周 | | 2.0 | 1 | №9 |
| 031101551 | 马克思主义理论与实践<br>Marxism Theory and Practice | 必<br>C | 2 周 | | 2.0 | 3 | 第 3 学期交作业 |
| 030100632 | 工程训练Ⅱ | 必<br>C | 4 周 | | 4.0 | 3 | №1 8 10 |
| 030100091 | 机械设计基础课程设计<br>Course Project of the Basis of Mechanical Design | 必<br>C | 2 周 | | 2.0 | 4 | №1 2 3 5 |
| 030103142 | 机械基础综合实验Ⅱ<br>Mechanical Basic Comprehensive Experiment | 必<br>C | 0.5 周 | | 0.5 | 4 | №1 2 3 |
| 030100291 | 生产实习<br>Production Practice | 必<br>C | 4 周 | | 4.0 | 6-7 | №1 2 6 8 11 12 |
| 030106101 | 工业装备控制工程课程设计<br>Course Project of Industrial Equipment Control Engineering | 必<br>C | 2 周 | | 2 | 6 | №1 2 3 |
| 047100702 | 化工原理课程设计<br>Course Design for Chemical Engineering | 必<br>C | 2 周 | | 2.0 | 6 | №1 2 3 7 |
| 030104371 | 学科基础实验（分散进行）<br>Discipline Basic Experiment | 必<br>C | 1 周 | | 1.0 | 4-5 | №1 2 3 9 |
| 067101731 | 专业综合实验（分散进行）<br>Specialized Comprehensive Experiment (Chemical Engineering Equipment and Control Engineering) | 必<br>C | 1.5 周 | | 1.5 | 6-7 | №1 2 3 6 |
| 030100352 | 专业课程设计（分散进行）<br>Specialty Course Design (Chemical Engineering Equipment and Control Engineering) | 必<br>C | 3 周 | | 3 | 6-7 | №1 2 3 7 |
| 067100644 | 毕业设计<br>Diploma Project (Thesis) | 必<br>C | 15 周 | | 10 | 8 | №1 2 3 4 5 6 10 12 |
| **合 计<br>Total** | | 必<br>C | 41 周 | | 34 | | |

## 四、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 2 个学分。

**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。

## 4.“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 two credits.

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.