

# 机械电子工程

## Mechatronics Engineering

专业代码：080204

学 制：4 年

Program Code: 080204

Duration: 4 years

### 培养目标：

本专业培养具有宽厚的数学、自然科学知识和良好的人文素养，掌握机械、电子、控制等机电系统的基本理论和基础知识，具备综合运用数学、自然科学及机电系统知识的能力，初步具备研发机电系统或机电设备的素质，能够从事科学研究、工程应用、运行管理等方面工作，具有较强创新意识和良好工程职业道德的高素质复合型工程技术人才。

### Educational Objectives:

This program aims at training the high-quality composite engineering and technical talents with a generous mathematics, natural science knowledge and good humanistic quality; mastering the basic theory and basic knowledge of mechatronics system such as machinery, electronics and control; with the ability of comprehensive use of mathematics, natural science and mechatronics system knowledge; having the initial quality of developing mechatronics systems or equipments; to engage in scientific research, engineering applications, operation and management aspects of work with strong sense of innovation and good engineering ethics.

### 毕业要求：

№1.工程知识：能够将数学、自然科学、工程基础和专业知识用于解决复杂的机械电子领域的工程问题。

№2.问题分析：能够应用数学、自然科学和工程科学的基本原理，识别、表达、并通过文献研究分析复杂的机械电子领域工程问题，以获得有效结论。

№3.设计/开发解决方案：能够设计针对复杂机械电子工程问题的解决方案，设计满足特定需求的系统、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机械电子领域复杂工程问题进行研究，包括设计实验、分析与解释数据、并通过信息综合得到合理有效的结论。

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

№6.工程与社会：能够基于机械电子工程相关背景知识进行合理分析，评价机械电子工程实践和复杂机械电子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机械电子领域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：能够就机械电子领域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：理解并掌握机械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.Engineering Knowledge: An ability to apply knowledge of mathematics, science, engineering fundamentals and engineering specialization to the solution of complex mechatronic engineering problems.

№2.Problem Analysis: An ability to identify, formulate and analyze complex mechatronic engineering problems, reaching to substantiated conclusions using basic principles of mathematics, science, and mechatronic engineering.

№3.Design / Development Solutions: An ability to design solutions for complex mechatronic engineering problems and innovatively design 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 mechatronic 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 modeling, to complex mechatronic engineering activities, with an understanding of the limitations.

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

№7.Environment and Sustainable Development: An ability to understand and evaluate the impact of mechatronic engineering solutions in environmental and societal contexts and demonstrate knowledge of 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 mechatronic 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：**

1995 年华南理工大学机械一系和机械二系合并成立机电工程系，机械电子教研室和焊接教研室；2008 年 1 月，原机械工程学院、工业装备与控制工程学院、汽车工程学院三个学院合并组建机械与汽车工程学院，原机械工程学院的机械电子研究所和焊接技术研究所合并成立新的机械电子工程研究所，负责机械电子工程专业人才培养；2013 年 1 月机械电子工程研究所调整为机械电子工程系。

本专业是广东省名牌专业，拥有广东省精密装备与制造技术重点实验室、精密制造技术与装备广东普通高校重点实验室，广州市智能无损检测行业工程技术研究中心以及 6 个科研团队。教师包括国家杰出青年科学基金获得者、珠江学者特聘教授等高水平教师；承担国家杰出青年科学基金、国家自然科学基金重点及重大项目、国家“973”计划项目、国家 863 计划项目、国家重大仪器开发专项等国家级项目。本专业学生主要学习机械工程、电子技术、控制理论与技术等方面的基本理论和基础知识，接受机械电子工程师的基本训练，培养机电一体化产品和系统的设计、制造、服务，以及性能测试与仿真、运行控制与管理等方面的基本能力。

### **Program Profile:**

In 1995 mechanical I department and mechanical II department merged to set up mechatronics engineering department and welding teaching and research section. In January 2008 the former School of Mechanical Engineering, School of Equipment and Control Engineering and School of Automotive Engineering merged to form School of Mechanical and Automotive Engineering, the Institute of Mechatronics Engineering and the Institute of Welding Technology merged to form the Institute of Mechatronics Engineering, responsible for Mechatronics Engineering professionals training. In January 2013 Institute of Mechatronics Engineering was adjusted to be Mechatronics Engineering Department.

The major is the Guangdong Province famous brand, having Guangdong Province Precision Equipment and Manufacturing Technology Key Laboratory, Precision Manufacturing Technology and Equipment Key Laboratory of Guangdong University, Guangzhou Intelligent Non-destructive Testing Engineering and Technology Research Center and six research teams. Among the teachers there includes the National Outstanding Young Scientist Fund winner, Zhujiang scholar Professor, and 10 doctoral instructors and 11 master instructors and are commitment to the National Outstanding Youth Science Fund, the National

Natural Science Foundation, "973" project, the national 863 project, the state major equipment development and other national projects.

Mechatronics is a multidisciplinary field of science that includes a combination of mechanical engineering, electronics, computer engineering, telecommunications engineering, systems engineering and control engineering. As technology advances, the subfields of engineering multiply and adapt. This major is a design process that unifies these subfields, and is designed to provide students with both professional and comprehensive knowledge in the field of mechatronics engineering. Our graduates will be qualified to work in a number of related areas such as mines and factories, research institutes and institutions of higher learning.

### **专业特色:**

立足华南，面向全国，瞄准机械装备、汽车、光电、能源动力等行业培养工程人才。注重机电领域未来产业人才培养，如机器人、制造物理信息系统、3D 打印、现代能源电源等。加强数、理、机、电等基础课程，重视实践创新能力培养。

### **Program Features:**

Based in South China and for the whole country, this major train the engineering talents of machinery and equipment, automotive, optoelectronics, energy and other industries; focus on future industries such as robots, manufacturing physical information systems, 3D printing and modern energy and so on; strengthen the basic knowledge and the innovation ability in practice.

**授予学位:** 工学学士学位

**Degree Conferred:** Bachelor of Engineering Science

### **主干课程:**

模拟电子技术、数字电子技术、微机原理及接口技术、机械原理、机械设计、成型技术基础、机械制造技术基础、自动控制原理、测试技术、机电系统设计。

### **Core Courses:**

Analog Electronic Technology, Digital Electronic Technology, Microcomputer Theory and Interfacing Technique, Theory of Machines and Mechanisms, Mechanical Design, Basis of Material Forming Technology, Foundation of Machine Manufacturing Technology, Automatic Control Theory, Testing Technology, Mechanical and Electrical Systems Design

### **特色课程:**

全英语教学课程：机械设计

双语教学课程：机械原理、机械设计、成型技术基础、机械制造技术基础、机械设备数控技术

研究型课程：工程中的模型与模拟

新生研讨课：机械工程概论

专题研讨课：快速成型技术

校企合作课：现代微电子封装技术

竞教结合课程：电子线路 CAD、机器人学导论

创新实践课程：先进制造技术实践、虚拟仪器（LabVIEW 程序设计）

创业教育课程：机电产品市场营销学、质量管理与控制

**Featured Courses:**

Courses Taught in English: Mechanical Design

Bilingual Courses: Theory of Machines and Mechanisms, Mechanical Design, Basis of Material Forming Technology, Foundation of Machine Manufacturing Technology, CNC Technology of Machinery and Equipment

Research Courses: Modeling and Simulation in Engineering

Freshmen Seminars: Introduction to Mechanical Engineering

Special Topics: Rapid Prototyping Technology, MEMS Technology and Applications

Cooperative Courses with Enterprises: Modern Microelectronic Packaging Technology

Contest-Teaching Integrated Courses: CAD for Electronic Circuits , Introduction to Robotics

Innovation Practice: Advanced Manufacturing Technology Integrated Experiment Course, Virtual Instrument (LabVIEW Programming)

Entrepreneurship Courses: Marketing for Mechanical and Electrical Products, Quality Management and Control

**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	工 程 大 作 业	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	M	B	B	16	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	G	G	A	A	A	A	A	A	A	A	A	A	A	A	A	Q	B	B	15	2																	1	20				
三	5	A	A	A	A	A	A	A	A	A	A	A	A	E	E	H	H	Q	B	B	13	2			2												1	20					
	6	E	E	A	A	A	A	A	A	A	A	A	A	A	A	Q	E	E	B	B	13	2			4													1	20				
四	7	A	A	A	A	A	A	A	K	K	A	A	A	A	A	A	Q	B	B	13	2																1	20					
	8	O	O	O	O	O	O	O	O	O	O	O	O	O	O	Q	Q	P	P	P																	15	3	2	20			
		合 计 (周)																		99	13	1	3	6		4	2	(4.5)		2										15	3	8	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	72.5	1132	
	通识 General Education	10.0	160	
学科基础课 Disciplinary Basic Courses	必修 Compulsory	51.0	848	
	选修 Elective	0	0	
专业领域课 Specialty-related Courses	必修 Compulsory	3.0	48	
	选修 Elective	7.0	112	
合计 Total		143.5	2300	
集中实践教学环节(周) Practice Training (Weeks)	必修 Compulsory	39.5	39.5 周	
毕业学分要求 Credits Required for Graduation	143.5+39.5=183.0			

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 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
2300	2028	272	2022	278	183	166	17	39.5	134.5	9	6

## 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	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

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			
	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	№9,12
	152002	体育（二） Physical Education (2)		32			32	1.0	2	№9,12
	152003	体育（三） Physical Education (3)		32			32	1.0	3	№9,12
	152004	体育（四） Physical Education (4)		32			32	1.0	4	№9,12
	106001	军事理论 Military Principle		(16)				1.0	2	№6,8,9
	140191	微积分 II（一） Calculus(I)		80				5.0	1	№1,2,4
	140192	微积分 II（二） Calculus(II)		80				5.0	2	№1,2,4
	140197	线性代数与解析几何 Linear Algebra and Analytic Geometry		48				3.0	1	№1,2,4
	140019	概率论与数理统计 Probability Theory & Mathematical Statistics		48				3.0	2	№1,2,4
	140015	复变函数 I Complex Variable		32				2.0	3	№1,2,4
	140016	积分变换 Integral Transformation		16				1.0	3	№1,2,4
	145022	计算方法 Calculation method		32				2.0	3	№1,2,4
	141005	大学物理III（一） College Physics		64				4.0	2	№1,2,4
	141006	大学物理III（二） College Physics		64				4.0	3	№1,2,4
	141007	大学物理实验（一） Experiments of College Physics		32		32		1.0	2	№1,2,4
	141008	大学物理实验（二） Experiments of College Physics		32		32		1.0	3	№1,2,4
	147045	大学化学 General Chemistry		32				2.0	1	№1,2,4
	147036	大学化学实验 General Chemistry Experiment		16		16		0.5	2	№1,2

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			
	130137	画法几何及机械制图（一） Descriptive Geometry & Mechanical Graphing		48				3.0	1	№3,10
	130138	画法几何及机械制图（二） Descriptive Geometry & Mechanical Graphing		64				4.0	2	№3,10
	145268	C++程序设计基础 Foundation of the C++ Programming Design		48				3.0	2	№4,5
		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
		<b>合 计</b> <b>Total</b>		1292		80	128	82.5		

备注：社会科学领域至少修读 2 学分管理类通识课。

At least 2 credits for management course

### 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 Hours			
学科基础课 Disciplinary Basic Courses	133100	理论力学 I Theoretical Mechanics I	必 C	64				4.0	3	№1,2,4
	133287	材料力学 I Material Mechanics I	必 C	48		6		3.0	4	№1,2,4
	130381	工程热力学 Engineering Thermodynamics	必 C	32				2.0	4	№1,2,4
	130380	流体力学 Fluid Mechanics	必 C	32				2.0	4	№1,2,4
	130412	传热学 Heat Transfer	必 C	32				2.0	5	№1,2,3
	135019	电路 II Electric Circuit I	必 C	64				4.0	3	№3,4
	135005	电路实验 Electric Circuit Experiment	必 C	16		16		0.5	4	№3,4
	135027	模拟电子技术 I Analog Electronic Technology I	必 C	64		16		3.5	4	№3,4
	135044	数字电子技术 I Digital Electronic Technology I	必 C	48		16		2.5	5	№3,4
	130078	机械工程材料 Mechanical Engineering Materials	必 C	40				2.5	4	№3,4



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			
	130070	互换性与技术测量 Interchangeability and Technological Measurement	必 C	24				1.5	5	№3,4
	130091	机械原理 II Theory of Machines and Mechanisms II	必 C	48				3.0	5	№3,4
	130262	机械设计 II Mechanical Design II	必 C	48				3.0	6	№3,4
	130269	微机原理及接口技术 Microcomputer Theory and Interfacing Technique	必 C	40				2.5	5	№3,5
	131070	自动控制原理 Automatic Control Theory	必 C	64	8	8		3.5	6	№2,3,4
	130052	测试技术 Testing Technology	必 C	40				2.5	6	№1,2,3
	130190	机械制造技术基础 Foundation of Machine Manufacturing Technology	必 C	56				3.5	6	№1,2,3
	130198	机械工程概论 Introduction to Mechanical Engineering	必 C	32				2.0	2	№6,7
	130020	成型技术基础 Basis of Material Forming Technology	必 C	56				3.5	5	№1,2,3
	<b>合计 Total</b>			必 C	848	8	62		51.0	
专业领域课 Specialty-related courses	130329	机电系统设计 Mechanical and Electrical Systems Design	必 C	48				3.0	7	№2,3,4
	130056	电子线路 CAD CAD for Electronic Circuits	选 E	16				1.0	4	№3,5
	130193	科技情报检索 Science and Technology Information Retrieval	选 E	16				1.0	6	№2,4,10
	130340	现代微电子封装技术 Modern Microelectronic Packaging Technology	选 E	24				1.5	5	№3,6,7
	130343	数字图像处理及应用 Digital Image Processing and Applications	选 E	48				3.0	5	
	130300	虚拟仪器 (LabVIEW 程序设计) Virtual Instrument (LabVIEW Programing)	选 E	32				2.0	5	№3,5
	130334	振动冲击与噪声 Vibration Shock and Noise	选 E	32				2.0	5	№3,4,6

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			
				130227	液压及气压传动技术 Hydraulic and Pneumatic Transmission	选 E	40			
130333	特种加工与现代制造技术 Special Processing and Modern Manufacturing Technology	选 E	32		2		2.0	6	№3,6,7	
130039	机电产品市场营销学 Marketing for Mechanical and Electrical Products	选 E	32				2.0	6	№9,10,11	
130082	机械设备数控技术 CNC Technology of Machinery and Equipment	选 E	32				2.0	6	№3,4,5	
130229	快速成型技术 Rapid Prototyping Technology	选 E	32		2		2.0	6	№3,5	
130072	机电传动控制 Electrical Transmission Control	选 E	40				2.5	7	№2,3,4	
130341	新能源能量高效变换技术及应用 New Energy Efficient Energy Conversion Technology and Applications	选 E	32		2		2.0	6	№3,5	
130187	机器人学导论 Introduction to Robotics	选 E	24				1.5	6	№3,5,7	
130299	加工过程的计算机控制 Computer Control of Processing	选 E	24				1.5	6	№2,3,5	
130001	可编程逻辑控制器-原理及应用 Programmable Controllers Theory and Implementation	选 E	32				2.0	7	№3,5	
130339	计算机辅助设计与制造 Computer-Aided Design and Manufacturing	选 E	32	12			1.5	7	№3,5,6	
130231	机电设备诊断技术基础 Fundamentals of Diagnosis Technology for Mechanical and Electrical Equipment	选 E	24				1.5	7	№2,3,5	
130228	汽车制造技术基础 Fundamentals of Automobile Manufacturing Technology	选 E	32				2.0	7	№3,6	
130107	控制系统抗干扰技术 Anti-Jamming Technology for Control Systems	选 E	32				2.0	7	№3,4	
	先进制造技术实践 Advanced Manufacturing Technology Practice	选 E	32				2.0	7	№3,5,6	

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			
	120003	创新研究训练 Innovation Research Training	选 E	32				2.0		№12
	120004	创新研究实践 I Innovation Research Practice I	选 E	32				2.0		№12
	120005	创新研究实践 II Innovation Research Practice II	选 E	32				2.0		№12
	120006	创业实践 Entrepreneurial Practice	选 E	32				2.0		№12
	<b>合 计 Total</b>		必 C	48				3.0		
			选 E	选修课修读最低要求 7.0 学分 minimum elective course credits required:						

备注：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。

#### 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
130357	工程训练 II Engineering Training	必 C	4 周		4.0	3	№2,6,8
141073	电子工艺实习 II Electronic Technology Practice	必 C	2 周		2.0	5	№2,6,8
130312	机械基础综合实验 III（分散进行） Comprehensive Experiment of Mechanical Basis (proceed dispersively)	必 C	1.5 周		1.5	4/5/6	№2,3,4
130080	机械工程材料综合实验（分散进行） Poly-experiment of Mechanical Engineering Materials (proceed dispersively)	必 C	1 周		1.0	4	№2,3,4
130160	机械原理课程设计 Curriculum Design of Mechanical Principles	必 C	2 周		2.0	5	№2,3,4
130175	机械设计课程设计 Course Project of Mechanical Design	必 C	2 周		2.0	6	№2,3,4
130245	微机原理课程设计 Course Project of Microcomputer Principle	必 C	2 周		2.0	6	№2,3,4
130178	学科基础实验课(制造)（分散进行） Subject-based Experiment (manufacturing) (proceed dispersively)	必 C	1 周		1.0	5-6	№1№2

130179	学科基础实验课(电控) (分散进行) Subject-based Experiment (electronic control) (proceed dispersively)	必 C	1 周		1.0	5-6	№1№2
130233	生产实习 Production Practice	必 C	3 周		3.0	7	№6,8,10
130036	毕业设计 (论文) Graduation Design (Dissertation)	必 C	15 周		15.0	8	№1-12
<b>合 计</b> <b>Total</b>		必 C	39.5 周		39.5		
		选 E	选修课修读最低要求 学分 minimum elective course credits required:				

## 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.