

应用物理学

Applied Physics

专业代码：070202

学制：4年

Program Code: 070202

Duration: Four years

培养目标：

培养基础扎实、掌握物理学基本理论与方法、具有较好的科学素养及一定的研究、开发和管理能力，具有创新、创业意识，具有竞争和团队精神，适应社会主义现代化建设，在物理学及其相关的高科技领域中从事科研、教学、技术开发、管理的创新型高级专门人才。

Educational Objectives:

Cultivate the innovative specialized talents with solid foundation, understanding the fundamental theories and methods of physics, with strong scientific perception and research, development and management abilities, with innovation and entrepreneurial awareness, with competition and team spirits, adapting to the socialist modernization construction, working in physics and the related high-tech fields engaged in scientific research, teaching, technology development, management.

毕业要求：

№1.基础知识：具有良好的数学基础、物理学专业知识、外语应用能力和基本实验技能，掌握电子技术、计算机技术、光电子技术等方面的应用基础知识和基本实验方法。

№2.问题分析：能够应用物理学专业知识的基本原理，识别、表达、并通过文献研究分析复杂科学或工程问题，以获得有效结论。

№3.研究：能够基于物理学原理并采用科学方法对复杂科学或工程问题进行研究，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。

№4.使用现代工具：能够针对复杂科学或工程问题，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。

№5.科学与社会：能够正确看待物理学原理、方法及其应用对人们日常生活、经济活动和社会所产生的潜在影响。

№6.职业规范：具有人文社会科学素养、社会责任感，能够在科学或工程实践中理解并遵守职业道德和规范，履行责任。

№7.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。

№8.沟通：能够就复杂科学或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。

№9.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.Fundamental Knowledge: Good knowledge of mathematics, physics, foreign language skills and basic experimental skills. An understanding the fundamental knowledge and experimental methods of electronics, computer science and optoelectronics.

№2.Problem Analysis: An ability to identify, formulate and analyze complex scientific or engineering problems, reaching to substantiated conclusions using the principles of physics.

№3.Research: An ability to conduct investigations of complex scientific or engineering problems based on the principles of physics and adopting scientific methods, including design of experiments, analysis and interpretation of data and synthesis of information to provide valid conclusions.

№4.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 or engineering activities, with an understanding of the limitations.

№5.Science and Society: A correct view of the potential impact of the principles, methods and applications of physics on people's daily life, economic activities and society.

№6.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.

№7.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.

№8.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.

№9.Lifelong Learning: With independent learning and lifelong learning awareness and the ability to learn continuously and adapt to developments.

专业简介:

华南理工大学应用物理学本科专业开办于 1986 年,1996 年更名为应用物理(光电信息与应用),2002 年新设光信息科学与技术专业招生,2003 年经过学校批准恢复应用物理学专业招生。2017 年应用物理学专业入选广东省高等学校重点专业。

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物理学一级学科的凝聚态物理、理论物理、声学等三个方向,同时在物理电子学、材料物理与化学等方向布局。研究领域顺应物理学的发展,具有特色鲜明、拓展性强等特点。

本专业现有 1 个本科专业实验室,实验室面积超过 300 平方,仪器设备总价值超过 400 万元。同时,应用物理学专业还包括声子晶体、高压物理和凝聚态物理实验平台等三个相关科研实验平台。

Program Profile:

The Applied Physics undergraduate program was founded in 1986. In 1996, it changed its name to Applied Physics (optoelectronic information and applications). In 2002, the new undergraduate program named by optical information science and technology was introduced. In 2003, Applied Physics undergraduate program was restarted. Applied Physics undergraduate program was selected as a key major of Guangdong Province.

We have 36 faculties, 30 (83%) of which have doctorate degrees, including 18 professors, 10 associate professors, 8 lecturers. The faculties have excellent ethics and professional knowledge. The scientific researches include condensed matter physics, theoretical physics and acoustics, as well as physical electronics, materials physics and chemistry. We have one undergraduate laboratory with more than 300 square meters and equipment of more than 4 million RMB. We also have three research laboratories covering phononic crystals, high pressure physics and condensed matter physics.

专业特色:

突出“夯实物理基础、注重实践创新、分流培养、面向国际”的特色。加强通识教育，培养物理基础扎实、掌握相关前沿学科领域最新研究动态、具有综合实践能力及一定的独立从事科学研究能力的创新型人才。

Program Features:

The program highlights the features of “strengthening the physics foundation, focusing on practical innovation, diversion training and international orientation.” Emphasize the general education and physics professional knowledge. Cultivate the innovative specialized talents with the comprehensive practical skills and the abilities to grasp the latest research trends in the field of related disciplines and to engage in scientific research.

授予学位: 理学学士学位

Degree Conferred: Bachelor of Natural Science

主干课程:

基础物理(1, 2, 3)、理论力学、数学物理方法、电动力学、热力学与统计物理、量子力学、固体物理、计算物理、电路与电子技术、数字电子技术 I。

Core Courses:

Fundamental of Physics (1, 2, 3), Theoretical Mechanics, Mathematical method for Physicists, Electrodynamics, Thermodynamics and Statistical Mechanics, Quantum Mechanics, Solid State Physics, Computational Physics, Electric Circuit and Electronics and Digital Electronics I.

特色课程:

全英语教学课程：基础物理(1, 2, 3)、量子力学、材料物理、数学物理方法

双语教学课程：固体物理、计算物理

研究型课程：固体物理、计算物理

新生研讨课：物理学的进化、宇宙的演化

MOOC：计算物理

本研贯通课：理论声学、电声学、固体物理 II、计算凝聚态物理、广义相对论与天体物理

创业教育课：物理学创新与创业

Featured Courses:

Courses Taught in English: Fundamental of Physics (1, 2, and 3), Quantum Mechanics, Materials Physics, And Mathematical Methods for Physicists.

Bilingual Courses: Solid State Physics I, Computational Physics

Research Courses: Solid State Physics, Computational Physics

Freshmen Seminars: The Evolution of Physics, the Evolution of the Universe

MOOCs: Computational Physics

Baccalaureate-Master's Integrated Courses: Theoretical Acoustics, Electroacoustics, Solid State Physics II, Computational Condensed Matter Physics, General Relativity and Astrophysics

Entrepreneurship Course: Physics Innovation and Entrepreneurship

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

学 年	学 期	教 学 进 度 安 排 (周)																			理 论 教 学	考 试	入 学 教 育	军 训	课 程 设 计	大 作 业	工 程 训 练	电 子 实 验	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	B	D	D	D	14	1	1	3													19				
	2	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	Q	Q	B	B	16	2											2			20					
	4	G	G	A	A	A	A	A	A	A	A	A	A	A	A	E	E	B	B	14	2		2	2											20					
三	5	H	H	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	A	E	E	B	B	16	2		2												20					
四	7	A	A	A	A	A	A	A	A	A	A	A	A	A	A	K	K	B	B	16	2							2							20					
	8	L	L	L	L	O	O	O	O	O	O	O	O	O	O	O	O	O	P											4		15	1			20				
合 计 (周)																			108	13	1	3	4		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	63.0	972	
	通识 General Education	10.0	160	
学科基础课 Disciplinary Basic Courses	必修 Compulsory	41.0	720	
	选修 Elective	0.0	0	
专业领域课 Specialty- related Courses	必修 Compulsory	6.0	128	
	选修 Elective	20.0	320	
合 计 Total		140.0	2300	
集中实践教学环节 (周) Practice Training (Weeks)	必修 Compulsory	34.0	34 周	
毕业学分要求 Credits Required for Graduation	140.0+34.0=174.0			

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	总学	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	分数 Total	必修学 分 Compulsory	选修学 分 Elective	集中实 实践教学 环节学 分 Practice- concentra ted 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 Entrepreneur ship Education
2300	1820	480	1912	388	174	144	30	34	128	12	13

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	143091	中国近现代史纲要 Skeleton of Chinese Modern History	必	(32) 24				2.0	1	No7
	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	No7
	143090	马克思主义基本原理 Fundamentals of Marxism Principle		(40) 36				2.5	3	No7
	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	No7
	143094	形势与政策 Analysis of the Situation & Policy		(128)				2.0	1-8	No7
	144001	大学英语 (一) College English(1)		64				4.0	1	No8
	144002	大学英语 (二) College English(2)		64				4.0	2	No8
	145223	大学计算机基础 Foundations of Computer		32				2.0	1	No4
	130009	工程制图 Engineering Drawing		48				3.0	1	No4
	145268	C++程序设计基础 C++ Programming Foundations		48				3.0	2	No4
	152001	体育 (一) Physical Education (1)		32			32	1.0	1	No9
	152002	体育 (二) Physical Education (2)		32			32	1.0	2	No9
	152003	体育 (三) Physical Education (3)		32			32	1.0	3	No9
	152004	体育 (四) Physical Education (4)		32			32	1.0	4	No9
	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 II (1)		80				5.0	1	No1
	140192	微积分 II（二） Calculus II (2)		80				5.0	2	No1
	140197	线性代数与解析几何 Linear Algebra & Analytic Geometry		48				3.0	1	No1
	140019	概率论与数理统计 Probability & Mathematical Statistics		48				3.0	2	No1
		人文科学领域 Humanities	通识课 E	96				6.0		No6
		社会科学领域 Social Science		64				4.0		No6
	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 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	141164	物理学的进化 The Evolution of Physics	必 C	16				1.0	1	No1
	141165	宇宙的演化 The Evolution of the Universe	必 C	16				1.0	2	No1
	135002	电路与电子技术 Electric Circuit and Electronics	必 C	64				4.0	3	No1No2
	135037	电路与电子技术实验 Experiment of Electric Circuits and Electronics	必 C	32		32		1.0	4	No1No2
	135044	数字电子技术 I Digital Electronics I	必 C	48		16		2.5	4	No1No2
	141064	理论力学III Theoretical Mechanics III	必 C	64				4.0	3	No1No2
	141168	数学物理方法 Mathematical Methods for Physicists	必 C	64				4.0	3	No1No2
	141110	计算物理 Computational Physics	必 C	64	20			3.5	4	No1No2
	141148	原子物理 Atomic Physics	必 C	64				4.0	4	No1No2
	141109	电动力学 Electrodynamics	必 C	48				3.0	4	No1No2
	141012	近代物理实验 Modern Physics Experiments	必 C	64		64		2.0	5	No1No2
	141090	量子力学 Quantum Mechanics	必 C	64				4.0	5	No1No2

	141065	热力学与统计物理 Thermodynamics and Statistical Physics	必 C	48				3.0	5	No1No2
	141089	固体物理 Solid State Physics	必 C	64				4.0	6	No1No2
	合 计 Total		必 C	720	20	112		41.0		
专业领域课 Specialty-related Courses	141017	信号与系统 Signals and systems	必 C	64				4.0	5	No2No3
	141112	专业实验（应物） Special Experiments for Applied Physics	必 C	64		64		2.0	7	No2No3
	147045	大学化学 General Chemistry	选 E	32				2.0	1	No2No3
	147036	大学化学实验 General Chemistry Experiment	选 E	16		16		0.5	2	No2No3
	141119	数据结构 Data Structure	选 E	48	16			2.5	4	No2No3
	141044	微机原理与应用 Micro-computer System	选 E	48	16			2.5	4	No2No3
	141045	信息光电子学 Information Opto-electronics	选 E	48				3.0	5	No2No3
	141156	理论声学 Theoretical Acoustics	选 E	48				3.0	5	No2No3
	141161	电动力学 II Electrodynamics II	选 E	32				2.0	5	No2No3
	141070	材料物理 Materials Physics	选 E	32				2.0	6	No2No3
	141144	半导体物理与器件 Semiconductor Physics and Devices	选 E	48				3.0	6	No2No3
	141052	电子测量 Electronic Measurement	选 E	48				3.0	6	No2No3
	141050	光电技术 Photoelectric Technology	选 E	48				3.0	6	No2No3
	141129	嵌入式系统及应用 Embedded Systems	选 E	48		16		2.5	6	No2No3
	141157	电声学 Electroacoustics	选 E	48				3.0	6	No2No3
	141089	固体物理 Solid State physics	选 E	32				2.0	7	No2No3
141162	计算凝聚态物理 Computational Condensed Matter Physics	选 E	48				3.0	7	No2No3	

141155	广义相对论与天体物理 General Relativity and Astrophysics	选 E	32				2.0	7	№2№3
141142	物理学前沿专题 Advanced Special Topics of Physics	选 E	32				2.0	7	№2№3
141173	物理学创新与创业 Physics Innovation and Entrepreneurship	选 E	16				1.0	7	№3№5 №9
120003	创新研究训练 Innovation Research Training	选 E	32				2.0		№3№5
120004	创新研究实践 I Innovation Research Practice I	选 E	32				2.0		№3№5
120005	创新研究实践 II Innovation Research Practice II	选 E	32				2.0		№3№5
120006	创业实践 Entrepreneurial Practice	选 E	32				2.0		№3№5
合 计 Total		必 C	128		64		6.0		
		选 E	选修课修读最低要求 20.0 学分 minimum elective course credits required:20						

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	№7
143197	马克思主义理论与实践 Marxism Theory and Practice	必 C	2 周		2.0	假期	№6
130356	工程训练 I Engineering Training	必 C	2 周		2.0	4	№3№4
141073	电子工艺实习 II Practice of Electronic II	必 C	2 周		2.0	5	№3№4
141151	计算物理课程设计 Course Design of Computational Physics	必 C	2 周		2.0	4	№3№4
141169	固体物理课程设计 Course Design of Solid State Physics	必 C	2 周		2.0	6	№3№4
141083	生产实习 Production Practice	必 C	2 周		2.0	7	№5
141125	毕业实习 Graduation Practice	必 C	4 周		4.0	8	№5

141126	毕业设计 Graduation Design	必 C	15 周		15.0	8	№3№4№5
合 计 Total		必 C	34 周		34.0		

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

In addition to the credits listed in the subject teaching curriculum, students are required to participate in extracurricular activities of Humanities Quality Education based on one’s interest, no less than two credits.

2) Basic Requirements of Innovative Ability Cultivation

In addition to the credits listed in the subject teaching curriculum, students are 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), no less than four credits.

应用物理学（严济慈英才班）

“NyTsi-Ze”Class of Applied Physics

专业代码：070202

学制：3+1 年

Program Code: 070202

Duration: 4 years

培养目标：

培养基础扎实、掌握物理学基本理论与方法、具有较好的科学素养及一定的研究、开发和管理能力，具有创新、创业意识，具有竞争和团队精神，适应社会主义现代化需要，科研思想活跃、国际视野开阔、具有逐步跻身国际一流科学家队伍潜力的科研骨干和领军学者。

本-博培养目标：培养掌握坚实宽广的基础理论、系统的专门知识、具有国际视野、能够独立从事科学研究，具有逐步跻身国际一流科学家队伍潜力的学术型领军学者

本-硕培养目标：培养数理基础扎实、综合能力强，具有逐步跻身国际一流科学家队伍潜力的学术骨干。

Educational Objectives:

Cultivate innovative specialized talents with solid foundation of the fundamental theories and methods of physics, strong scientific perception and basic research capability, strong skills of management innovation and entrepreneurial awareness, in addition to the competitive and team-work spirit adapting to the socialist modernization construction. Qualify for scientific research, teaching, technology development, management positions in physics and the related high-tech fields, with the scientific research and active thinking, international vision, and the potentials to be the key research fellow and the leading scholar.

毕业要求：

№1.基础知识：具有良好的数学基础、物理学专业知识、外语应用能力和基本实验技能，掌握电子技术、计算机技术、光电子技术等方面的应用基础知识和基本实验方法。

№2.问题分析：能够应用物理学专业知识的基本原理，识别、表达、并通过文献研究分析复杂科学或工程问题，以获得有效结论。

№3.研究：能够基于物理学原理并采用科学方法对复杂科学或工程问题进行研究，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。并能够在物理及其相关领域的具体问题中有初步创新性成果。

№4.使用现代工具：能够针对复杂科学或工程问题，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。

№5.科学与社会：能够正确看待物理学原理、方法及其应用对人们日常生活、经济活动和社会所产生的潜在影响。

№6.职业规范：具有人文社会科学素养、社会责任感，能够在科学或工程实践中理解并遵守职

业道德和规范，履行责任。

№7.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。

№8.沟通：能够就复杂科学或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。并具备很好的国际视野，能够在跨文化背景下进行沟通和交流。

№9.终身学习：具有突出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.Fundamental Knowledge: Good knowledge of mathematics, physics, foreign language skills and basic experimental skills. An understanding the fundamental knowledge and experimental methods of electronics, computer science and optoelectronics.

№2.Problem Analysis: An ability to identify, formulate and analyze complex scientific or engineering problems, reaching to substantiated conclusions using the principles of physics.

№3.Research: An ability to conduct investigations of complex scientific or engineering problems based on the principles of physics and adopting scientific methods, including design of experiments, analysis and interpretation of data and synthesis of information to provide valid conclusions. Primitive innovational work is required in physics related projects are required in the thesis for graduation.

№4.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 or engineering activities, with an understanding of the limitations.

№5.Science and Society: A correct view of the potential impact of the principles, methods and applications of physics on people's daily life, economic activities and society.

№6.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.

№7.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.

№8.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 smoothly in cross-cultural contexts with international perspective.

№9.Lifelong Learning: With outstanding independent learning and lifelong learning awareness and the ability to learn continuously and adapt to developments.

专业简介:

华南理工大学应用物理学本科专业开办于1986年,1996年更名为应用物理(光电信息与应用),2002年新设光信息科学与技术专业招生,2003年经过学校批准恢复应用物理学专业招生。2017年

设应用物理学（严济慈英才班）。

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物理学一级学科的凝聚态物理、理论物理、声学等三个方向，同时在物理电子学、材料物理与化学等方向布局。研究领域顺应物理学的发展，具有特色鲜明、拓展性强等特点。

本专业现有 1 个本科专业实验室，实验室面积超过 300 平方，仪器设备总价值超过 400 万元。同时，应用物理学专业还包括声子晶体、高压物理和凝聚态物理实验平台等三个相关科研实验平台。并有中国科学院物理所和中国散裂中子源中心（东莞）等合作培养单位的师资和科研设备支持。

Program Profile:

The Applied Physics undergraduate program was founded in 1986. In 1996, it changed its name to Applied Physics (optoelectronic information and applications). In 2002, the new undergraduate program named by optical information science and technology was introduced. In 2003, Applied Physics undergraduate program was restarted. In 2017, the “NyTsi-Ze” Class of Applied Physics program was set up.

We have 36 faculties, 30 (83%) of which have doctorate degrees, including 18 professors, 10 associate professors, 8 lecturers. The faculties have excellent ethics and professional knowledge. The scientific researches include condensed matter physics, theoretical physics and acoustics, as well as physical electronics, materials physics and chemistry. We have one undergraduate laboratory with more than 300 square meters and equipment of more than 4 million RMB. We also have three research laboratories covering phononic crystals, high pressure physics and condensed matter physics. Particularly, the faculties and facilities of Institute of Physics, CAS, as well as the China Spallation Neutron Source (Dong Guan) are available for the “NyTsi-Ze” Class of Applied Physics program.

专业特色:

应用物理学创新班与中国科学院物理所和中国散裂中子源中心（东莞）等联合培养，突出“研究型、国际化”的高端人才培养理念，以导师制的人才培养方式，探究出一条培养科研思想活跃、国际视野开阔、具有逐步跻身国际一流科学家队伍潜力的科研骨干和领军学者的成长道路。

Program Features:

The “NyTsi-Ze” Class of Applied Physics program highlights the talents training mode with the features of "research and international oriented". With the mentor full participating, cultivate the talents with scientific research and active thinking, international vision, and the potentials to be the key research fellow and the leading scholar.

授予学位: 理学学士学位

Degree Conferred: Bachelor of Natural Science

主干课程:

基础物理 (1, 2, 3)、理论力学、数学物理方法、电动力学、热力学与统计物理、量子力学、固体物理、计算物理、电路与电子技术、数字电子技术 I。

Core Courses:

Fundamental of Physics (1, 2, 3), Theoretical Mechanics, Mathematical method for Physicists, Electrodynamics, Thermodynamics and Statistical Mechanics, Quantum Mechanics, Solid State Physics, Computational Physics, Electric Circuit and Electronics and Digital Electronics I.

特色课程:

全英语教学课程: 基础物理(1, 2, 3)、量子力学、材料物理、数学物理方法

双语教学课程: 固体物理 I、计算物理

研究型课程: 固体物理、计算物理

新生研讨课: 物理学的进化、宇宙的演化

专题研讨课: 物理学前沿专题

MOOC: 计算物理

本研贯通课: 全部研究生专业硕士生课程

创业教育课: 物理学创新与创业

Featured Courses:

Courses Taught in English: Fundamental of Physics (1, 2, and 3), Quantum Mechanics, Materials Physics, and Mathematical Methods for Physicists.

Bilingual Courses: Solid State Physics, Computational Physics

Research Courses: Solid State Physics, Computational Physics

Freshmen Seminars: The Evolution of Physics, the Evolution of the Universe

MOOCs: Computational Physics

Baccalaureate-Master's Integrated Courses: Theoretical Acoustics, Electroacoustics, Solid State Physics II, Computational Condensed Matter Physics, General Relativity and Astrophysics

Entrepreneurship Course: Physics Innovation and Entrepreneurship

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

学 年	学 期	教 学 进 度 安 排 (周)																		理 论 教 学	考 试	入 学 教 育	军 训	课 程 设 计	大 作 业	工 程 训 练	电 子 实 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	B	D	D	D	14	1	1	3										19							
	2	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	Q	Q	B	B	16	2										2	20								
	4	G	G	A	A	A	A	A	A	A	A	A	A	A	A	E	E	B	B	14	2		2	2								20								
三	5	H	H	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	E	E	E	E	B	B	14	2		2				2					20								
四	7	研究生阶段学习，并完成本科毕业实习和毕业设计（论文）																		16	2									2						20				
	8																														4			15	1		20			
		合 计 (周)																		104	13	1	3	4		2	2					2	4		2	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	65.0	1036	
	通识 General Education	10.0	160	
学科基础课 Disciplinary Basic Courses	必修 Compulsory	41.0	720	
	选修 Elective	0	0	
专业领域课 Specialty- related Courses	必修 Compulsory	6.0	128	
	选修 Elective	15.0	240	
合 计 Total		137.0	2284	
集中实践教学环节 (周) Practice Training (Weeks)	必修 Compulsory	34.0	34 周	
毕业学分要求 Credits Required for Graduation	137.0+34.0=171.0			

备注：1. 分流出身严济慈英才班但申请留在该班的学生以及未获推免的学生，其毕业学分要求需达到普通班学分要求；
 2. 硕士、博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；
 3. 学生本科阶段在取得专业教学计划规定学分的同时，还必须第二课堂取得 2 个人文素质教育学分和 4 个创新能力培养学分。

2.类别统计表 (Category Registration Form)

学时 Academic Hours					学分 Credits						
总学时数 Total	其中 Include		其中 Include		总学分数 Total	其中 Include		其中 Include			其中 Include
	必修学时 Compulsory	选修学时 Elective	理论教学学时 Theory Course	实验教学学时 Lab		必修学分 Compulsory	选修学分 Elective	集中实践教学环节学分 Practice-concentrated Training	理论教学学分 Theory Course Credits	实验教学学分 Lab	创新创业教育学分 Innovation and Entrepreneurship Education
2284	1884	400	1896	388	171	146	25	34	125	12	13

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 C	(32) 24				2.0	3	N ₇
	143093	思想道德修养与法律基础 Cultivation of Thought and Morals & Fundamental of Law		(40) (36)				2.5	4	N ₇
	143090	马克思主义基本原理 Fundamentals of Marxism Principle		(40) 36				2.5	5	N ₇
	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	6	N ₇
	143094	形势与政策 Analysis of the Situation & Policy		(128)				2.0	1-8	N ₇
	144001	大学英语 (一) College English(1)		64				4.0	1	N ₈
	144002	大学英语 (二) College English(2)		64				4.0	2	N ₈
	130009	工程制图 Engineering Drawing		48				3.0	1	N ₄
	145268	C++程序设计基础 C++ Programming Foundations		48				3.0	1	N ₄
	145271	面向对象程序设计 Object-Oriented Programming		32				2.0	2	N ₄
	152001	体育 (一) Physical Education (1)		32			32	1.0	1	N ₉
	152002	体育 (二) Physical Education (2)		32			32	1.0	2	N ₉
	152003	体育 (三) Physical Education (3)		32			32	1.0	3	N ₉
	152004	体育 (四) Physical Education (4)		32			32	1.0	4	N ₉
	106001	军事理论 Military Principle		(16)				1.0	2	N ₉
	141078	基础物理 (I) Fundamental of Physics(1)		48				3.0	1	N ₁ N ₂
	141079	基础物理 (II) Fundamental of Physics(2)		64				4.0	2	N ₁ N ₂
	141080	基础物理 (III) Fundamental of Physics(3)		48				3.0	3	N ₁ N ₂

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	No1
140192	微积分 II（二） Calculus(2)		80				5.0	2	No1
140197	线性代数与解析几何 Linear Algebra & Analytic Geometry		48				3.0	1	No1
140019	概率论与数理统计 Probability & Mathematical Statistics		48				3.0	2	No1
140099	数学实验 Mathematical Experiment		64				2.0	4	No1No4
	人文科学领域 Humanities	通识课 E	96				6.0		No6
	社会科学领域 Social Science		64				4.0		No6
合 计 Total			1196		64	128	75.0		

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	141165	宇宙的演化 The Evolution of the Universe	必 C	16				1.0	1	No1
	141164	物理学的进化 The Evolution of Physics	必 C	16				1.0	2	No1
	135002	电路与电子技术 Electric Circuit and Electronics	必 C	64				4.0	3	No1No2
	135037	电路与电子技术实验 Experiment of Electric Circuits and Electronics	必 C	32		32		1.0	4	No1No2
	135044	数字电子技术 I Digital Electronics I	必 C	48		16		2.5	4	No1No2
	141064	理论力学III Theoretical Mechanics III	必 C	64				4.0	3	No1No2
	141168	数学物理方法 Mathematical methods for Physicists	必 C	64				4.0	3	No1No2
	141110	计算物理 Computational Physics	必 C	64	20			3.5	3	No1No2
	141148	原子物理 Atomic Physics	必 C	64				4.0	4	No1No2
	141109	电动力学 Electrodynamics	必 C	48				3.0	4	No1No2
	141012	近代物理实验 Modern Physics Experiments	必 C	64		64		2.0	5	No1No2
	141090	量子力学 Quantum Mechanics	必 C	64				4.0	5	No1No2

	141065	热力学与统计物理 Thermodynamics and Statistical Physics	必 C	48				3.0	5	№1№2
	141089	固体物理 Solid State Physics	必 C	64				4.0	6	№1№2
	合 计 Total		必 C	720	20	112		41.0		
专业领域课 Specialty-related Courses	141017	信号与系统 Signals and systems	必 C	64				4.0	5	№2№3
	141112	专业实验（应物） Special Experiments for Applied Physics	必 C	64		64		2.0	6	№2№3
	147045	大学化学 General Chemistry	选 E	32				2.0	1	№2№3
	147036	大学化学实验 General Chemistry Experiment	选 E	16		16		0.5	2	№2№3
	141119	数据结构 Data Structure	选 E	48	16			2.5	4	№2№3
	141044	微机原理与应用 Micro-computer System	选 E	48	16			2.5	4	№2№3
	141045	信息光电子学 Information Opto-electronics	选 E	48				3.0	5	№2№3
	141156	理论声学 Theoretical Acoustics	选 E	48				3.0	5	№2№3
	141161	电动力学 II Electrodynamics II	选 E	32				2.0	5	№2№3
	141070	材料物理 Materials Physics	选 E	32				2.0	6	№2№3
	141144	半导体物理与器件 Semiconductor Physics and Devices	选 E	48				3.0	6	№2№3
	141052	电子测量 Electronic Measurement	选 E	48				3.0	6	№2№3
	141050	光电技术 Photoelectric Technology	选 E	48				3.0	6	№2№3
	141129	嵌入式系统及应用 Embedded Systems	选 E	48		16		2.5	6	№2№3
	141157	电声学 Electroacoustics	选 E	48				3.0	6	№2№3
	141180	固体物理 Solid State physics	选 E	32				2.0	7	№2№3
	141162	计算凝聚态物理 Computational Condensed Matter Physics	选 E	48				3.0	7	№2№3
	141155	广义相对论与天体物理 General Relativity and Astrophysics	选 E	32				2.0	7	№2№3

141142	物理学前沿专题 Advanced Special Topics of Physics	选 E	32				2.0	7	№2№3
141173	物理学创新与创业 Physics Innovation and Entrepreneurship	选 E	16				1.0	7	№2№3
120003	创新研究训练 Innovation Research Training	选 E	32				2.0		№3№5
120004	创新研究实践 I Innovation Research Practice I	选 E	32				2.0	5	№3№5
120005	创新研究实践 II Innovation Research Practice II	选 E	32				2.0	6	№3№5
120006	创业实践 Entrepreneurial Practice	选 E	32				2.0		№3№5
合 计 Total		必 C	128		64		6.0		
		选 E	选修课修读最低要求 15.0 学分 minimum elective course credits required: 15						

备注：“严济慈英才班”学生必须参与相关的课外科研活动，并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）。每个学生须累计申请 4 个专业选修课学分，且累计申请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	№7
143197	马克思主义理论与实践 Marxism Theory and Practice	必 C	2 周		2.0	假期	№6
130356	工程训练 I Engineering Training	必 C	2 周		2.0	4	№3№4
141073	电子工艺实习 II Practice of Electronic II	必 C	2 周		2.0	5	№3№4
141151	计算物理课程设计 Course Design of Computational Physics	必 C	2 周		2.0	4	№3№4
141169	固体物理课程设计 Course Design of Solid State Physics	必 C	2 周		2.0	6	№3№4
141083	生产实习 Production Practice	必 C	2 周		2.0	7	№5
141125	毕业实习 Graduation Practice	必 C	4 周		4.0	8	№5
141126	毕业设计 Graduation Design	必 C	15 周		15.0	8	№3№4№5

合 计 Total	必 C	34 周	34.0		
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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，还必须在导师指导下参加科学实践活动，或参加国家创新创业训练计划或广东省创新创业训练计划、SRP（学生研究计划）、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 8 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

In addition to the credits listed in the subject teaching curriculum, students are required to participate in extracurricular activities of Humanities Quality Education based on one’s interest, no less than two credits.

2) Basic Requirements of Innovative Ability Cultivation

In addition to the credits listed in the subject teaching curriculum, students are 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), no less than four credits.