

电子科学与技术

Electronic Science and Technology

专业代码: 080702

学 制: 4 年

Program Code: 080702

Duration: 4 years

培养目标:

培养适应社会主义经济、科技和社会发展需要的、德智体全面发展、获得工程师基本训练和具有综合知识的高级集成电路学科技术人才。学生毕业后,可以到集成电路企业、电子工程企业、电信部门、财税金融部门和机关、科研机构等单位,从事集成电路设计、生产、封测及集成系统、计算机软硬件、通信网络工程的研究、开发和管理等工作。

Educational Objectives:

We train the senior IC talent with moral and intellectual all-round development, access to basic training of engineers and a comprehensive knowledge of senior engineering, to meet the need of economic, technological and social development. After graduation, students can go to the electronic engineering enterprises, telecommunications sector, finance and taxation departments and institutions, scientific research institutions and other units, engaged in integrated circuit design, production, packaging and testing and integration systems, computer hardware and software, communications network engineering research, development and management work.

毕业要求:

№1.工程知识: 掌握扎实的基础知识、专业基本原理、方法和手段,能够将数学、自然科学、本专业基础知识和专业知识用于解决复杂工程问题,并接触和掌握电子行业部分营运知识,为解决企业电子工程实际复杂问题打下知识基础。

№2.问题分析: 能够应用数学、自然科学、本专业的基本原理、方法、手段和电子行业营运知识,识别、表达、并通过文献研究分析电子工程中的复杂问题,以获得有效结论。

№3.设计/开发解决方案: 能够设计针对电子工程复杂问题的解决方案,设计满足特定需求的电子系统、单元(部件)或工艺流程,并能够在设计环节中体现创新意识,考虑社会、健康、安全、法律、文化以及环境等因素。

№4.研究: 能够基于科学原理并采用科学方法对电子工程复杂问题进行研究,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。

№5.使用现代工具: 能够针对复杂电子工程问题,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,包括对电子工程复杂问题的预测与模拟,并能够理解其局限性。

№6.工程与社会: 能够基于电子工程相关背景知识进行合理分析,评价电子工程实践和电子工程复杂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.环境和可持续发展：能够理解和评价针对电子工程复杂问题的工程实践对环境、社会可持续发展的影响。

№8.职业规范：具有人文社会科学素养、社会责任感，能够在工程实践中理解并遵守工程职业道德和规范，履行责任。

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

№10.沟通：能够就电子工程复杂问题与业界同行及社会公众进行有效沟通和交流，包括撰写报告和设计文稿、陈述发言、清晰表达或回应指令。并具备一定的国际视野，能够在跨文化背景下进行沟通和交流。

№11.项目管理：理解并掌握电子工程管理原理与经济决策方法，并能在多学科环境中应用。

№12.终身学习：具有自主学习和终身学习的意识，有不断学习和适应发展的能力。

Student Outcomes:

№1.Master solid professional basic knowledge, basic principle, method and means, and apply mathematics, natural science, the professional knowledge and professional knowledge to solve complex engineering problems, and exposure and master some operating knowledge in electronics industry and set the knowledge foundation to solve the actual complex problems of enterprise electronic engineering.

№2.Problem Analysis: An ability to identify, formulate and analyze complex electronic engineering problems, reaching to substantiated conclusions using basic principles of mathematics, science, the basic principle of this major, operating method ,means and electronic industry knowledge .

№3.Design / Development Solutions: An ability to design solutions for complex electronic engineering problems and innovatively electronic systems, components or process that meet specific needs with societal, public health, safety, legal, cultural and environmental considerations.

№4.Research: An ability to conduct investigations of complex electronic engineering problems based on scientific theories and adopting scientific methods including design of experiments, analysis and interpretation of data and synthesis of information to provide valid conclusions.

№5.Applying Modern Tools: An ability to create, select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling of complex electronic engineering problems, to complex electronic engineering activities with an understanding of the limitations.

№6.Engineering and Society: An ability to apply reasoning informed by contextual knowledge of electronic engineering to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional electronic engineering practice and complex electronic engineering problems.

№7.Environment and Sustainable Development: An ability to understand and evaluate the impact of engineering practice to professional complex electronic engineering problems in environmental and societal contexts and need for sustainable development.

№8.Professional Standards: An understanding of humanity science and social responsibility, being able to

understand and abide by professional ethics and standards responsibly in engineering practice.

№9.Individual and Teams: An ability to function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings.

№10.Communication: An ability to communicate effectively on complex electronic engineering problems with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, give and receive clear instructions, and communicate in cross-cultural contexts with international perspective.

№11.Project Management: Demonstrate knowledge and understanding of electronic engineering management principles and methods of economic decision-making, to function in multidisciplinary environments.

№12.Lifelong Learning: A recognition of the need for, and an ability to engage in independent and life-long learning with the ability to learn continuously and adapt to new developments.

专业简介：

电子科学与技术 1958 年创办，专业历经半导体材料与器件专业、半导体物理与器件、微电子技术等专业名称变迁，作为全国最早建立该专业的 6 所工科院校之一及国务院学位委员会第一批硕士学位授予点的专业，已形成了包括本科—硕士—博士的完整人才培养体系，是华南地区唯一的广东省重点学科。

当前，根据国家与区域产业重大需求，形成计算芯片、射频/模拟集成电路、智能传感器、第三代半导体器件等领域方向。拥有国家移动超声探测工程技术研究中心、广州集成电路设计与培训中心、广东省短距离无线探测与通信重点实验室、广东省天线与射频技术工程技术研究中心、广东省人体数据科学工程技术研究中心。

继承冯秉铨教授注重教学改革的传统，长期承担学校教育教学改革探索试点，成效显著，在五年一次的国家级教学成果奖评选中，连续两届获国家级教学成果二等奖。学院拥有国家级实验教学示范中心、国家级人才培养模式创新实验区、国家集成电路人才培养基地、国家工程实践教育中心、国家级教学团队，这些为创新人才培养提供保障。

学生培养得到产业界鼎力支持，目前已与华为技术、华为海思、中兴通讯、京信通信、雷曼光电、汕头超声电子、德赛电子、广州视源电子、三星广州研究院、广东中星电子、珠海全志、泰斗微电子、安凯微电子、工信部电子第五研究所等信息产业龙头企业共建企业实习基地。

Program Profile:

Electronic Science and technology founded in 1958, after the name changes such as semiconductor materials and devices, semiconductor physics and devices, and microelectronic technology, is one of the first batch of disciplines accredited to grant master's degree by the State Council Academic Degree Committee. As the only provincial key discipline of Guangdong in South China, the major has firmly established a complete talent training system, including undergraduate, master's and doctoral students.

In recent years, based on the national and regional industrial demand, the major encompasses a wide research and teaching scope of computing chip, RF/Analog IC, Intelligent sensor, the 3rd semiconductor devices and so on. We have 5 high level R&D centers and labs, which are National mobile ultrasonic detection engineering research center, Guangzhou IC design and training center, Guangdong key laboratory of short-range wireless detection and communication, Guangdong antennas for wireless communications engineering research center, and Guangdong somatic data engineering research center.

Carry forward the professor Pingchuan Feng's tradition of laying stress on teaching reform, the major is long been rated as pilot reform of education reform and achieves remarkable results. In the five National Teaching Achievement Award, we won the second prize for the two consecutive year. To provides a strong guarantee for the cultivation of innovative talents, the school has built excellent national level groups and centers, such as exemplary center of experimental teaching, innovative experiment area of talent cultivating mode, training base of IC talented person, engineering practice education center and teaching group.

Our student cultivation is fully supported by the industry. Until now, we have built internship bases with a lot of leading enterprises in industry, such as Huawei, Hisilicon, ZTE, Comba Telecom, Ledman Optoelectronic, Guangdong Goworld, Desay, Guangzhou Shiyuan Electronics, Samsung Guangzhou Mobile R&D Center, Guangdong Vimicro, Zhuhai Allwinner Technology, Techtotop Microelectronics, Anyka Microelectronics, and CEPREI.

专业特色:

电子科学与技术专业是国家特色专业和广东省名牌专业, 国家示范性微电子学院筹建单位之一, 首批获得工程博士专业授予权, 全国首批 61 所“电子科学与技术”卓越工程师计划试点高校之一, 具有 60 年的积淀与优势。本专业注重综合素质和创新实践能力的培养。

Program Features:

Electronic science and technology is the national special major and Guangdong excellent major. It is one of preparatory constructed unit of national microelectronics exemplary institute, and also one of the first majors accredited to grant doctoral degree. The major, with 60 years of accumulation and advantages, is approved the Excellent Engineer Program of Electronic Science and Technology as in the first batch of 61 pilot universities. This major focus on the cultivation of comprehensive quality and innovative practice ability.

授予学位: 工学学士学位

Degree Conferred: Bachelor of Engineering

主干课程:

电路 II、模拟电子技术 II、数字电子技术 II、信号与系统、微机系统与接口、通信电子线路、

半导体物理、半导体器件、集成电路制造技术、模拟集成电路原理与设计、数字集成电路原理与设计。

Core Courses:

Circuit, Analog Electronic Technology, Digital Electronic Technology, Signals and Systems, Microcomputer System and Interface, Digital Signal Processing, Communication Electronic Circuit, Semiconductor Physics, Semiconductor Device, IC Fabrication Technology, Principle and Design of Analog Integrated Circuit, Principle and Design of Digital Integrated Circuit.

特色课程:

全英课程：信号与系统、数字电子技术 II、数字信号处理、数字系统设计、数字集成电路原理与设计、数据结构、电磁场与电磁波

讨论型课程：微电子学科导论

创新实践课程：电子系统综合设计

创业教育课程：电子信息行业创业基础

Featured Courses:

Courses Taught in English: Signals and Systems, Digital Electronic Technology II , Digital Signal Processing, Digital Systems Design, Digital Integrated Circuit Principle and Design, The Data Structure, Electromagnetic Field and Wave

Freshmen Seminars: Introduction to Microelectronics

Innovation Practice Courses: Electronic System Design

Entrepreneurship courses: Basis of Electronic Information Industry Entrepreneurship

一、教学计划总体安排表 (General Teaching Schedule)

| 学 年 | 学 期 | 教 学 进 度 安 排 (周) | | | | | | | | | | | | | | | | | | 理 论 教 学 | 考 试 | 入 学 教 育 | 军 训 | 课 程 设 计 | 大 作 业 | 工 程 训 练 | 电 子 实 习 | 综 合 实 验 | 社 会 实 践 | 生 产 实 习 | 毕 业 实 习 | 其 它 实 习 | 中 外 合 作 项 目 | 毕 业 设 计 | 就 业 安 排 | 机 动 | 假 期 | 小 计 | | | |
|---------|--------|-----------------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|-----|----|------------------|--------|------------------|--------|------------------|-------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|----------------------------|------------------|------------------|--------|--------|--------|----|-----|----|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | | | | | | | | | | | | | | | | | | | | 19 | 20 | |
| | | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | | | | | | | | | | | | | | | | | | | | | | |
| 一 | 1 | | C | A | A | A | A | A | A | A | A | A | A | A | A | B | B | D | D | D | 13 | 2 | 1 | 3 | | | | | | | | | | | | | | | | | 19 |
| | 2 | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A | B | B | 18 | 2 | | | | | | | | | | | | | | | | | | 20 | |
| 二 | 3 | A | A | A | A | A | A | A | A | A | A | G | G | A | A | A | A | A | B | B | 16 | 2 | | | 2 | | | | | | | | | | | | | | | 20 | |
| | 4 | A | A | E | A | A | A | A | A | A | A | A | A | A | A | A | A | Q | B | B | 16 | 2 | | 1 | | | | | | | | | | | | | | 1 | | 20 | |
| 三 | 5 | A | A | A | A | A | A | A | A | A | A | A | A | A | A | E | E | B | B | 16 | 2 | | 1 | | | | | | | | | | | | | | | 1 | | 20 | |
| | 6 | E | E | E | A | A | A | A | A | A | A | A | A | A | A | A | A | A | B | B | 16 | 2 | | 2 | | | | | | | | | | | | | | | | 20 | |
| 四 | 7 | L | L | L | L | A | A | A | A | A | A | A | A | A | A | A | A | A | B | B | 14 | 2 | | | | | | | | | | | | | | | | 4 | | | 20 |
| | 8 | O | O | O | O | O | O | O | O | O | O | O | O | O | O | O | P | Q | Q | Q | | | | | | | | | | | | | | | | | | 15 | 1 | 3 | |
| 合 计 (周) | | | | | | | | | | | | | | | | | | 109 | 14 | 1 | 3 | 4 | 0 | 2 | 0 | 0 | 1 | 0 | 4 | 0 | 0 | 15 | 1 | 5 | | | | | | 159 | |

二、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 | 65.0 | 1028 | |
| | 通识 General Education | 10.0 | 160 | |
| 学科基础课 Disciplinary Basic Courses | 必修 Compulsory | 48.5 | 852 | |
| | 选修 Elective | 0.0 | 0 | |
| 专业领域课 Specialty-related Courses | 必修 Compulsory | 0.0 | 0 | |
| | 选修 Elective | 15.5 | 248 | |
| 合 计 Total | | 139.0 | 2288 | |
| 集中实践教学环节 (周) Practice Training (Weeks) | 必修 Compulsory | 38.0 | 38 周 | |
| 毕业学分要求 Credits Required for Graduation | 139.0+38.0=177.0 | | | |

备注：学生在取得专业教学计划规定学分的同时，还必须取得第二课堂 2 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-concentrated Training | 理论教学学分 Theory Course Credits | 实验教学学分 Lab | 创新创业教育学分 Innovation and Entrepreneurship Education |
| 2288 | 1880 | 408 | 1900 | 388 | 177 | 151.5 | 25.5 | 38 | 127 | 12 | 11 |

三、专业教学计划表 (Teaching 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 | 上机 Computer-aided Class Hours | 实验 Lab Hours | 实践 Practice Hours | | | |
| 公共基础课 General Basic Courses | 143093 | 思想道德修养与法律基础 Cultivation of Thought and Morals & Fundamental of Law | 必修 课 C | (40) (36) | | | | 2.5 | 1 | №8 |
| | 143091 | 中国近现代史纲要 Skeleton of Chinese Modern History | | (32) 24 | | | | 2.0 | 2 | №8 |
| | 143106 | 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 | | (80) 48 | | | | 5.0 | 3 | №8 |
| | 143090 | 马克思主义基本原理 Fundamentals of Marxism Principle | | (40) 36 | | | | 2.5 | 4 | №8 |
| | 143094 | 形势与政策 Analysis of the Situation & Policy | | (128) | | | | 2.0 | 1-8 | №8 |
| | 106001 | 军事理论 Military Principle | | (16) | | | | 1.0 | 2 | №9 |
| | 144001 | 大学英语 (一) College English(1) | | 64 | | | | 4.0 | 1 | №10 |
| | 144002 | 大学英语 (二) College English(2) | | 64 | | | | 4.0 | 2 | №10 |
| | 152001 | 体育 (一) Physical Education (1) | | 32 | | | 32 | 1.0 | 1 | №12 |
| | 152002 | 体育 (二) Physical Education (2) | | 32 | | | 32 | 1.0 | 2 | №12 |
| | 152003 | 体育 (三) Physical Education (3) | | 32 | | | 32 | 1.0 | 3 | №12 |
| | 152004 | 体育 (四) Physical Education (4) | | 32 | | | 32 | 1.0 | 4 | №12 |
| | 130009 | 工程制图 Engineering Drawing | | 48 | | | | 3.0 | 2 | №9 |
| | 145223 | 大学计算机基础 Foundations of Computer | | 32 | | | | 2.0 | 1 | №5 |
| | 135013 | 高级语言程序设计III high-level Language Programming | | 56 | 16 | | | 3.0 | 1 | №5 |
| | 140191 | 微积分 II (一) Calculus(1) | | 80 | | | | 5.0 | 1 | №1 |
| | 140192 | 微积分 II (二) Calculus(2) | | 80 | | | | 5.0 | 2 | №1 |
| | 140197 | 线性代数与解析几何 Linear Algebra and Analytic Geometry | | 48 | | | | 3.0 | 1 | №1 |
| | 140015 | 复变函数 Complex Variable | | 32 | | | | 2.0 | 3 | №1 |
| | 140019 | 概率论与数理统计 Probability & Mathematical Statistics | | 48 | | | | 3.0 | 4 | №1 |
| | 140099 | 数学实验 Mathematical Experiments | | 48 | 32 | | | 2.0 | 4 | №1 |
| | 141005 | 大学物理 II (一) General Physics (1) | | 64 | | | | 4.0 | 2 | №1 |
| | 141006 | 大学物理 II (二) General Physics (2) | | 64 | | | | 4.0 | 3 | №1 |
| | 141007 | 大学物理实验 (一) Physics Experiment(1) | | 32 | | 32 | | 1.0 | 2 | №1 |
| | 141008 | 大学物理实验 (二) Physics Experiment(2) | | 32 | | 32 | | 1.0 | 3 | №1 |

| | | | | | | | | | |
|--|--------------------------|-------|------|----|----|-----|------|--|----|
| | 人文科学领域 Humanities | 通识课 E | 96 | | | | 6.0 | | №8 |
| | 社会科学领域 Social Science | | 64 | | | | 4.0 | | №8 |
| | 合 计 Total | | 1188 | 48 | 64 | 128 | 75.0 | | |

三、专业教学计划表（续）（Teaching 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 | 上机 Computer-aided Class Hours | 实验 Lab Hours | 实践 Practice | | | |
| 学科基础课 Disciplinary Basic Courses | 135173 | 微电子学科导论 Introduction of Microelectronics | 必 C | 16 | | | | 1.0 | 1 | №1 |
| | 135020 | 电路 II Circuit Theory | 必 C | 64 | | | | 4.0 | 2 | №2,3 |
| | 135005 | 电路实验 Circuit Experiment | 必 C | 16 | | 16 | | 0.5 | 3 | №2,3 |
| | 135034 | 模拟电子技术 II Analog Electronics | 必 C | 64 | | | | 4.0 | 3 | №2,3 |
| | 135043 | 模拟电子技术实验 Experiment of Analog Circuits | 必 C | 20 | | 20 | | 0.5 | 3 | №2,3 |
| | 155081 | 数字电子技术 II Digital Electronics | 必 C | 64 | | | | 4.0 | 3 | №2,3 |
| | 135045 | 数字电子技术实验 Experiment of Digital Circuits | 必 C | 16 | | 16 | | 0.5 | 3 | №2,3 |
| | 135176 | 固体物理基础 Solid State Physics | 必 C | 48 | | | | 3.0 | 3 | №2,3 |
| | 135150 | 微机系统与接口 Microcomputer System and Interface Technology | 必 C | 64 | | 16 | | 3.5 | 4 | №2,3 |
| | 141017 | 信号与系统 Signals and Systems | 必 C | 64 | | | | 4.0 | 4 | №2,3 |
| | 135042 | 信号与系统实验 Signals and Systems Experiment | 必 C | 16 | | 16 | | 0.5 | 4 | №2,3 |
| | 135046 | 通信电子线路 Communication Electronic Circuits | 必 C | 48 | | | | 3.0 | 4 | №2,3 |
| | 135175 | 通信电子线路实验 Experiment of Communication Electronic Circuits | 必 C | 16 | | 16 | | 0.5 | 4 | №2№3 |
| | 141062 | 半导体物理 Semiconductor Physics | 必 C | 48 | | | | 3.0 | 4 | №2,3 |
| | 135050 | 数字系统设计 Digital System Design | 必 C | 64 | | 16 | | 3.5 | 5 | №2,3 |

| | | | | | | | | | | |
|------------------------------------|----------------------|---|--------|-----|----|-----|--|------|---|------|
| | 135162 | 半导体器件 Semiconductor Devices | 必 C | 48 | | | | 3.0 | 5 | №2,3 |
| | 141135 | 半导体物理与器件实验 Experimental Semiconductor Physics and Devices | 必 C | 32 | | 32 | | 1.0 | 5 | №2,3 |
| | 135161 | 电子系统综合设计 Synthetic Design of Electronic System | 必 C | 16 | | | | 1.0 | 6 | №2,3 |
| | 135159 | 集成电路制造技术 IC Fabrication Technology | 必 C | 32 | | | | 2.0 | 6 | №2,3 |
| | 135101 | 模拟集成电路原理与设计 Principles and Designs of Analog Integrated Circuits | 必 C | 48 | | | | 3.0 | 6 | №2,3 |
| | 135100 | 数字集成电路原理与设计 Principles and Designs of Digital Integrated Circuits | 必 C | 48 | | | | 3.0 | 6 | №1 |
| | 合 计 Total | | 必 C | 852 | | 148 | | 48.5 | | |
| 专业领域课 Specialty-related Courses | 135053 | 数据结构 Data Structure | 选 E | 56 | 16 | | | 3.0 | 2 | №1,5 |
| | 140070 | 软件工程 Software Engineering | 选 E | 32 | | | | 2.0 | 3 | №2,3 |
| | 135154 | 射频电路 RF Circuits | 选 E | 48 | | | | 3.0 | 5 | №2,3 |
| | 135156 | △射频电路实验 Experiments of RF Circuits | 选 E | 32 | | 32 | | 1.0 | 5 | №2,3 |
| | 135108 | 光纤通信技术 Optical Fiber Communication Technology | 选 E | 64 | | 16 | | 3.5 | 5 | №2,3 |
| | 135048 | 数字信号处理 II Digital Signal Processing | 选 E | 48 | | | | 3.0 | 5 | №2,3 |
| | 135096 | 数字信号处理实验 Digital Signal Processing Experiment | 选 E | 16 | | 16 | | 0.5 | 5 | №2,3 |
| | 135093 | 通信原理 II Principles of Communications | 选 E | 56 | | | | 3.5 | 5 | №2,3 |
| | 135189 | 通信原理实验 Experiment of Principles of Communications | 选 E | 16 | | 16 | | 0.5 | 5 | №2,3 |
| | 135155 | 天线原理 Principle of Antenna | 选 E | 32 | | | | 2.0 | 6 | №2,3 |
| | 135134 | 嵌入式系统理论与技术 Embedded Systems Theory and Technology | 选 E | 48 | | 32 | | 2.0 | 6 | №2,3 |
| | 135114 | Linux 与嵌入式通信技术 Linux and Embedded Communication Technology | 选 E | 48 | | 16 | | 2.5 | 6 | №2,3 |

| | | | | | | | | | |
|---------------------|---|--------|--|--|----|--|-----|---|-------------|
| 135183 | 新型光电子材料与器件 Advanced Materials and Devices on Optoelectronics | 选 E | 32 | | | | 2.0 | 6 | №2,3 |
| 135179 | 集成电路测试实验 Integrated Circuits Testing Experiment | 选 E | 16 | | 16 | | 0.5 | 6 | №2,3 |
| 135181 | 微纳机电系统与传感技术 Micro/Nano Electro-Mechanical Systems and Sensing technology | 选 E | 32 | | | | 2.0 | 7 | №2,3 |
| 135123 | 半导体器件可靠性与失效分析 Reliability and Failure Analysis of Semiconductor Devices | 选 E | 32 | | | | 2.0 | 7 | №2,3 |
| 135180 | 芯片互连与电磁兼容 Chip Interconnection and EMC | 选 E | 32 | | | | 2.0 | 7 | №2,3 |
| 135182 | 纳米器件与纳米电子学 Nano Devices and Nanoelectronics | 选 E | 32 | | | | 2.0 | 7 | №2,3 |
| 135184 | 固体照明与显示技术 Solid-State Lighting and Display Technology | 选 E | 32 | | | | 2.0 | 7 | №2,3 |
| 135128 | 信息安全概论 Introduction to Information Security | 选 E | 32 | | | | 2.0 | 7 | №2,3 |
| 135147 | 数字视音频技术 Digital Audio Technology | 选 E | 64 | | 16 | | 3.5 | 7 | №4,9 |
| 135174 | 电子信息行业创业基础 Basis of electronic information industry entrepreneurship | 选 E | 16 | | | | 1.0 | 7 | №3,6,8,9,11 |
| 120003 | 创新研究训练 Innovation Research Training | 选 E | 32 | | | | 2.0 | | №4,9 |
| 120004 | 创新研究实践 I Innovation Research Practice 1 | 选 E | 32 | | | | 2.0 | | №4,9 |
| 120005 | 创新研究实践 II Innovation Research Practice 2 | 选 E | 32 | | | | 2.0 | | №4,9 |
| 120006 | 创业实践 Entrepreneurial Practice | 选 E | 32 | | | | 2.0 | | №1 |
| 合计 Total | | 选 E | 选修课修读最低要求 15.5 学分 minimum elective course credits required:15.5 | | | | | | |

备注：1. 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。2. 带“△”的课程要求同时选修“射频电路”课程。

四、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 | | | |
| 106002 | 军训 Military Training | 必 C | 3 周 | | 3.0 | 1 | №8 |
| 143197 | 马克思主义理论与实践 Marxism Theory and Practice | 必 C | 2 周 | | 2.0 | 假期 | №9 |

| | | | | | | | |
|----------------------------|---|--------|------|--|------|---|------|
| 130356 | 工程训练 I Engineering Training | 必 C | 2 周 | | 2.0 | 3 | №1,6 |
| 135160 | 高级语言程序设计课程设计 Advanced Language Programming Course Design | 必 C | 1 周 | | 1.0 | 2 | №1,3 |
| 135095 | 电子技术工程素质实践基础 The Engineering Experiment of Electrical and Electronic | 必 C | 1 周 | | 1.0 | 3 | №1,3 |
| 135115 | 模拟电子技术课程设计 Analog Electronics Design | 必 C | 1 周 | | 1.0 | 4 | №1,3 |
| 135146 | 微机系统与接口课程设计 Course Project of Microcomputer System and Interface Technology | 必 C | 1 周 | | 1.0 | 4 | №1,3 |
| 135117 | 通信电子线路课程设计 Communication Electronic Circuit Design | 必 C | 1 周 | | 1.0 | 5 | №1,3 |
| 135165 | 电子系统综合设计课程设计 Curriculum Design of the Synthetic Design of Electronic System | 必 C | 2 周 | | 2.0 | 6 | №1,3 |
| 135102 | 模拟集成电路原理与设计课程设计 Course Design of Analog Integrated Circuit Design | 必 C | 1 周 | | 1.0 | 6 | №1,3 |
| 135099 | 数字集成电路原理与设计课程设计 Course Design of Digital Integrated Circuit Design | 必 C | 1 周 | | 1.0 | 6 | №10 |
| 141074 | 微电子工艺实习 Practice of Microelectronics Process | 必 C | 2 周 | | 2.0 | 6 | №10 |
| 135188 | 微电子工艺及器件仿真课程设计 Microelectronic Process and Device Simulation Design | 必 C | 1 周 | | 1.0 | 6 | №12 |
| 135073 | 毕业实习 Graduate Intern | 必 C | 4 周 | | 4.0 | 7 | №8 |
| 135074 | 毕业设计 Final Year Project | 必 C | 15 周 | | 15.0 | 8 | №9 |
| 合 计 Total | | 必 C | 38 周 | | 38.0 | | |

五、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或广东省创新

创业训练计划或 SRP（学生研究计划）或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。

5.“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.