

自动化创新班（本硕连读）

Automation (Innovation Class)

专业代码: 080801

学 制: 4 年

Program Code: 080801

Duration: 4 years

培养目标:

本专业坚持社会主义道路, 培养能适应社会发展需要, 在知识、能力、素质和德、智、体、美诸方面全面发展, 掌握自动化领域的基本理论、专门知识和技能, 并能在国民经济、国防和科研各部门中从事运动控制、过程控制、制造系统自动化、人工智能与机器人控制、自动化仪表和设备、新型传感器、信息处理、智能建筑、复杂网络与计算机应用系统等领域的科学研究、技术开发、工程设计、系统运行管理与维护、教育和管理决策等宽口径、高素质、复合型的自动化研究型人才。作为自动化本硕连读创新班, 要求具有继续读研深造的潜质、更高的科学素质和创新实践能力, 为继续读研深造打下良好的专业基础。

Educational Objectives:

This specialty nurtures wide-coverage, high-quality, inter-disciplinary students who adhere to the socialist road, can meet the requirements of social development, have knowledge, ability, quality and all-round development of moral, intellectual, physical and aesthetic aspects, master the basic theories, specialized knowledge and skills in the field of automation, and can be engaged in scientific research, technology development, engineering design, system operation and maintenance, education and managerial decision and so on in the fields of motion control, process control, automatic manufacturing system, artificial intelligence and robot control, automatic instrument and equipment, new sensor, information processing, intelligent buildings, complex network and computer application system in the departments of national economy, national defense and scientific research. As the innovation class, the students are required to have potential for further study in graduate school, higher scientific quality and innovative practice ability, which lay good professional foundation for further study in graduate school.

毕业要求:

№1.基础知识: 掌握扎实的基础知识、专业基本原理、方法和手段, 构建清晰的数学、自然科学、工程基础和专业知识体系, 用于解决自动化领域的复杂工程问题, 并接触和掌握自动化相关行业部分营运知识, 为解决实际企业自动化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、本专业基本原理、方法和手段和自动化相关行业的营运知识, 识别、表达、并通过文献研究分析和提炼出复杂理论与工程问题, 获得有效结论。

№3.设计/开发解决方案: 能够设计针对自动化复杂理论与工程问题的解决方案, 设计满足特定需求的控制系统、单元(部件)或自动化工艺流程, 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自动化复杂理论与工程问题进行研究，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。

№5.使用现代工具：能够针对自动化复杂理论与工程问题，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，包括对自动化复杂理论与工程问题的预测与模拟，并能够理解其局限性。

№6.工程与社会：能够基于自动化相关背景知识进行合理分析，评价专业工程实践和复杂工程问题解决方案对社会、健康、安全、法律以及文化的影响，并理解应承担的责任。

№7.环境和可持续发展：能够理解和评价针对自动化复杂工程问题的专业工程实践对环境、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。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：具有较好的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. Basic Knowledge: Mastering solid basic knowledge, primary theories, methods and solutions of the major; an ability to apply knowledge about mathematics, science and engineering fundamentals and industry knowledge in automation fields to solve the complex engineering problems, contacting with and mastering the knowledge related to operation management in the automation industry, building a good foundation of basic knowledge about practical complex problems in automation engineering.

№2. Problem Analysis: An ability to apply mathematic, natural science knowledge, the basic knowledge, primary theories, methods and solutions of automation major to identify, formulate and analyze complex engineering problems, reaching to substantiated conclusions using basic principles of mathematics, science and engineering, and industry knowledge in automation fields .

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

№4. Research: An ability to conduct investigations of complex automation engineering problems based on scientific theories and to adopt 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 modeling to complex theoretical automation problems and engineering activities, with an understanding of the limitations.

№6. Engineering and Society: An ability to evaluate the influences of solutions to engineering practice and complex engineering problems on society, health, safety, law and culture according to contextual knowledge, and to take the consequent responsibilities.

№7. Environment and Sustainable Development: An ability to understand and evaluate the impact of professional automation engineering solutions on environmental and societal 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, a member or a leader in diverse teams and in multi-disciplinary settings.

№10. Communication: An ability to communicate effectively on complex 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 engineering management principles and methods of economic decision-making, to function in multidisciplinary environments.

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

专业简介:

华南理工大学自动化专业设置可追溯到 1958 年，已有近 60 年的办学历史，是由原有的四个本科专业（自动控制、船舶船厂电气自动化、工业企业电气自动化、化工自动化及仪表）经两次调整合并的宽口径专业，具有深厚的专业基础，为了培养自动化学术型人才，2010 年设置自动化创新班（本硕连读）。2001 年被评为广东省首批本科名牌专业，2009 年获教育部批准为国家级特色专业，2010 年获广东省特色专业，2011 年通过教育部“工程教育专业认证”。

专业拥有一支年龄学历结构合理、学术水平高的教学科研队伍，拥有包括长江学者、国家杰青在内的一批在国内外享有较高声望的著名学者。在科研教学基地方面，现有自主系统与网络控制教育部重点实验室、精密电子制造装备教育部工程研究中心、国家实验教学示范中心——电气信息及控制实验教学中心、广州市脑机交互关键技术及应用重点实验室、自动化与智能技术大学生创新创业训练基地等，为本科生科技创新创造了良好的氛围。

Program Profile:

With a history of nearly 60 years, Automation in South China University of Technology is a wide-coverage specialty that has a strong foundation with two merging process of 4 original undergraduate majors (Automatic Control, Marine and shipyard Electric Automation, Industrial Enterprise Electric Automation

and Chemical Automation and Instrument). It was honored as one of Famous-brand Undergraduate Specialties of Guangdong province in the first election in 2001, National Characteristic Specialties of the Ministry of Education of the People's Republic of China (MOE) in 2009 and Characteristic Specialties of Guangdong province in 2010. Besides that, the Specialty of Automation achieved Engineering Education Professional Certification by MOE in 2011.

The Specialty of Automation is with 4-year educational system, which confers the Bachelor degree of Engineering. This major nurtures wide-coverage, high-quality, inter-disciplinary students who can be engaged in scientific research, technology development, engineering design, system operation and maintenance, education and managerial decision and so on in the fields related to Automation in the departments of national economy, national defense and scientific research.

The faculty of Automation is with high academic level, rational age and educational background structure, which has 64 professional teachers, consisting of 20 professors, 27 associated professors and 3 senior engineers, including a group of high-reputation scholars, such as the Yangtze scholar, National Outstanding Youth, etc. The scientific research and teaching laboratories provide a good technical innovation environment for undergraduates, including Key Laboratory of Autonomous Systems and Network Control of Ministry of Education, Engineering Research Center for Precision Electronic Manufacturing Equipments of Ministry of Education, National Experimental Teaching Demonstrating Center—Electric Information and Control Experiment Teaching Center, Guangzhou Key Laboratory of Key Technology and Application on brain-computer interaction, College Students' Innovation and Entrepreneurial Training base of Automation and Intelligent Technology, etc.

专业特色：

本专业面向自动化学科前沿和应用构建了模块化、实践导向式综合培养体系，在基础扎实的前提下注重综合素质、创新实践能力和研究潜力的培养。培养的学生具有知识面广、基础厚实、创新实践能力强、有研究潜力等特色。

Program Features:

As a specialty of engineering, Automation engaged in training the students' comprehensive quality, innovative practical ability and potential for further study based on solid basic knowledge, which is implemented by the modularized, practice-oriented comprehensive cultivating system towards the frontier and application of Automation. Students has the characteristics of wide-coverage knowledge, solid foundation, good innovative and practical ability, potential for further study.

授予学位：工学学士学位

Degree Conferred: Bachelor of Engineering

主干课程：

电路、模拟电子技术、数字电子技术、自动控制原理、现代控制理论、信号分析与处理、微型计算机原理、自动检测技术、电机及拖动基础、电力电子技术、运动控制系统、过程控制仪表及装置、过程控制工程。

Core Courses:

Electric Circuits, Analog Electronic Technology, Digital Electronics Technology, Principles of Automatic Control, Modern Control Theory, Signal Analysis and Processing, Microcomputer Principle, Automatic Detection and Measurement Technology, Motor and Drive Foundation, Power Electronics Technology, Motion Control System, Process Control Instrumentation Technology, Process Control Engineering.

特色课程:

双语教学课程: C++编程语言 (I)、C++编程语言 (II)、信号分析与处理、过程控制仪表及装置、软件技术基础

创新实践课程: 自动化前沿探索、学科基础创新实践、学科专业创新实践 (I)、学科专业创新实践 (II)、自动控制系统综合创新实践、智能机器人创新实践、模式识别与机器视觉创新实践、嵌入式系统创新实践、PLC 与工厂自动化创新实践、楼宇自动化创新实践

竞教结合课程: 自动控制系统综合创新实践、智能机器人创新实践

创业教育课程: 自动化行业产业发展模式与职业规划

Featured Courses:

Bilingual Courses: C++ Programming Language (Part I)、C++ Programming Language (Part II)、Signals Analysis and Processing、Process Control Instrumentation Technology、Fundamentals of Computer Software

Innovation Practice Courses: Automation Frontier Exploration、Discipline Innovation Practice、Professional Disciplines Innovation Practice (I)、Professional Disciplines Innovation Practice (II)、Innovation Practice on Automatic Control System、Innovation practice on Intelligent Robot、Innovation Practice on Pattern Recognition and Machine Vision、Innovation Practice on Embedded Systems、Innovation Practice on PLC and Factory Automation、Innovation Practice on Building Automation

Entrepreneurship Education Courses: Industrial Development Model and Career Planning of Automation Industry

Competition and Education Combination Courses: Innovation Practice on Automatic Control System、Innovation practice on Intelligent Robot

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 期	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	A	B	D	D	D	14	1	1	3												19				
	2	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	Q	B	B	17	2												1		20				
二	3	G	G	A	A	A	A	A	A	A	A	A	A	A	A	A	A	Q	B	B	15	2				2									1		20			
	4	H	H	A	A	A	A	A	A	A	A	A	A	A	A	A	A	E	B	B	15	2		1		2											20			
三	5	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	E	E	B	B	16	2		2													20			
	6	A	A	A	A	A	A	A	A	A	A	E	E	E	E	E	E	E	B	B	11	2		7														20		
四	7	研究生阶段学习，并完成本科毕业设计（论文）																		14	2																			20
	8																																							20
合 计 (周)																				99	13	1	3	10		2	2							4		15	5	7	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	61.0	940	
	通识 General Education	10.0	160	
学科基础课 Disciplinary Basic Courses	必修 Compulsory	45.5	792	
	选修 Elective	0	0	
专业领域课 Specialty-related Courses	必修 Compulsory	14.5	260	
	选修 Elective	12.0	192	
合 计 Total		143.0	2344	
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	143.0 + 38.0 = 181.0			

备注：硕士阶段课程修读要求及毕业资格按照学生修读的研究生专业培养方案执行，第四年在导师的指导下修读相关课程；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	其中 Include	其中 Include	总	其中 Include	其中 Include	其中 Include

学时数 Total	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	学分数 Total	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
2344	1992	352	1962	382	181	159	22	38	131	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 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	3	№8
	143091	中国近现代史纲要 Skeleton of Chinese Modern History		(32) 24				2.0	4	№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	5	№8
	143090	马克思主义基本原理 Fundamentals of Marxism Principle		(40) 36				2.5	6	№8
	143094	形势与政策 Analysis of the Situation & Policy		(128)				2.0	1-8	№8
	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	
	106001	军事理论 Military Principle	(16)				1.0	2	№9	
	140195	数学分析(一) Mathematics Analysis(1)	80				5.0	1	№1	
	140196	数学分析(二) Mathematics Analysis(2)	112				7.0	2	№1	
	141005	大学物理III(一) General Physics (1)	64				4.0	2	№1	
	141006	大学物理III(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	
	130009	工程制图 Engineering Drawing	48				3.0	1	№1	

	140197	线性代数与解析几何 Linear Algebra & Analytic Geometry		48				3.0	1	№1
	140019	概率论与数理统计 Probability & Mathematical Statistics		48				3.0	2	№1
	140015	复变函数 I Complex Variable		32				2.0	3	№1
	140016	积分变换 Integral Transformation		16				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				1100		64	128	71.0	

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	146105	自动化(专业)概论 Introduction to Automation	必 C	16				1.0	1	№1,8,12
	146063	脑信号处理与脑机接口初步 Brain Signal Processing And Brain-Computer Interfaces	必 C	16				1.0	1	№1,8,9,10,11,12
	146064	机器智能探索 Machine Intelligence Exploration	必 C	16				1.0	2	№1,8,9,10,11,12
	135020	电路 II Electric Circuits	必 C	64				4.0	2	№1,2,3,4,5
	146114	C++编程语言（一） C++ Programming Language（1）	必 C	40		8		2.5	2	№1,2,3,4,5,8,12
	146115	C++编程语言（二） C++ Programming Language（2）	必 C	40		8		2.5	3	№1,2,3,4,5,8,12
	135005	电路实验 Experiment of Circuit	必 C	16		16		0.5	3	№2,3,4,5
	146062	计算机网络与通信技术 Computer Network and Communication Technology	必 C	32				2.0	3	№1,2,3
	135034	模拟电子技术 II Analog Electronics	必 C	64				4.0	3	№1,2,3,4,5
	135043	模拟电子技术实验 Experiment of Analog Circuits	必 C	16		16		0.5	4	№2,3,4,5
	155081	数字电子技术 II Digital Electronics	必 C	64				4.0	4	№1,2,3,4,5
	135045	数字电子技术实验 Experiment of Digital Electronics	必 C	16		16		0.5	4	№2,3,4,5
	146002	自动控制原理 Principles of Automatic Control	必 C	72				4.5	4	№1,2,3,4,5,6,7,12
	146008	自动控制原理实验 Principles of Automatic Control Experiment	必 C	28		28		1.0	4	№3,4,5,9,10

	146005	电机及拖动基础 Motor and Drive Foundation	必 C	44				2.5	4	№1,2,3,4,5
	146075	电机及拖动基础实验 Experiment of Motor and Drive Foundation	必 C	16		16		0.5	4	№3,4,5,9,10
	146007	现代控制理论 Modern Control Theory	必 C	48				3.0	5	№1,2,3,4,5,6,7,12
	146003	微型计算机原理 Microcomputer Principle	必 C	44				2.5	5	№1,2,3,4,5
	146043	微型计算机原理实验 Experiment of Microcomputer Principle	必 C	12		12		0.5	5	№3,4,5,9,10
	146060	信号分析与处理 Signal Analysis and Processing	必 C	32				2.0	4	№1,2,4
	146073	电力电子技术 Power Electronics Technology	必 C	44		8		2.5	5	№1,2,3,4,5,6,7,12
	146006	自动检测技术 Automatic Detection and Measurement Technology	必 C	40				2.5	4	№1,2,3,4,5
	146011	自动检测技术实验 Experiment of Automatic Detection and Measurement Technology	必 C	12		12		0.5	5	№3,4,5,9,10
	146116	控制系统 Matlab 仿真 MATLAB Simulation for Control System	选	32				2.0	3	№1,2,4,5
	合计 Total			必 C	792		140		45.5	
专业领域课 Specialty-related Courses	146031	单片机原理及应用 Principle & Application of Single-chip Microcomputer	必 C	44		12		2.5	6	№1,2,3,5
	146017	运动控制系统 Motion Control System	必 C	44				2.5	6	№1,2,3,6
	146021	运动控制系统实验 Experiment of Motion Control System	必 C	16		16		0.5	6	№3,4,5,9,10
	146018	过程控制仪表及装置 Process Control Instrumentation Technology	必 C	32				2.0	5	№1,3,6,10,12
	146016	过程控制工程 Process Control Engineering	必 C	32				2.0	6	№1,2,3,6
	146117	过程控制系统实验 Experiment of Process Control System	必 C	16		16		0.5	6	№3,4,5,9,10
	146118	机器人系统 Robotics System	必 C	32				2.0	6	№1,2,3,4,5,6,7
	146024	计算机控制技术 Computer Control Technology	必 C	44		6		2.5	6	№1,2,3,6
	146089	模式识别基础 Fundamentals of Pattern Recognition	选 E	32				2.0	5	№1,2,3,4,5,6,7,12
	146071	自动化行业产业发展模式与职业规划 Industrial Development Model and Career Planning of Automation Industry	选 E	16				1.0	3	№6,7,8,9,10
	146081	图像处理与机器视觉 Image Processing and Machine Vision	选 E	48				3.0	4	№1,2,3,4,5,6

146027	嵌入式系统及应用 Embedded System and Applications	选 E	32		8		2.0	5	№1,2,3,5,9,10
146001	系统工程导论 General for System Engineering	选 E	32				2.0	4	№1,2,3,6,7,11
146070	企业经济管理 Enterprise Economic Management	选 E	32				2.0	5	№1,2,3,6,7,11
146106	电气控制与 PLC Electrical Control and PLC	选 E	48		8		3.0	6	№1,2,3,5,9,10
146019	楼宇自动化 Building Automation System	选 E	32				2.0	5	№2,3,5,6,8,9,10,11
创新实践模块（最低修读 7.5 学分）									
146065	*自动化前沿探索 Frontier Exploration Related to Automation	选 E	(16)			(16)	1.0	2	№3,6,7,8,9,10,11,12
146066	*学科基础创新实践 Innovation Practice on Fundamentals of Automation	选 E	(32)			(16)	1.5	4	№2,3,4,5,6,8,9,10,11,12
146068	*学科专业创新实践（I） Advanced Innovation Practice Related to Automation(I)	选 E	(32)			(16)	1.5	5	
146069	*学科专业创新实践（II） Advanced Innovation Practice Related to Automation(II)	选 E	(32)			(16)	1.5	6	
146119	自动控制系统综合创新实践 Innovation Practice on Automatic Control System	选 E	(32)			(32)	1.0	5	
146049	智能机器人创新实践 Innovation Practice on Intelligent Robot	选 E	(32)			(32)	1.0	6	
146126	模式识别与机器视觉创新实践 Innovation Practice on Pattern Recognition and Machine Vision	选 E	(32)			(32)	1.0	5	
146121	嵌入式系统创新实践 Innovation Practice on Embedded Systems	选 E	(32)			(32)	1.0	5	
146056	PLC 及运动控制系统创新实践 Innovation Practice on PLC and Factory Automation	选 E	(32)			(32)	1.0	5	
146059	楼宇自动化创新实践 Innovation Practice on Building Automation	选 E	(32)			(32)	1.0	5	
120003	创新研究训练 Innovation Research Training	选 E	32				2.0		
120004	创新研究实践 I Innovation Research Practice 1	选 E	32				2.0		№4,12
120005	创新研究实践 II Innovation Research Practice 2	选 E	32				2.0		№4,12
120006	创业实践 Entrepreneurial Practice	选 E	32				2.0		№4,12
合计 Total		必 C 选 E	260		50		14.5		
选修课修读最低要求 12.0 学分 minimum elective course credits required: 12									

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.学科基础课和专业领域选修课最低修读 12 学分，其中创新实践类课程最低修读 7.5 学分。自动控制系统综合

创新实践为必选。创新实践课程与专业理论课的先修关系如下：

运动控制系统，过程控制过程----自动控制系统综合创新实践；

电气控制与 PLC----PLC 与工厂自动化创新实践；

嵌入式系统及应用----嵌入式系统创新实践；

图像处理与机器视觉----模式识别与机器视觉创新实践；

机器人系统----智能机器人创新实践；

楼宇自动化----楼宇自动化创新实践。

3.带“*”的课程在导师制下由导师负责指导，自学与创新实践相结合。

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	№9
143197	马克思主义理论与实践 Marxism Theory and Practice	必 C	2 周		2.0	假期	№8
130356	工程训练 I Engineering Training	必 C	2 周		2.0	3	№2,3,5,6 №9 №10
141073	电子工艺实习 II Practice of Electronic	必 C	2 周		2.0	4	№2,3,5,6 №9 №10
135070	数字电路课程设计 Curriculum Design on Digital Electronics Technique	必 C	1 周		1.0	4	№1,2,3,4,5,9,10,11,12
146122	模式识别基础课程设计 Curriculum Design on Fundamentals of Pattern Recognition	必 C	1 周		1.0	5	№3,4,5,6,8,9,10,11,12
146123	电力电子技术课程设计 Curriculum Design on Power Electronics Technology	必 C	1 周		1.0	5	№3,4,5,6,8,9,10,11,12
146124	单片机原理及应用课程设计 Curriculum Design on Principle & Application of Single-chip Microcomputer	必 C	2 周		2.0	6	№3,4,5,6,8,9,10,11,12
146125	机器人系统课程设计 Curriculum Design on Robotics System	必 C	2 周		2.0	6	№3,4,5,6,8,9,10,11,12
146041	自动控制系统课程设计 Curriculum Design on Automatic Control System	必 C	2 周		2.0	6	№3,4,5,6,8,9,10,11,12
146042	计算机控制技术课程设计 Curriculum Design on Computer Control Technology	必 C	1 周		1.0	6	№3,4,5,6,8,9,10,11,12
146054	毕业实习 Graduation Practice	必 C	4 周		4.0	6-7	№3,6,7,8,9,10
146055	毕业设计 Graduation Project	必 C	15 周		15.0	8	№2,3,4,5,6,7,8,9,10,11,12
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.

自动化

Automation

专业代码: 080801

学制: 4 年

Program Code:080801

Duration: 4 years

培养目标:

本专业坚持社会主义道路,培养能适应社会发展需要,在知识、能力、素质和德、智、体、美诸方面全面发展,掌握自动化领域的基本理论、专门知识和技能,并能在国民经济、国防和科研各部门中从事运动控制、过程控制、制造系统自动化、人工智能与机器人控制、自动化仪表和设备、新型传感器、信息处理、智能建筑、复杂网络与计算机应用系统等领域的科学研究、技术开发、工程设计、系统运行管理与维护、教育和管理决策等宽口径、高素质、复合型的自动化科技、工程人才。

Educational Objectives:

This specialty nurtures wide-coverage, high-quality, inter-disciplinary students who adhere to the socialist road, can meet the requirements of social development, have knowledge, ability, quality and all-round development of moral, intellectual, physical and aesthetic aspects, master the basic theories, specialized knowledge and skills in the field of automation, and can be engaged in scientific research, technology development, engineering design, system operation and maintenance, education and managerial decision and so on in the fields of motion control, process control, automatic manufacturing system, artificial intelligence and robot control, automatic instrument and equipment, new sensor, information processing, intelligent buildings, complex network and computer application system in the departments of national economy, national defense and scientific research.

毕业要求:

№1.基础知识:掌握扎实的基础知识、专业基本原理、方法和手段,构建清晰的数学、自然科学、工程基础和专业知识体系,用于解决自动化领域的复杂工程问题,并接触和掌握自动化相关行业部分营运知识,为解决实际企业自动化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、本专业基本原理、方法和手段和自动化相关行业的营运知识,识别、表达、并通过文献研究分析和提炼出复杂理论与工程问题,获得有效结论。

№3.设计/开发解决方案:能够设计针对自动化复杂理论与工程问题的解决方案,设计满足特定需求的控制系统、单元(部件)或自动化工艺流程,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自动化复杂理论与工程问题进行研究,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。

№5.使用现代工具：能够针对自动化复杂理论与工程问题，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，包括对自动化复杂理论与工程问题的预测与模拟，并能够理解其局限性。

№6.工程与社会：能够基于自动化相关背景知识进行合理分析，评价专业工程实践和复杂工程问题解决方案对社会、健康、安全、法律以及文化的影响，并理解应承担的责任。

№7.环境和可持续发展：能够理解和评价针对自动化复杂工程问题的专业工程实践对环境、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。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. Basic Knowledge: Mastering solid basic knowledge, primary theories, methods and solutions of the major; an ability to apply knowledge about mathematics, science and engineering fundamentals and industry knowledge in automation fields to solve the complex engineering problems, contacting with and mastering the knowledge related to operation management in the automation industry, building a good foundation of basic knowledge about practical complex problems in automation engineering.

№2. Problem Analysis: An ability to apply mathematic, natural science knowledge, the basic knowledge, primary theories, methods and solutions of automation major to identify, formulate and analyze complex engineering problems, reaching to substantiated conclusions using basic principles of mathematics, science and engineering, and industry knowledge in automation fields .

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

№4. Research: An ability to conduct investigations of complex automation engineering problems based on scientific theories and to adopt 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 modeling to complex theoretical automation problems and engineering activities, with an understanding of the limitations.

№6. Engineering and Society: An ability to evaluate the influences of solutions to engineering practice and

complex engineering problems on society, health, safety, law and culture according to contextual knowledge, and to take the consequent responsibilities.

№7. Environment and Sustainable Development: An ability to understand and evaluate the impact of professional automation engineering solutions on environmental and societal 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, a member or a leader in diverse teams and in multi-disciplinary settings.

№10. Communication: An ability to communicate effectively on complex 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 engineering management principles and methods of economic decision-making, to function in multidisciplinary environments.

№12. Lifelong Learning: A cognition 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：

华南理工大学自动化专业可追溯到 1958 年，已有近 60 年的办学历史，是由原有的四个本科专业（自动控制、船舶船厂电气自动化、工业企业电气自动化、化工自动化及仪表）经两次调整合并的宽口径专业，具有深厚的专业基础。2001 年被评为广东省首批本科名牌专业，2009 年获教育部批准为国家级特色专业，2010 年获广东省特色专业，2011 年通过教育部“工程教育专业认证”。

专业拥有一支年龄学历结构合理、学术水平高的教学科研队伍，拥有包括长江学者、国家杰青在内的一批在国内外享有较高声望的著名学者。在科研教学基地方面，现有自主系统与网络控制教育部重点实验室、精密电子制造装备教育部工程研究中心、国家实验教学示范中心——电气信息及控制实验教学中心、广州市脑机交互关键技术及应用重点实验室、自动化与智能技术大学生创新创业训练基地等，为本科生科技创新创造了良好的氛围。

Program Profile:

With a history of nearly 60 years, Automation in South China University of Technology is a wide-coverage specialty that has a strong foundation with two merging process of 4 original undergraduate majors (Automatic Control, Marine and shipyard Electric Automation, Industrial Enterprise Electric Automation and Chemical Automation and Instrument). It was honored as one of Famous-brand Undergraduate Specialties of Guangdong province in the first election in 2001, National Characteristic Specialties of the Ministry of Education of the People's Republic of China (MOE) in 2009 and Characteristic Specialties of Guangdong province in 2010. Besides that, the Specialty of Automation achieved Engineering Education

Professional Certification by MOE in 2011.

The Specialty of Automation is with 4-year educational system, which confers the Bachelor degree of Engineering. This major nurtures wide-coverage, high-quality, inter-disciplinary students who can be engaged in scientific research, technology development, engineering design, system operation and maintenance, education and managerial decision and so on in the fields related to Automation in the departments of national economy, national defense and scientific research.

The faculty of Automation is with high academic level, rational age and educational background structure, which has 64 professional teachers, consisting of 20 professors, 27 associated professors and 3 senior engineers, including a group of high-reputation scholars, such as the Yangtze scholar, National Outstanding Youth, etc. The scientific research and teaching laboratories provide a good technical innovation environment for undergraduates, including Key Laboratory of Autonomous Systems and Network Control of Ministry of Education, Engineering Research Center for Precision Electronic Manufacturing Equipments of Ministry of Education, National Experimental Teaching Demonstrating Center—Electric Information and Control Experiment Teaching Center, Guangzhou Key Laboratory of Key Technology and Application on brain-computer interaction, College Students' Innovation and Entrepreneurial Training base of Automation and Intelligent Technology, etc.

专业特色:

本专业面向自动化学科前沿和应用构建了模块化、实践导向式综合培养体系，在基础扎实的前提下注重综合素质和创新实践能力的培养。培养的学生具有知识面广、基础厚实、创新实践能力强、适应性和就业范围广等特色。

Program Features:

As a specialty of engineering, Automation engaged in training the students' comprehensive quality and innovative practical ability based on solid basic knowledge, which is implemented by the modularized, practice-oriented comprehensive cultivating system towards the frontier and application of Automation. Students has the characteristics of wide-coverage knowledge, solid foundation, good innovative and practical ability, good adaptability and employment.

授予学位: 工学学士学位

Degree Conferred: Bachelor of Engineering

主干课程:

电路、模拟电子技术、数字电子技术、自动控制原理、现代控制理论、信号分析与处理、微型计算机原理、自动检测技术、电机及拖动基础、电力电子技术、运动控制系统、过程控制仪表及装置、过程控制工程。

Core Courses:

Electric Circuits, Analog Electronic Technology, Digital Electronics Technology, Principles of Automatic Control, Modern Control Theory, Signal Analysis and Processing, Microcomputer Principle, Automatic Detection and Measurement Technology, Motor and Drive Foundation, Power Electronics Technology, Motion Control System, Process Control Instrumentation Technology, Process Control Engineering

特色课程:

双语教学课程: C++编程语言 (I)、C++编程语言 (II)、信号分析与处理、过程控制仪表及装置、软件技术基础

创新实践课程: 自动控制系统综合创新实践、智能机器人创新实践、模式识别与机器视觉创新实践、嵌入式系统创新实践、PLC 与工厂自动化创新实践、楼宇自动化创新实践

竞教结合课程: 自动控制系统综合创新实践、智能机器人创新实践

创业教育课程: 自动化行业产业发展模式与职业规划

Featured Courses:

Bilingual Courses: C++ Programming Language (Part I)、C++ Programming Language (Part II)、Signals Analysis and Processing、Process Control Instrumentation Technology、Fundamentals of Computer Software

Innovation Practice Courses: Innovation Practice on Automatic Control System、Innovation Practice on Intelligent Robot、Innovation Practice on Pattern Recognition and Machine Vision、Innovation Practice on Embedded Systems、Innovation Practice on PLC and Factory Automation、Innovation Practice on Building Automation

Entrepreneurship Education Courses: Industrial Development Model and Career Planning of Automation Industry

Competition and Education Combination Courses: Innovation Practice on Automatic Control System、Innovation practice on Intelligent Robot

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	A	B	D	D	D	14	1	1	3												19				
	2	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	Q	B	B	B	17	2												1		20				
二	3	G	G	A	A	A	A	A	A	A	A	A	A	A	A	A	Q	B	B	15	2													1		20				
	4	H	H	A	A	A	A	A	A	A	A	A	A	A	A	A	E	B	B	15	2		1			2										20				
三	5	A	A	A	A	A	A	A	A	A	A	A	A	A	A	E	E	B	B	16	2			2												20				
	6	A	A	A	A	A	A	A	A	A	A	A	A	E	E	E	E	B	B	13	2			5												20				
四	7	L	L	L	L	A	A	A	A	A	A	A	A	A	I	I	I	B	B	11	2						3			4						20				
	8	O	O	O	O	O	O	O	O	O	O	O	O	O	Q	Q	Q	Q	P													15	1	4		20				
合 计 (周)																				101	13	1	3	8		2	2	3				4			15	1	6			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	61.0	940	
	通识 General Education	10.0	160	
学科基础课 Disciplinary Basic Courses	必修 Compulsory	43.5	760	
	选修 Elective	0	0	
专业领域课 Specialty-related Courses	必修 Compulsory	12.5	226	
	选修 Elective	16.0	208	
合 计 Total		143.0	2294	
集中实践教学环节 (周) Practice Training (Weeks)	必修 Compulsory	36.0	36 周	
毕业学分要求 Credits Required for Graduation	143.0 + 36.0 = 179.0			

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	其中 Include	其中 Include	总	其中 Include	其中 Include	其中 Include

学时数 Total	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	学分数 Total	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
2294	1926	368	1910	384	179	153	26	36	131	12	14

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	
	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	
	145223	大学计算机基础 Foundations of Computer		32				2.0	1	№5	
	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	
	106001	军事理论 Military Principle		(16)				1.0	2	№9	
	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	
	141005	大学物理III(一) General Physics (1)		64				4.0	2	№1	
	141006	大学物理III(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	
	130009	工程制图 Engineering Drawing		48				3.0	1	№1	
	140197	线性代数与解析几何 Linear Algebra & Analytic Geometry		48				3.0	1	№1	
	140019	概率论与数理统计 Probability & Mathematical Statistics		48				3.0	2	№1	
	140015	复变函数I Complex Variable		32				2.0	3	№1	
	140016	积分变换 Integral Transformation		16				1.0	3	№1	
		人文科学领域 Humanities		96	通识 课 E				6.0		№8
		社会科学领域 Social Science		64					4.0		№8

合 计 Total				1100		64	128	71.0		
---------------------	--	--	--	------	--	----	-----	------	--	--

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	146105	自动化(专业)概论 Introduction to Automation	必 C	16				1.0	1	№1,8,12
	135020	电路II Electric Circuits	必 C	64				4.0	2	№1,2,3,4,5
	146114	C++编程语言（一） C++ Programming Language（1）	必 C	40		8		2.5	2	№1,2,3,4,5,8,12
	146115	C++编程语言（二） C++ Programming Language（2）	必 C	40		8		2.5	3	№1,2,3,4,5,8,12
	135005	电路实验 Experiment of Circuit	必 C	16		16		0.5	3	№2,3,4,5
	146062	计算机网络与通信技术 Computer Network and Communication Technology	必 C	32				2.0	3	№1,2,3
	135034	模拟电子技术II Analog Electronics	必 C	64				4.0	3	№1,2,3,4,5
	135043	模拟电子技术实验 Experiment of Analog Circuits	必 C	16		16		0.5	4	№2,3,4,5
	155081	数字电子技术II Digital Electronics	必 C	64				4.0	4	№1,2,3,4,5
	135045	数字电子技术实验 Experiment of Digital Electronics	必 C	16		16		0.5	4	№2,3,4,5
	146002	自动控制原理 Principles of Automatic Control	必 C	72				4.5	4	№1,2,3,4,5,6,7,12
	146008	自动控制原理实验 Experiment of Principles of Automatic Control	必 C	28		28		1.0	4	№3,4,5,9,10
	146060	信号分析与处理 Signal Analysis and Processing	必 C	32				2.0	4	№1,2,4
	146005	电机及拖动基础 Motor and Drive Foundation	必 C	44				2.5	4	№1,2,3,4,5
	146075	电机及拖动基础实验 Experiment of Motor and Drive Foundation	必 C	16		16		0.5	4	№3,4,5,9,10
	146006	自动检测技术 Automatic Detection and Measurement Technology	必 C	40				2.5	4	№1,2,3,4,5
146011	自动检测技术实验 Experiment of Automatic Detection and Measurement Technology	必 C	12		12		0.5	5	№3,4,5,9,10	

	146007	现代控制理论 Modern Control Theory	必 C	48				3.0	5	№1,2,3,4,5,6,12
	146003	微型计算机原理 Microcomputer Principle	必 C	44				2.5	5	№1,2,3,4,5
	146043	微型计算机原理实验 Experiment of Microcomputer Principle	必 C	12		12		0.5	5	№3,4,5,9,10
	146073	电力电子技术 Power Electronics Technology	必 C	44		8		2.5	5	№1,2,3,4,5,6,7,12
	146116	控制系统 Matlab 仿真 MATLAB Simulation for Control System	选 E	32				2.0	3	№1,2,4,5
	合 计 Total			必 C	760		140		43.5	
专业领域课 Specialty-related Courses	146031	单片机原理及应用 Principle & Application of Single-chip Microcomputer	必 C	44		12		2.5	6	№1,2,3,5
	146017	运动控制系统 Motion Control System	必 C	44				2.5	6	№1,2,3,6
	146021	运动控制系统实验 Experiment of Motion Control System	必 C	16		16		0.5	6	№3,4,5,9,10
	146018	过程控制仪表及装置 Process Control Instrumentation Technology	必 C	32				2.0	5	№1,3,6,10,12
	146016	过程控制工程 Process Control Engineering	必 C	32				2.0	6	№1,2,3,6
	146117	过程控制系统实验 Experiment of Process Control System	必 C	16		16		0.5	6	№3,4,5,9,10
	146024	计算机控制技术 Computer Control Technology	必 C	42		8		2.5	6	№1,2,3,6
	146089	模式识别基础 Fundamentals of Pattern Recognition	选 E	32				2.0	5	№1,2,3,4,5,6,7,12
	146071	自动化行业产业发展模式与职业 规划 Industrial Development Model and Career Planning of Automation Industry	选 E	16				1.0	3	№6,7,8,9,10
	146134	机器人技术基础 Fundamentals to Robotics	选 E	48				3.0	6	№1,2,3,4,5,6,7
	146081	图像处理与机器视觉 Image Processing and Machine Vision	选 E	48				3.0	6	№1,2,3,4,5,6
	146027	嵌入式系统及应用 Embedded System and Applications	选 E	32		8		2.0	7	№1,2,3,5,9,10
	146001	系统工程导论 General for System Engineering	选 E	32				2.0	4	№1,2,3,6,7,11
146070	企业经济管理 Enterprise Economic Management	选 E	32				2.0	5	№1,2,3,6,7,11	

146106	电气控制与 PLC Electric Control and PLC	选 E	48		8		3.0	6	№1,2,3,5,9,10
146019	楼宇自动化 Building Automation System	选 E	32				2.0	7	№2,3,5,6,8,9,10,11
146107	软件技术基础 Fundamentals of Software Technology	选 E	36				2.0	7	№1,2
146029	智能控制导论 General for Intelligent Control	选 E	32				2.0	7	№1,2,6,10
	神经网络与机器学习 Neural Networks and Learning Machines	选 E	40				2.5	7	№1,2,3,4,5
146109	电能供给及配送 Design of Manufactory Power Supply	选 E	32				2.0	7	№1,2,3,4,5
146110	数字信号处理器(DSP)原理及应 用 Principles and Application of Digital Signal Processor	选 E	32				2.0	7	№1,2,3,4,5
146111	DCS 与现场总线 DCS and Field bus	选 E	32				2.0	7	№1,2,3,4,5
146015	管理信息系统 Management Information Systems	选 E	32				2.0	7	№1,2,3,4,5
146119	自动控制系统综合创新实践 Innovation Practice on Automatic Control System	选 E	(32)			(32)	1.0	7	№2,3,4,5,6,8,9,10,11, 12
146049	智能机器人创新实践 Innovation Practice on Intelligent Robot	选 E	(32)			(32)	1.0	7	
146126	模式识别与机器视觉创新实践 Innovation Practice on Pattern Recognition and Machine Vision	选 E	(32)			(32)	1.0	7	
146121	嵌入式系统创新实践 Innovation Practice on Embedded Systems	选 E	(32)			(32)	1.0	7	
146056	PLC 及工厂自动化创新实践 Innovation Practice on PLC and Factory Automation	选 E	(32)			(32)	1.0	7	
146059	楼宇自动化创新实践 Innovation Practice on Building Automation	选 E	(32)			(32)	1.0	7	
120003	创新研究训练 Innovation Research Training	选 E	32				2.0		
120004	创新研究实践 I Innovation Research Practice 1	选 E	32				2.0		
120005	创新研究实践 II Innovation Research Practice 2	选 E	32				2.0		
120006	创业实践 Entrepreneurial Practice	选 E	32				2.0		
合 计 Total		必 C	226		52		12.5		
		选 E	选修课修读最低要求 16.0 学分 minimum elective course credits required: 16						

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.学科基础课和专业领域选修课最低修读 16 学分，其中创新实践类课程最低修读 3 学分，自动控制系统综合创新实践为必选。创新实践课程与专业理论课的先修关系如下：

运动控制系统，过程控制过程----自动控制系统综合创新实践；

电气控制与 PLC---PLC 与工厂自动化创新实践；

嵌入式系统及应用----嵌入式系统创新实践；

图像处理与机器视觉----模式识别与机器视觉创新实践；

楼宇自动化----楼宇自动化创新实践。

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	№9
143197	马克思主义理论与实践 Marxism Theory and Practice	必 C	2 周		2.0	假期	№8
130356	工程训练 I Engineering Training	必	2 周		2.0	3	№2,3,5,6 №9 №10
141073	电子工艺实习 II Practice of Electronic	必	2 周		2.0	4	№2,3,5,6 №9 №10
135070	数字电路课程设计 Curriculum Design on Digital Electronics Technique	必	1 周		1.0	4	№1,2,3,4,5,9,10,11,12
146122	模式识别基础课程设计 Curriculum Design on Fundamentals of Pattern Recognition	必	1 周		1.0	5	№3,4,5,6,8,9,10,11,12
146123	电力电子技术课程设计 Curriculum Design on Power Electronics Technology	必	1 周		1.0	5	№3,4,5,6,8,9,10,11,12
146124	单片机原理及应用课程设计 Curriculum Design on Principle & Application of Single-chip Microcomputer	必	2 周		2.0	6	№3,4,5,6,8,9,10,11,12
146041	自动控制系统课程设计 Curriculum Design on Automatic Control System	必	2 周		2.0	6	№3,4,5,6,8,9,10,11,12
146042	计算机控制技术课程设计 Curriculum Design on Computer Control Technology	必	1 周		1.0	6	№3,4,5,6,8,9,10,11,12
146054	毕业实习 Graduation Practice	必	4 周		4.0	6-7	№3,6,7,8,9,10
146055	毕业设计 Graduation Project	必	15 周		15.0	8	№2,3,4,5,6,7,8,9,10,11,12
合计 Total		必 C	36 周		36.0		

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.

智能科学与技术

Intelligent Science and Technology

专业代码：080907T

学 制：4 年

Program Code:080907T

Duration: 4years

培养目标：

本专业培养坚持社会主义道路，能适应社会发展需要，在知识、能力、素质和德、智、体、美诸方面全面发展，掌握智能科学与技术领域的基本理论、专门知识和技能，并能在国民经济、国防和科研各部门中从事人工智能与机器人控制、新型传感器、信息处理、大数据与计算机应用系统等领域的科学研究、技术开发、工程设计、系统运行管理与维护、教育和管理决策等宽口径、高素质、复合型的智能科学与技术工程人才。

Educational Objectives:

This specialty nurtures wide-coverage, high-quality, inter-disciplinary students who can meet the requirements of social development, have knowledge, ability, quality and all-round development of moral, intellectual, physical and aesthetic aspects, master the basic theories, specialized knowledge and skills in the field of intelligent science and technology, and can be engaged in scientific research, technology development, engineering design, system operation and maintenance, education and managerial decision and so on in the fields of artificial intelligence, automatic manufacturing system, artificial intelligence and robot control, new sensor, information processing, intelligent buildings, big data and computer application system in the departments of national economy, national defense and scientific research.

毕业要求：

№1.基础知识：掌握扎实的基础知识、专业基本原理、方法和手段，构建清晰的数学、自然科学、工程基础和专业知识体系，用于解决智能科学与技术领域的复杂工程问题，并接触和掌握智能科学与技术相关行业部分营运知识，为解决实际企业智能化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、本专业基本原理、方法和手段和智能科学与技术相关行业的营运知识，识别、表达、并通过文献研究分析和提炼出复杂理论与工程问题，获得有效结论。

№3.设计/开发解决方案：能够设计针对智能科学与技术复杂理论与工程问题的解决方案，设计满足特定需求的控制系统、单元（部件）或智能化处理流程，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智能科学与技术复杂理论与工程问题进行研究，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。

№5.使用现代工具：能够针对智能科学与技术复杂理论与工程问题，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，包括对智能科学与技术复杂理论与工程问题的预测与模拟，并能够理解其局限性。

№6.工程与社会：能够基于智能科学与技术相关背景知识进行合理分析，评价专业工程实践和复杂工程问题解决方案对社会、健康、安全、法律以及文化的影响，并理解应承担的责任。

№7.环境和可持续发展：能够理解和评价针对智能科学与技术复杂工程问题的专业工程实践对环境、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。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. Basic Knowledge: Mastering solid basic knowledge, primary theories, methods and solutions of the major; an ability to apply knowledge about mathematics, science and engineering fundamentals and industry knowledge in intelligent science and technology fields to solve the complex engineering problems, contacting with and mastering the knowledge related to operation management in the intelligent science and technology industry, building a good foundation of basic knowledge about practical complex problems in intelligent engineering.

№2. Problem Analysis: An ability to apply mathematic, natural science knowledge, the basic knowledge, primary theories, methods and solutions of intelligent science and technology major to identify, formulate and analyze complex engineering problems, reaching to substantiated conclusions using basic principles of mathematics, science and engineering, and industry knowledge in artificial intelligence fields.

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

№4. Research: An ability to conduct investigations of complex artificial intelligence engineering problems based on scientific theories and to adopt 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 to complex theoretical artificial intelligence problems and engineering activities, with an understanding of the limitations.

№6. Engineering and Society: An ability to evaluate the influences of solutions to engineering practice and

complex engineering problems on society, health, safety, law and culture according to contextual knowledge, and to take the consequent responsibilities.

№7. Environment and Sustainable Development: An ability to understand and evaluate the impact of professional artificial intelligence engineering solutions on environmental and societal 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, a member or a leader in diverse teams and in multi-disciplinary settings.

№10. Communication: An ability to communicate effectively on complex 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 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:

为了解决目前社会急需智能型人才的需求,学校于2014年设置智能科学与技术。该专业是一个面向人工智能前沿高新技术及其应用的基础性本科专业,是计算机,自动化,通信等多学科的交叉专业。目前自动化学院结合智能技术和自动控制技术,已经建立了完备的教师人才体系,实验和实习等锻炼平台,与多家相关企业建立了学生创新实践基地,从软件和硬件层面建立了完善的人才培养体系。

Program Profile:

To meet the urgent need of intelligent technology outstanding engineering talents, SCUT set up intelligent science and technology in year 2014. It is a specialty for artificial intelligence and its related applications, as well as a cross subject specialty of computer, control and communication, etc. Now this specialty is set up in the college of automation science and engineering as a cross subject specialty of intelligent and automation technique. We have a strong team for related training, research as well as practice. We also have setup some platforms with industry for student training and internship.

专业特色:

本专业定位以工科为主,注重综合素质和创新能力的培养,学生除了具有扎实的智能科学与技术理论、系统、工程知识外,还具有良好的计算机、电子、信息处理、系统综合管理等知识,具有

专业口径宽、知识面广，基础厚实、动手能力强、适应性和就业范围广等特色。

本专业以自动化技术为基础，立足于智能技术和自动控制、大数据处理相结合，为智能机器人和智能大数据处理等行业培养人才，具有鲜明的特色。

Program Features:

As a specialty of engineering, intelligent science and technology engaged in cultivating the students' comprehensive quality and innovative ability. Students should master the knowledge of artificial intelligence theory, system and engineering. Besides that, the knowledge of computer, electronics, information processing, and system integrated management is required too. The specialty of Intelligent Science and Technology has the characteristics of wide coverage, broad spectrum of knowledge, solid foundation, good practical ability, good adaptability and employment.

Intelligent science and technology bases on automation technology, intersects with automation and big data, targets to train engineers and researchers for intelligent robots and intelligent data processing.

授予学位：工学学士学位

Degree Conferred: Bachelor of Engineering

主干课程：

信号与系统、微型计算机原理、经典控制理论与应用、机器人技术基础、模式识别原理、人工智能、数据挖掘。

Core Courses:

Signals and Systems, Microcomputer Principle, Classical Control Theory and Application, Fundamentals of Robotics, Pattern Recognition Principles, Artificial Intelligence, Data Mining.

特色课程：

全英语教学课程：信号与系统

双语教学课程：C++编程语言（I）、C++编程语言（II）

研究型课程：模式识别原理

专题研讨课：脑机接口

创新实践课程：模式识别与智能技术综合创新实践、智能机器人创新实践、信号处理综合创新实践、嵌入式系统创新实践、生物医学信息处理创新实践、图像处理与机器视觉创新实践

竞教结合课程：智能机器人创新实践

创业教育课程：智能科学与技术行业产业发展模式与职业规划

Featured Courses:

Courses Taught in English: Signals and Systems

Bilingual Courses: C++ Programming Language (Part I) , C++ Programming Language (Part II)

Research Courses: Pattern Recognition Principles

Special Topics: Brain-Computer Interface

Innovation Practice: Integrated Innovation Practice on Pattern Recognition and Intelligent technology、
Innovation Practice on Intelligent Robot、 Integrated Innovation Practice on Signal Processing、 Innovation
Practice on Embedded Systems、 Innovation Practice on Biomedical Information Processing、 Innovation
Practice on Image Processing and Machine Vision

Competition and Education Combination Courses: Innovation practice on Intelligent Robot

Entrepreneurship Courses: Industrial Development Mode and Career Planning of Intelligent Science and
Technology Industry

时数 Total	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	学 分 数 Total	必修 学分 Compulsory	选修 学分 Elective	集中实 践教学 环节学 分 Practice-c oncentrate d 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
2276	1876	400	1940	336	177	152	25	36	130.5	10.5	14

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	№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	
	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	
	145223	大学计算机基础 Foundations of Computer		32				2.0	1	№5	
	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	
	106001	军事理论 Military Principle		(16)				1.0	2	№9	
	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	
	141005	大学物理III (一) General Physics (1)		64				4.0	2	№1	
	141006	大学物理III (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	
	130009	工程制图 Engineering Drawing		48				3.0	1	№1	
	140197	线性代数与解析几何 Linear Algebra & Analytic Geometry		48				3.0	1	№1	
	140019	概率论与数理统计 Probability & Mathematical Statistics		48				3.0	2	№1	
	140015	复变函数 I Complex Variable		32				2.0	3	№1	
	140016	积分变换 Integral Transformation		16				1.0	3	№1	
		人文科学领域 Humanities		96	通识 课 E				6.0		№8
		社会科学领域 Social Science		64					4.0		№8

合 计 Total				1100		64	128	71.0		
---------------------	--	--	--	------	--	----	-----	------	--	--

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	135020	电路II Electric Circuits	必	64				4.0	2	№1,2
	135005	电路实验 The Experiment of Electric Circuits	必	16		16		0.5	3	№2
	135034	模拟电子技术II Analog Electronics	必	64				4.0	3	№1,2
	135043	模拟电子技术实验 Experiment of Analog Circuits	必	16		16		0.5	4	№2
	155081	数字电子技术II Digital Electronics	必	64				4.0	4	№1,2
	135045	数字电子技术实验 Experiment of Digital Electronics	必	16		16		0.5	4	№2
	146062	计算机网络与通信技术 Computer Network and Communication Technology	必	32				2.0	3	№1,2,3
	146087	数值分析 Numerical Analysis	必	32				2.0	3	№1
	146114	C++编程语言（一） C++ Programming Language（1）	必	40		8		2.5	2	№1,2,3,4 ,5,8,12
	146115	C++编程语言（二） C++ Programming Language（2）	必	40		8		2.5	3	№1,2,3,4 ,5,8,12
	146127	数据结构与算法 Data Structures and Algorithms	必	48		8		3.0	4	№1
	146085	信号与系统 Signals and Systems	必	64				4.0	4	№1,2,3,5
	146128	智能科学与技术概论 Introduction to Intelligent Science and Technology	必	32				2.0	3	№1,8,12
	146129	模式识别原理 Pattern Recognition Principles	必	64				4.0	5	№1,2,3,4 ,5,6,12
	146130	人工智能 Artificial Intelligence	必	32				2.0	4	№1,2,3,4 ,5,6,12
	146078	经典控制理论与应用 Classical Control Theory and Application	必	64				4.0	5	№1,2,3,4 ,5,6,12
	146076	经典控制理论与应用实验 Experiment of Classical Control Theory and Application	必	28		28		1.0	5	№3,4,5,9 ,10
	146003	微型计算机原理 Microcomputer Principle	必	48				3.0	5	№1,2,3,4 ,5
	146043	微型计算机原理实验 Experiment of Microcomputer Principle	必	12		12		0.5	5	№3,4,5,9 ,10
	146132	最优化理论与方法 Optimization Theory and Methods	选	48				3.0	6	№1,2,5
合 计 Total			必 C	776		112		46.0		
Specialty- related	146097	数据库技术及应用 Database Technologies and Applications	必	48				3.0	5	№1,2,3,5
	146133	数据挖掘 Data Mining	必	32				2.0	6	№1,2,3,5
	146134	机器人技术基础 Fundamentals of Robotics	必	48				3.0	6	№1,2,3,4 ,5,6,7

146135	机器人技术基础实验 Experiment of Fundamentals of Robotics	必	32		32		1.0	6	№3,4,5,9,10
146079	脑机接口 Brain-Computer Interface	选	32				2.0	6	№1,2,4,7
146081	图像处理与机器视觉 Image Processing and Machine Vision	选	48				3.0	6	№1,2,3,4,5,6
146031	单片机原理及应用 Principle & Application of Single-chip Microcomputer	选	44		12		2.5	6	№1,2,3,5
146027	嵌入式系统及应用 Embedded System and Applications	选	32		8		2.0	6	№1,2,3,5,9,10
	机器学习理论与应用 Theory and Applications of Machine Learning	选	32				2.0	6	№1,2,3,4,5
146001	系统工程导论 General for System Engineering	选	32				2.0	4	№1,2,3,6,7,11
146099	生物医学信号处理 Biomedical Signal Processing	选	32				2.0	6	№1,2,3,4,5,6
146101	生物信息学 Bioinformatics	选	32				2.0	6	№1,2,3,4,5,6
146136	智能科学与技术行业产业发展模式与职业规划 Industrial Development Mode and Career Planning of Intelligent Science and Technology Industry	选	16				1.0	3	№6,7,8,9,10
146140	模式识别与智能技术综合创新实践 Integrated Innovation Practice on Pattern Recognition and Intelligent Technology	选	(32)			(32)	1.0	7	№2,3,4,5,6,8,9,10,11,12
146049	智能机器人创新实践 Innovation Practice on Intelligent Robot	选	(32)			(32)	1.0	7	
146141	信号处理综合创新实践 Integrated Innovatory Practice on Signal Processing	选	(32)			(32)	1.0	7	
146121	嵌入式系统创新实践 Innovation Practice on Embedded Systems	选	(32)			(32)	1.0	7	
146137	生物医学信息处理创新实践 Innovation Practice on Biomedical Information Processing	选	(32)			(32)	1.0	7	
146142	图像处理与机器视觉创新实践 Innovation Practice on Image Processing and Machine Vision	选	(32)			(32)	1.0	7	
120003	创新研究训练 Innovation Research Training	选 E	32				2.0		
120004	创新研究实践 I Innovation Research Practice 1	选 E	32				2.0		
120005	创新研究实践 II Innovation Research Practice 2	选 E	32				2.0		
120006	创业实践 Entrepreneurial Practice	选 E	32				2.0		
合计 Total		必 C 选 E	160		32		9.0		
		选修课修读最低要求 15.0 学分 minimum elective course credits required:15.0							

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.学科基础课和专业领域选修课最低修读 15 学分，其中创新实践类课程最低修读 4 学分。模式识别与智能技术综合

创新实践为必修课程。创新实践课程与专业理论课的先修关系如下：

- 模式识别原理---模式识别与智能技术综合创新实践；
- 机器人技术基础---智能机器人创新实践；
- 信号与系统---信号处理综合创新实践；
- 嵌入式系统及应用---嵌入式系统创新实践；
- 生物医学信号处理---生物医学信息处理创新实践；
- 图像处理与机器视觉---图像处理与机器视觉创新实践。

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 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	№9
143197	马克思主义理论与实践 Marxism Theory and Practice	必 C	2周		2.0	假期	№8
130356	工程训练 I Engineering Training	必	2周		2.0	3	№2,3,5,6 №9 №10
141073	电子工艺实习 II Practice of Electronic	必	2周		2.0	4	№2,3,5,6 №9 №10
146096	高级程序语言设计 Curriculum Design on Advanced Programming Language	必	2周		2.0	3	№2,3,4,5
146131	人工智能课程设计 Curriculum Design on Artificial Intelligence	必	1周		1.0	4	№2,3,4,5
146138	模式识别原理课程设计 Curriculum Design on Pattern Recognition Principles	必	2周		2.0	4	№2,3,4,5
146139	机器人技术基础课程设计 Curriculum Design on Fundamentals of Robotics	必	3周		3.0	6	№2,3,4,5
146054	毕业实习 Graduation Practice	必	4周		4.0	6-7	№2,3,5,6,7,8,9,10,11,12
146055	毕业设计 Graduation Project	必	15周		15.0	8	№2,3,4,5,6,9,10,12
合计 Total		必 C	36周		36.0		

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.