

电子科学与技术（卓越班）

Electronic Science and Technology (Excellent Engineer Class)

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、获得工程师专业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 professional 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：

No1.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。

No2.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。

No3.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。

No4.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。

No5.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。

No6.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：

电子科学与技术专业 1958 年创办，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，是国务院学位委员会第一批硕士学位授予点的专业，2010 年获批“电子科学与技术”卓越工程师计划，为全国首批 61 所试点高校之一，2011 年招生第一批电子科学与技术（卓越班）学生。本专业已形成了包括本科—硕士—博士的完整人才培养体系。

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，培养过程突出集成电路设计全流程实践训练。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。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 first master degree awarded majors granted by the State Council Academic Degree Committee. Also as one of the first batch of 61 pilot universities, the major approved the Excellent Engineer Program of Electronic Science and Technology in 2010. Now the major has firmly established a complete talent training system, including undergraduate, master and doctoral students.

Recently, based on the national and regional industrial demand, the Excellent Engineer Class encompasses a wide research and teaching scope of computing chip, RF/Analog IC, Intelligent sensor, the 3rd semiconductor devices and so on. The developing program focuses on the practical training of whole process in IC design. 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:

我校是全国首批 61 所“电子科学与技术”卓越工程师计划试点高校之一。通过国内外顶级企业实习、海外访学等途径，本专业培养知识系统宽厚、工程能力突出、富有主动精神及创新意识的集成电路与电子工程领域高层次复合型人才。

Program Features

The major is approved the Excellent Engineer Program of Electronic Science and Technology as in the first batch of 61 pilot universities. Through the top corporate internships and overseas study or so on, we cultivate high-level compound talents in the field of integrated circuits and electronic engineering with wide knowledge system, outstanding engineering ability, and full of initiative and innovative awareness.

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:

全语教学课程：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：微电子学概论、新生研讨课(移动信息化服务的新发展，摩尔时代与后摩尔时代)

创新实践课程：电子系统综合设计

本研贯通课：电源管理集成电路设计、混合信号集成电路设计、射频集成电路设计

工程特色课程（4-8 学分）：课程着重学生工程实践能力及系统意识的培养，与企业实际需求或工程项目相结合，由卓越工程师合作教育企业参与共同设定，所获学分可以替代专业领域选修课学分。

创业教育课程：电子信息行业创业基础

Featured Courses:

Course taught in English: Signals and Systems, Digital Electronic Technology II, Digital Signal Processing, Digital System Design, Digital Integrated Circuit Principles and Design, Data Structures, Electromagnetic Field and Wave

Discussion course: Introduction to Microelectronics, Freshman Seminar (new development of the mobile information service, Moore and More Than Moore)

Innovative practice: Integrated Design of Electronic Systems

Engineering courses (4-8 credits): the course focuses on cultivating students' practical ability and the system consciousness, combined with the actual needs of enterprises or projects, by the excellent engineers education cooperation enterprises to participate in the common setting, course credits can substitute for professional elective credits.

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 验	综 合 实 践	社 会 实 习	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	F	A	A	A	A	A	A	A	A	A	A	A	B	B	17	2			1										20					
二	3	I	A	A	A	A	A	A	A	A	A	G	G	A	A	A	A	A	B	B	15	2				2		1							20					
	4	E	E	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B	B	16	2			2										20					
三	5	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	E	B	B	17	2			1										20					
	6	E	E	E	E	H	H	A	A	A	A	A	A	A	A	A	A	A	B	B	12	2			4		2								20					
四	7	L	L	L	L	L	A	A	A	A	A	A	A	A	A	A	A	A	B	B	12	2							6							20				
	8	J	O	O	O	O	O	O	O	O	O	O	O	O	O	O	P	Q	Q	Q										15	1	3				20				
合 计 (周)																		102	14	1	3	7	1	2	2	1	1		6	0	0	15	1	3			159			

备注: 1. 部分企业实习在寒暑假穿插进行; 2. 第四学年进行企业实习、本科毕业设计、部分硕士课程等。

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	67.0	1052	
	通识 General Education	10.0	160	
学科基础课 Disciplinary Basic Courses	必修 Compulsory	48.5	860	
	选修 Elective	0.0	0	
专业领域课 Specialty-related Courses	必修 Compulsory	0.0	0	
	选修 Elective	13.5	216	
合 计 Total		139.0	2288	
集中实践教学环节 (周) Practice Training (Weeks)	必修 Compulsory	40.0	40 周	
毕业学分要求 Credits Required for Graduation	139.0+40.0=179.0			

备注: 硕士阶段课程修读要求及毕业资格按照学生修读的硕士专业培养方案执行, 并在校内导师和企业导师指导下修读课程和企业实习; 学生本科阶段在取得专业教学计划规定学分的同时, 还必须第二课堂取得 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	1912	376	1900	388	179	155.5	23.5	40	127	12	16

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-ai ded 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	No8
	143091	中国近现代史纲要 Skeleton of Chinese Modern History		(32) 24				2.0	2	No8
	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	No8
	143090	马克思主义基本原理 Fundamentals of Marxism Principle		(40) 36				2.5	4	No8
	143094	形势与政策 Analysis of the Situation & Policy		(128)				2.0	1-8	No8
	106001	军事理论 Military Principle		(16)				1.0	2	No9
	144001	大学英语 (一) College English(1)		64				4.0	1	No10
	144002	大学英语 (二) College English(2)		64				4.0	2	No10
	152001	体育 (一) Physical Education (1)		32			32	1.0	1	No12
	152002	体育 (二) Physical Education (2)		32			32	1.0	2	No12
	152003	体育 (三) Physical Education (3)		32			32	1.0	3	No12
	152004	体育 (四) Physical Education (4)		32			32	1.0	4	No12
	130009	工程制图 Engineering Drawing		48				3.0	2	No9
	145268	C++程序设计基础 C++Programming Foundations		48				3.0	1	No5
	145271	面向对象程序设计 Object-Oriented Programming		32				2.0	2	No5
	140197	线性代数与解析几何 Linear Algebra & Analytic Geometry		48				3.0	1	No1
	140195	数学分析 (一) Mathematics Analysis(1)		80				5.0	1	No1
	140196	数学分析 (二) Mathematics Analysis(2)		112				7.0	2	No1
	140015	复变函数 Complex Variable		32				2.0	3	No1
	140019	概率论与数理统计 Probability & Mathematical Statistics		48				3.0	4	No1
	140099	数学实验 Mathematical Experiments		48		32		2.0	4	No1
	141005	大学物理 II (一) General physics(1)		64				4.0	2	No1,2

	141007	大学物理实验（一） Physics Experiment(1)		32		32		1.0	2	№1,2
	141006	大学物理II（二） General physics(2)		64				4.0	3	№1,2
	141008	大学物理实验（二） Physics Experiment(2)		32		32		1.0	3	№1,2
		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			1212		96	128	77.0		

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-ai ded 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
	145209	数据结构 Data Structures	必 C	56	16			3.0	2	№1,5
	135020	电路II Electric Circuits	必 C	64				4.0	2	№2,3
	135005	电路实验 Experiment of Circuit	必 C	16		16		0.5	3	№2,3
	135034	模拟电子技术II Analog Electronics II	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 II	必 C	64				4.0	3	№2,3
	135045	数字电子技术实验 Experiment of Digital Electronics	必 C	16		16		0.5	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 & Systems	必 C	64				4.0	4	№2,3
	135042	信号与系统实验 Experiment of Signals and Systems	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	№2,3,4
	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 Experiments on Semiconductor Physics and Devices	必 C	32		32		1.0	5	№2,3
	135159	集成电路制造技术 IC Fabrication Technology	必 C	32				2.0	6	№2,3,6
	135161	电子系统综合设计 The Synthetic Design of Electronic System	必 C	16				1.0	6	№2,3,4
	135101	模拟集成电路原理与设计 Analysis and Design of Analog Integrated Circuit	必 C	48				3.0	6	№2,3,6
	135100	数字集成电路原理与设计 Course Design of Digital Integrated Circuits	必 C	48				3.0	6	№2,3,6
	合 计 Total			必 C	860	16	148		48.5	
专业领域课 Specialty-related Courses	135143	☆移动信息化服务的新发展 The New Development of Mobile Information Services	选 E	16				1.0	2	№2
	135151	☆摩尔时代与后摩尔时代 Moore and More Than Moore	选 E	16				1.0	2	№2
	135176	固体物理基础 Solid State Physics	选 E	48				3.0	3	№2,3
	140070	软件工程 Software Engineering	选 E	32				2.0	3	№2,3,5
	135016	电磁场与电磁波 Electromagnetic Fields and Waves	选	64				4.0	4	№2,3
	135048	数字信号处理 II Digital Signal Processing II	选 E	48				3.0	5	№2,3
	135096	数字信号处理实验 Experiment of Digital Signal Processing	选 E	16		16		0.5	5	№2,3
	135177	自动控制原理 Automatic Control Theory	选 E	32				2.0	5	№2,3
	135134	嵌入式系统理论与技术 Embedded System and its Application	选 E	48		32		2.0	6	№2,3
	135114	Linux 与嵌入式通信技术 Linux & Embedded Communication System	选 E	48		16		2.5	6	№2,3

135093	通信原理 II Principle of Communications II	选 E	56				3.5	6	№2,3
135178	深度学习与计算机视觉 A Deep Learning Tour of Computer Vision	选 E	32				2.0	6	№2,3
135179	集成电路测试实验 Microelectronic Process and Device Simulation	选 E	16		16		0.5	6	№2,3,4,6
135180	芯片互连与电磁兼容 Chip Interconnection and EMC	选 E	32				2.0	7	№2,3,5,6
135181	微纳机电系统与传感技术 Micro/Nano Electro-Mechanical Systems and Sensing technology	选	32				2.0	7	№2,3,6
135182	纳米器件与纳米电子学 Nano Devices and Nanoelectronics	选	32				2.0	7	№2,3
135183	新型光电子材料与器件 Advanced Materials and Devices on Optoelectronics	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	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	№2,3,7
135128	信息安全概论 An Introduction to Information Security	选 E	32				2.0	7	№2,3
135147	数字视音频技术 Digital Audio Technology	选	64		16		3.5	7	№2,3
135185	电源管理集成电路设计 Power Management Integrated Circuits Design	选 E	32				2.0	7	№2,3,4
135186	混合信号集成电路设计 Mixed-Signal Integrated Circuits Design	选 E	32				2.0	7	№2,3,4
135187	射频集成电路设计 RF integrated Circuits Design	选 E	32				2.0	7	№2,3,4
135174	电子信息行业创业基础 Basis of Electronic Information Industry Entrepreneurship	选 E	16				1.0	7	№3,6,8,9,10,11
120003	创新研究训练 Innovation Research Training	选 E	32				2.0		№4,9,11
120004	创新研究实践 I Innovation Research Practice 1	选 E	32				2.0		№4,9,11
120005	创新研究实践 II Innovation Research Practice 2	选 E	32				2.0		№4,9,11
120006	创业实践 Entrepreneurial Practice	选 E	32				2.0		№4,9,11

	合 计 Total	选 E	选修课修读最低要求 13.5 学分 minimum elective course credits required:13.5
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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“☆”课程要求至少选修 1 门，带“Δ”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			
143197	马克思主义理论与实践 Marxism Theory and Practice	必 C	2 周		2.0	假期	№8
106002	军训 Military Training	必 C	3 周		3.0	1	№9
135160	高级语言程序设计课程设计 High-level Language Programming Design	必 C	1 周		1.0	2	№4,5
130356	工程训练 I Engineering Training	必 C	2 周		2.0	3	№1,6
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
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	№4,5
135115	模拟电子技术课程设计 Project of Analog Electronics	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	№1,3,4,5
135099	数字集成电路原理与设计课程设计 Course Design of Digital Integrated Circuits	必 C	1 周		1.0	6	№2,3,6
135102	模拟集成电路原理与设计课程设计 Course Design of Analog Integrated Circuits	必 C	1 周		1.0	6	№2,3,6
141074	微电子工艺实习 Practice of Microelectronics Process	必 C	2 周		2.0	6	№7,10
135188	微电子工艺及器件仿真课程设计 Microelectronic Process and Device Simulation	必 C	1 周		1.0	6	№3,4
	集成电路设计实践 Practice of IC Design	选 E	2 周		2.0	7	№3,4,5,6,7
139067	毕业实习 Graduate Intern	必 C	6 周		6.0	7	№7,8,11

135074	毕业设计 Final Year Project	必 C	15 周		15.0	8	№4,9
合 计 Total		必 C	40 周		40.0		

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.