

光电信息科学与工程（光电器件）

Opto-electronics Information Science and Engineering (Optoelectronic Device)

专业代码：080705

学 制：4 年

Program Code:080705

Duration: 4 years

培养目标：

培养坚持社会主义道路，具有良好的道德修养，遵守法律法规，知识、素质、能力俱佳，有国际竞争力；富有人文素养、管理能力、团队精神、现代科学意识和国际视野；具有数理基础、专业知识、实践能力和创新精神；能够胜任光电信息科学与工程领域的前沿科学研究、先进器件与系统设计开发；并能承担推动社会、经济、科技可持续发展的责任，以团队负责人、技术或管理骨干的角色，在工程实践活动中取得创新性成就的高级专业技术人才。

Educational Objectives:

This program aims at developing the professional technical talents with strong faith in socialist process, good moral tutelage, fund of knowledge, good quality and ability, rich humanities, management ability, team spirit, consciousness of modern science and the international field of vision, along with the mathematical basis, professional knowledge, practice ability and innovation spirit; They should be competent in frontier science research in the field of opto-electronics information science and engineering, advanced devices as well as systems design and development; And be able to undertake the responsibility of the sustainable development of society, economy, science and technology, to obtain innovative achievements in engineering practice as the role of team leader, or the backbone of technology or management.

毕业要求：

№1.工程知识：掌握扎实的基础知识、专业基本原理、方法和手段，能够将数学、自然科学、本专业基础知识和专业知识用于解决复杂工程问题，并接触和掌握光电行业部分营运知识，为解决企业光电技术领域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、方法和手段和光电行业营运知识，识别、表达、并通过文献研究分析机械工程中的复杂问题，以获得有效结论。

№3.设计/开发解决方案：能够设计针对光电信息科学与工程领域复杂问题的解决方案，设计满足特定需求的光电系统、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光电信息科学与工程领域复杂问题进行研究，

包括设计实验、分析与解释数据、并通过信息综合得到合理有效的结论。

№5.使用现代工具：能够针对光电信息科学与工程领域复杂问题，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：能够基于光电信息科学与工程领域相关背景知识进行合理分析，评价专业工程实践和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光电信息科学与工程领域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：能够就光电信息科学与工程领域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 engineering problems.

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

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

№6.Engineering and Society: An ability to apply reasonable analysis informed by contextual knowledge to assess societal, health, safety, legal and cultural issue, and understand the consequent responsibilities relevant to professional engineering practice.

№7.Environment and Sustainable Development: An ability to understand and evaluate the impact of professional 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 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：

光电信息科学与工程（光电器件）专业属于电子信息学科。本专业是该校为了响应国家及广东省大力发展战略性新兴产业的号召，为培养光电产业技术和研发人才而兴建的本科专业。专业创建于2008年，原名“信息显示与光电技术”，于2012年更名为“光电信息科学与工程（光电器件）”。于2011年03月获批国家高等学校特色专业建设点，2011年11月获批广东省高等学校特色专业建设点。2016年2月，获批建设光电材料与器件国家级虚拟仿真实验教学中心。专业依托发光材料与器件国家重点实验室、先进材料国际联合实验室建设，以“新型显示技术”、“半导体照明（LED）技术”、“太阳能电池技术”、“光电检测技术”等作为教学及科研的主要方向。目前已拥有一支包括中国科学院院士、国家杰出青年基金获得者、珠江学者等高层次人才在内的教师队伍，共17人，其中教授10人、副教授3人，具有博士学位教师16人。拥有约300平方米的本科教学实验室，用于本科教学的仪器设备约200台（套）；拥有1个省级校外实践基地及多个校级校外实践基地；并共享材料科学与工程学院实验平台和华南理工大学完备的分析测试平台以及丰富的图书资料资源。

Program Profile:

Opto-electronics Information Science and Engineering (Optoelectronic Device) belongs to the discipline of electronic information. The program was set up by our university in response to the call of country and the developing strategic emerging industry in Guangdong province, cultivating the construction of photovoltaic industry technology and the talents of research and development. The program was founded in 2008, formerly named as "Information Display and Opto-electronics Technology"; In 2012, we changed its name to " Opto-electronics Information Science and Engineering (Opto-electronic Device) ". In March 2011, we were approved by the national characteristic specialty construction for institutions of higher learning, and in November 2011, approved by the characteristic specialized construction points of institutions of higher learning in Guangdong province. In February 2016, we were approved to built the national education center

of opto-electronic materials and devices and virtual simulation experiment. The program is relying on the state key laboratory of luminescent materials and devices, advanced materials international joint laboratory construction, with the "technology of new display", "technology of semiconductor lighting (LED) ", "technology of solar cell" and "technology of opto-electronic detection" as the main direction of education and scientific research. We are now having a team with a total of 17 people, including 10 professors, 3 associate professors, and 16 teachers with doctorate, as well as the high-level personnel and teachers such as the members of Chinese Academy of Sciences, the gainers of National Outstanding Youth Fund or the Pearl River Scholars. We have about 300 square meters of laboratory for the education of undergraduate, and 200 sets of teaching instruments and equipment; We have one provincial off-campus practice base and several field off-campus practice bases, and sharing complete testing platform and the rich resources of books and materials with the experimental platform of the college of materials science and engineering, as well as the testing and analysis platform of the South China University of Technology.

专业特色:

本专业以新型显示、半导体照明技术、太阳能电池、光电检测等国家和广东省战略性新兴产业应用为引导，以发光材料与器件国家重点实验室和先进功能材料国际合作联合实验室为支撑，有机整合材料、器件、系统及应用的完整知识链条，将光电技术领域国际前沿科学研究与产业发展有机融入本科教学，旨在培养具有国际视野的高端人才。

Program Features:

With the guide of strategic emerging industry of country and Guangdong province such as new displays, semiconductor lighting technology, solar cells and photoelectric detection, and supported by the State Key Laboratory of Luminescent Materials and Devices and Advanced Functional Materials International Cooperation Joint Laboratory, the program organically integrates a complete chain of materials, devices and application, combines the international frontier opto-electronic technology and undergraduate education, and aims at cultivating the talents with international vision for scientific research and industrial development.

授予学位: 工学学士学位

Degree Conferred: Bachelor of Engineering

主干课程:

模拟电子技术、数字电子技术、固体物理、半导体物理、物理光学、应用光学、光电检测技术、激光原理、有机光电子技术、半导体照明技术。

Core Courses:

Analog Electronics, Digital Electronics, Solid State Physics, Semiconductor Physics, Physical Optics,

Applied Optics, Optoelectronic Detection Technology, Principles of Lasers, Organic Optoelectronic Technology, Semiconductor Lighting Technology

特色课程：

全英语教学课程：纳米材料与技术、材料科学与工程导论

双语教学课程：有机光电子技术

研究型课程：显示器件驱动技术、光伏太阳能电池器

专题设计课：照明光学系统设计、显示器件驱动技术设计

创新实践课程：光学综合实验、光电信息技术综合实验

创业教育课程：先进材料产业模式与创新发

Featured Courses:

Courses Taught in English: Nanomaterials and Nanotechnologies, Introduction to Materials Science and Engineering

Bilingual Courses: Organic Optoelectronic Technology

Research Courses: Driving Technology of Display Devices, Photovoltaic Solar Cells Device

Special Designs: Design of Illumination System, Driving Technology Design of Display Devices

Innovation Practice: Comprehensive Experiment of Optics, Comprehensive Experiment of Optoelectronic Information Technology

Entrepreneurship Courses: Development and innovation of advanced materials industry

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
2284	1676	608	1968	316	177	139	38	36	131	10	8

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	2	№8
	143091	中国近现代史纲要 Skeleton of Chinese Modern History		(32) 24				2.0	1	№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	4	№8
	143090	马克思主义基本原理 Fundamentals of Marxism Principle		(40) 36				2.5	3	№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	№1,2
	140192	微积分II(二) Calculus(2)		80				5.0	2	№1,2
	140197	线性代数与解析几何 Linear Algebra & Analytic Geometry		48				3.0	1	№1,2
	140019	概率论与数理统计 Probability & Mathematical Statistics		48				3.0	2	№1,2
	140015	复变函数 Complex Variable		32				2.0	3	№1,2
	141005	大学物理II(一) General Physics(1)		64				4.0	2	№1,2
	141006	大学物理II(二) General Physics(2)		64				4.0	3	№1,2

	141007	大学物理实验（一） Physics Experiment(1)		32		32		1.0	2	№1,2,4
	141008	大学物理实验（二） Physics Experiment(1)		32		32		1.0	3	№1,2,4
	145268	C++程序设计基础 C++ Programming Foundations		48				3.0	2	№5
	130009	工程制图 Engineering Drawing		48				3.0	1	№1,3
		人文科学领域 Humanities		96				6.0		№8
		社会科学领域 Social Science		64				4.0		№8
	合 计 Total				1132		64	128	73.0	

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	147001	无机化学 I Inorganic Chemistry	必 C	32				2.0	1	№1
	147003	无机化学实验 I Experiment of Inorganic Chemistry	必 C	16		16		0.5	1	№1,3
	135020	电路 II Electric Circuits	必 C	64				4.0	3	№1
	135005	电路实验 Experiment of Circuit	必 C	16		16		0.5	4	№1,3
	135027	模拟电子技术 I Analog Electronics	必 C	64		12		3.5	4	№1
	135044	数字电子技术 I Digital Electronics	必 C	48		16		2.5	4	№1
	141067	量子力学 Fundamentals of Quantum Mechanics	必 C	48				3.0	3	№1,2
	136001	固体物理 Solid State Physics	必 C	64				4.0	4	№1,2
	136350	物理光学 Physical Optics	必 C	32				2.0	3	№1,2,5
	136351	应用光学 Applied Optics	必 C	32				2.0	3	№1,2,5
	136352	光电检测技术 Optoelectronic Detection Technology	必 C	48		16		2.5	4	№1,3,4
	141062	半导体物理 Semiconductor Physics	必 C	48				3.0	4	№1,4
	136353	激光原理 Principles of Lasers	必 C	32				2.0	5	№1,3,4
	135047	微机原理与应用 The Principle and Application of Microcomputer	必 C	48	16			2.5	5	№5
	147020	有机化学 I Organic Chemistry	选 E	48				3.0	3	№1
	147058	物理化学 I Physical Chemistry	选 E	48				3.0	4	№1
	135162	半导体器件 Semiconductor Devices	选 E	48				3.0	5	№1,4

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-ai ded Class Hours	实验 Lab Hours	实践 Practice			
	136238	薄膜物理与技术 Physics and Technology of Thin Films	选 E	32				2.0	5	№2,4
	135159	集成电路制造技术 Modern Integrate Circuit Fabrication Technology	选 E	32				2.0	6	№2,4
	135048	数字信号处理 II Digital Signal Processing	选 E	48				3.0	5	№1,2
	141017	信号与系统 Signal & Systematic	选 E	64				4.0	4	№1,2
	136297	材料科技英语 Technical English for Materials Discipline	选 E	16				1.0	3	№10
	136065	文献检索与利用 Indexing of Scientific Literature	选 E	16				1.0	5	№2
	136295	科技论文写作 Academic Writing	选 E	16				1.0	5	№10,12
	136296	实验室安全规范	选 E	8				0.5	3	№8
	合计 Total		必 C	592	16	76		34.0		
			选 E	选修课修读最低要求 9.0 学分 minimum elective course credits required: 9.0						
专业领域课 Specialty-related Courses	136266	有机光电子技术 Organic Optoelectronic Technology	必 C	48				3.0	6	№1,4
	136240	半导体照明技术 Semiconductor Lighting Technology	必 C	32				2.0	6	№2,3
	136322	光电信息技术综合实验 Comprehensive Experiment of Optoelectronic Information Technology	必 C	32		32		1	7	№3,5
	136355	光电显示技术 Optoelectronic Display Technology	选 E	48				3.0	5	№2,6
	136229	TFT 技术与应用 TFT Technology and Application	选 E	32				2.0	6	№2,4
	136294	光伏太阳能电池器件 Photovoltaic Solar Cells Device	选 E	32				2.0	6	№2,5
	136233	液晶材料与技术 Liquid Crystal Material and Technology	选 E	48		16		2.5	6	№2,4
	136231	显示器件驱动技术 Driving Technology of Display Devices	选 E	48		16		2.5	7	№3,5
	135006	单片机及接口技术 Mono-Chip Computers and Interface Technology	选 E	48		16		2.5	6	№3,5
	136354	光学综合实验 Comprehensive Experiment of Optics	选 E	16		16		0.5	4	№3,4
	130307	纳米材料与纳米技术 Nanomaterials and Nanotechnologies	选 E	32				2.0	6	№1,2
	136230	发光原理基础 Foundation of Photoemission Principle	选 E	32				2.0	6	№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-ai ded Class Hours	实验 Lab Hours	实践 Practice			
	135086	现代信号测量理论与技术 Theory and Technology of Modern Signal Measurement	选 E	64				4.0	7	№1,2
	136008	传感器及其应用电子技术 Fundamentals of Sensors & Application	选 E	48				3.0	6	№1,2
	135147	数字视音频技术 Digital Audio Technology	选 E	64		16		3.5	7	№1,2
	135108	光纤通信技术 Fibre Optical Communication technology	选 E	64		16		3.5	5	№2,4
	136356	虚拟仪器技术 Virtual Instrument Technology	选 E	32				2.0	5	№3,5
	136191	材料科学与工程导论 Introduction to Materials Science and Engineering	选 E	64				4.0	5	№2,6
	136298	先进材料产业模式与创新 Development and innovation of advanced materials industry	选 E	32				2.0	4	№6,7
	120003	创新研究训练 Innovation Research Training	选 E	32				2.0		№3,4,11
	120004	创新研究实践 I Innovation Research Practice I	选 E	32				2.0		№4
	120005	创新研究实践 II Innovation Research Practice II	选 E	32				2.0		№3
	120006	创业实践 Entrepreneurial Practice	选 E	32				2.0		№3,4,11
	合计 Total		必 C	112		32		6.0		
			选 E	选修课修读最低要求 19.0 学分 minimum elective course credits required: 19.0						

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
130356	工程训练 I Engineering Training	必 C	2 周		2.0	4	№2,4
141073	电子工艺实习 II Practice of Electronics Technology	必 C	2 周		2.0	4	№3,5
135115	模拟电子技术课程设计 Course Project of Analog Electronics	必 C	1 周		1.0	5	№2,4
135116	数字电子技术课程设计 Course Project of Digital Electronics	必 C	2 周		2.0	5	№2,4
136239	显示器件驱动技术设计 Driving Technology Design of Display Devices	必 C	2 周		2.0	7	№3,5,10

136241	照明光学系统设计 Design of Illumination System	必 C	2 周		2.0	7	№2,9,11
136142	生产实习 Manufactural Practice	必 C	2 周		2.0	6	№6,7,8,10
136163	毕业实习 Practice on Diploma Project	必 C	3 周		3.0	8	№2,9,10
136162	毕业设计（论文） Diploma Project (Thesis)	必 C	15 周		15.0	8	№2,4,10,12
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.