

光电信息科学与工程(光电信息)

Opto-electronics Information Science and Engineering (Optoelectronic Information)

专业代码: 080705

学 制: 4 年

Program Code: 080705

Duration: Four years

培养目标:

培养社会主义德、智、体全面发展, 具有扎实的光电信息理论基础和实践技能、具有较好的科学素养及一定的研究、开发和管理能力, 英语应用能力和工程实践动手能力强, 人文素质和创新精神优秀, 能适应技术进步和社会需求变化, 在光电技术、计算机技术、电子与通信等方向具有一定专长的创新型高级专门人才。

Educational Objectives:

Aiming at preparing socialist, all-rounded, high-quality talents with solid foundation in basic optoelectronic information theory and practice skills, with strong scientific perception and research, development and management abilities. This program will enable students to be capable of comprehensive English skill and practical skill, excellent human quality and innovation spirit. Students can be able to adapt to technological progress and changes in social demands in related optoelectronic technology, computer technology, electronics and communication fields.

毕业要求:

№1.工程知识: 能够将数学、物理学和光电信息科学知识用于解决复杂科学和工程问题。

№2.问题分析: 能够应用数学、物理学和光电信息科学的基本原理, 识别、表达、并通过文献研究分析复杂科学和工程问题, 以获得有效结论。

№3.设计/开发解决方案: 能够设计针对光电信息工程复杂问题的解决方案, 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复杂科学和工程问题进行研究, 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: 能够针对复杂科学和工程问题, 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, 包括对复杂科学或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: 能够基于工程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复杂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：能够就复杂科学和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：理解并掌握光电信息工程管理原理，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, physics, optoelectronic information science to the solution of complex scientific and engineering problems.

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

№3.Design / Development Solutions: An ability to design solutions for complex optoelectronic information 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 scientific and 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 scientific and 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 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 scientific and 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 optoelectronic information engineering management principles, 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：

华南理工大学光电信息科学与工程（光电信息）本科专业开办于 2002 年，依托于物理学一级学科，原专业名称为“光信息科学与技术”，2013 年更改为现名。本专业教师具有良好的师德师风，专业背景与科研方向涵盖光学和物理电子学两个方向。本专业现有 1 个“广东高校半导体照明工程研究中心”（省级工程研究中心），一个本科专业实验室，实验室的总面积达 600 平方米，同时还包括声子晶体、人工微结构光学实验平台等相关科研实验平台。在专业定位上，立足于培养光电信息科学基础扎实、具有国际视野，能在光学、信息技术、电子与计算机技术等领域的创新型高级专门人才。

Program Profile:

The Opto-electronics Information Science and Engineering (Optoelectronic Information) undergraduate program which was based on the discipline of Physics was founded in 2002. Its original name was “Optical Information Science and Technology” and it was renamed in 2013.

We have 24 full-duty teachers, including 8 full professors, 9 associate professors and 7 intermediate grade teachers. 21 faculty members hold the doctoral degree, accounting for eighty-eight percent. At present, two postgraduate program are administered—one for Master degree in Optics and one for both Ph.D. degree and Master degree in Physical Electronics. We have one center for LED Engineering Research (Provincial engineering research center) and one undergraduate laboratory with more than 600 square meters. We also have the research experimental platform for photonic crystal and micro-nano optical structure. The program focuses on cultivating students with solid foundation in optoelectronic information science who have international perspective and the innovation ability in the fields of optics, information technology and computer technology.

专业特色：

以理促工、理工结合；强化国际化教育，拓展学生的国际视野；注重培养学生的实践能力和创新创业潜能；使学生具备扎实的数学、物理、电子、计算机和通信等学科知识基础和宽口径就业的优势。

Program Features:

The talents training aims at the combination of science and engineering, and it highlights the characteristics of strengthening international education and international senior, focusing on forming students' practical capabilities and innovation ability. Cultivate students with widely employment and solid foundation in the fields of mathematics, physics, electronics, computer and communication.

授予学位：工学学士学位

Degree Conferred: Bachelor of Engineering

主干课程：

光学、信息光电子学、工程光学、光电技术、电路、模拟电子技术、数字电子技术、微机原理与应用、数据结构、信号与系统、信息论基础、通信原理、数字信号处理III、电动力学。

Core Courses:

Optics、Information Optoelectronics、Optical Engineering、Photoelectric Technology、Electric Circuits、Analog Electronics、Digital Electronics、Principles and Application of Microcomputer 、Data Structures、Signals and Systems、Elements of Information Theory、Communication Principles、Digital Signal Processing III、Electrodynamics.

特色课程：

全英语教学课程：基础物理（1）、基础物理（2）、基础物理（3）、光学

双语教学课程：信息光电子学、工程光学、薄膜光学、非线性光学基础、光谱学基础、数据结构、信号与系统、通信原理、数字信号处理、数字图象处理、光纤通信、计算机通信网、波分复用技术。

新生研讨课：光学前沿

创业教育课：光电信息与创业

Featured Courses:

Courses Taught in English: Fundamental of Physics(1)、Fundamental of Physics(2)、Fundamental of Physics(3)、Optics

Bilingual Courses: Information Optoelectronics、Optical Engineering、Thin Film Optics、Fundamentals of Nonlinear Optics、Fundamental Spectroscopy、Data Structures、Signals and systems、Communication Principles、Digital Signal Processing、Digital Image Processing、Optical Fiber Communications、Computer Communication Network、Wavelength Division Multiplexing Technology.

Freshmen Seminars: Advances in Optics

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

学 年	学 期	教 学 进 度 安 排 (周)																			理 论 教 学	考 试	入 学 教 育	军 训	课 程 设 计	大 作 业	工 程 训 练	电 子 实 验	综 合 实 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	Q	B	B	16	2												2	20					
二	3	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	Q	Q	B	B	16	2												2	20					
	4	G	G	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B	B	16	2				2									20					
三	5	H	H	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B	B	16	2				2									20					
	6	A	A	A	A	A	A	A	A	A	A	A	A	A	E	E	E	E	B	B	14	2		4											20					
四	7	A	A	A	A	A	A	A	A	A	A	A	A	E	E	K	K	B	B	14	2		2						2					20						
	8	L	L	L	L	O	O	O	O	O	O	O	O	O	O	O	O	O	O	P											4		15	1			20			
合 计 (周)																			106	13	1	3	6		2	2					2	4			15	1	4		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	60.0	924	
	通识 General Education	10.0	160	
学科基础课 Disciplinary Basic Courses	必修 Compulsory	46.5	784	
	选修 Elective	0.0	0	
专业领域课 Specialty-related Courses	必修 Compulsory	11.0	224	
	选修 Elective	12.5	200	
合 计 Total		140.0	2292	
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	140.0+36.0=176.0			

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
2292	1932	360	1924	368	176	153.5	22.5	36	128.5	11.5	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	143091	中国近现代史纲要 Skeleton of Chinese Modern History	必修课	(32) 24				2.0	1	No8
	143093	思想道德修养与法律基础 Cultivation of Thought and Morals & Fundamental of Law		(40) (36)				2.5	2	No8
	143090	马克思主义基本原理 Fundamentals of Marxism Principle		(40) 36				2.5	3	No8
	143106	毛泽东思想和中国特色社会主义理论体系概论 Thought of Mao ZeDong and Theory of Socialism with Chinese Characteristics		(80) 48				5.0	4	No8
	143094	形势与政策 Analysis of the Situation & Policy		(128)				2.0	1-8	No8
	144001	大学英语 (一) College English(1)		64				4.0	1	No10
	144002	大学英语 (二) College English(2)		64				4.0	2	No10
	145223	大学计算机基础 Foundations of Computer		32				2.0	1	No5
	145268	C++程序设计基础 C++ Programming Foundations		48				3.0	2	No2No5
	152001	体育 (一) Physical Education (1)		32			32	1.0	1	No12
	152002	体育 (二) Physical Education (2)		32			32	1.0	2	No12
	152003	体育 (三) Physical Education (3)		32			32	1.0	3	No12
	152004	体育 (四) Physical Education (4)		32			32	1.0	4	No12
	106001	军事理论 Military Principle		(16)				1.0	2	No9
	141078	基础物理 (1) Fundamental of Physics(1)		48				3.0	1	No1No2
	141079	基础物理 (2) Fundamental of Physics(2)		64				4.0	2	No1No2
	141080	基础物理 (3) Fundamental of Physics(3)		48				3.0	3	No1No2
	141095	基础物理实验 (一) Physics Experiment(1)		32		32		1.0	2	No1No2
141096	基础物理实验 (二) Physics Experiment(2)	32		32		1.0	3	No1No2		

	140191	微积分 II (一) Calculus(1)		80				5.0	1	No1No2
	140192	微积分 II (二) Calculus(2)		80				5.0	2	No1No2
	140197	线性代数与解析几何 Linear Algebra & Analytic Geometry		48				3.0	1	No1No2
	140019	概率论与数理统计 Probability & Mathematical Statistics		48				3.0	2	No1No2
		人文科学领域 Humanities	通识课 E	96				6.0		No8
		社会科学领域 Social Science		64				4.0		No8
	合计 Total				1084		64	128	70.0	

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	130009	工程制图 Engineering Drawing	必 C	48				3.0	1	No2No5	
	141163	光学前沿 Advances in Optics	必 C	16				1.0	2	No2No4	
	135020	电路 II Electric Circuits	必 C	64				4.0	3	No2No4	
	135005	电路实验 Experiment of Circuit	必 C	16		16		0.5	4	No2No4	
	135034	模拟电子技术 II Analog Electronics	必 C	64				4.0	4	No2No4	
	135043	模拟电子技术实验 Experiment of Analog Circuits	必 C	16		16		0.5	4	No2No4	
	155081	数字电子技术 II Digital Electronics	必 C	64				4.0	5	No2No4	
	135045	数字电子技术实验 Experiment of Digital Electronics	必 C	16		16		0.5	5	No2No4	
	141153	光学 Optics	必 C	64				4.0	3	No2No10	
	141044	微机原理与应用 Principles and Application of Microcomputer	必 C	48	16			2.5	4	No2No3	
	141109	电动力学 Electrodynamics	必 C	48				3.0	4	No2	
	141119	数据结构 Data Structures	必 C	48	16			2.5	4	No2No10	
	141017	信号与系统 Signals and systems	必 C	64				4.0	5	No2No10	
	141047	信息论基础 Elements of Information Theory	必 C	48				3.0	5	No1No2	
	141058	通信原理 Communication Principles	必 C	48				3.0	6	No2No5 No10	
	141022	数字信号处理 III Digital Signal Processing III	必 C	64				4.0	6	No2No10	
	141050	光电技术 Photoelectric Technology	必 C	48				3.0	6	No2No4	
	合计 Total			必 C	784	32	48		46.5		
	ty	141168	数学物理方法 Methods of Mathematical Physics	必 C	48				3.0	3	No1No2

141045	信息光电子学 Information Optoelectronics	必 C	48				3.0	5	№2№10
141138	工程光学 Optical Engineering	必 C	32				2.0	5	№2№10
141154	专业基础实验 Special Basic Experiments	必 C	48		48		1.5	6	№3№4 №5
141113	专业实验 Special Experiments	必 C	48		48		1.5	7	№3№4 №5
141059	传感技术 Sense Technology	选 E	32				2.0	4	№1№2
141019	通信电路 Communication Circuit	选 E	48				3.0	5	№1№2 №5
141090	量子力学 Quantum Mechanics	选 E	48				3.0	5	№1№2
141103	颜色测量 Color Measurement	选 E	32				2.0	5	№1№4
141052	电子测量 Electronic Measurement	选 E	48				3.0	6	№1№4
141143	激光技术 Laser Technology	选 E	32				2.0	6	№1№4
141170	光纤通信 Optical Fiber Communications	选 E	48				3.0	6	№2№10
141041	数字图象处理 Digital Image Processing	选 E	48	16			2.5	6	№4№10
141129	嵌入式系统及应用 Embedded Systems	选 E	48		16		2.5	6	№4№5
141104	光谱学基础 Fundamental Spectroscopy	选 E	32				2.0	6	№2№10
141136	薄膜光学 Thin Film Optics	选 E	48				3.0	6	№2№10
141133	非线性光学基础 Fundamentals of Nonlinear Optics	选 E	32				2.0	6	№1№2
141093	波分复用(WDM)通信技术 Wavelength Division Multiplexing Technology	选 E	32				2.0	6	№2№10
141054	计算机通讯网 Computer Communication Network	选 E	48	24			2.5	7	№2№10
141172	光电信息与创业	选 E	16				1.0	7	№6№11
120003	创新研究训练 Innovation Research Training	选 E	32				2.0		№3№6
120004	创新研究实践 I Innovation Research Practice 1	选 E	32				2.0		№3№6
120005	创新研究实践 II Innovation Research Practice 2	选 E	32				2.0		№3№6
120006	创业实践 Entrepreneurial Practice	选 E	32				2.0		№3№6
合 计 Total		必 C	224		96		11.0		
		选 E	选修课修读最低要求 12.5 学分 minimum elective course credits required:12.5						

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 weeks Practice	授课 Hours Lecture			
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	№6
140173	电子工艺实习 II Practice of Electronic II	必 C	2周		2.0	5	№6
141084	课程设计(I) Course Design (I)	必 C	2周		2.0	6	№2№3
141085	课程设计(II) Course Design (II)	必 C	2周		2.0	6	№2№3
141171	课程设计(III) Course Design (III)	必 C	2周		2.0	7	№2№3
141083	生产实习 Production Practice	必 C	2周		2.0	7	№7№8
141125	毕业实习 Graduation Practice	必 C	4周		4.0	8	№10№11
141126	毕业设计 Graduation Design	必 C	15周		15.0	8	№6№10
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.