环境科学

Environmental Science

专业代码：082503　　**学 制：**4 年

Program Code: 082503　　**Duration：**4years

培养目标：

培养适应社会主义现代化建设需要和现代科学技术发展需要、德智体全面发展，具备扎实的自然科学与人文科学基础，具备计算机和外语应用能力，掌握环境科学专业的理论知识，具有创新、创造、创业精神和国际视野的高素质人才。毕业生应具有从事环境科学研究、环境监测、环境评价、环境教育、环境工程建设与运行管理等工作的能力。学生毕业五年后，预期可成为环境科学领域的骨干。

Educational Objectives:

Training our students to meet the needs of socialist modernization and the development of modern science and technology, who are all-round developed in moral, intellectual and physical qualities. The students are trained with natural science and humane studies, capable for practical applications with computer operation and foreign language. The students are well trained with theoretical knowledge in environmental science, who are innovative, creative, and entrepreneurship. The graduates should have the work capability to engage Environmental Science research, Environmental Monitoring, Environmental Assessment, Environmental Education, Environmental Engineering construction and Management, and etc. Five years after graduation, the graduates are anticipated to be the important members in the leadership in their engaged environmental science related directions.

毕业要求：

№1：工程知识：能够将数学与化学、生物等自然科学知识以及相关的工程技术基础理论和专业知识用于解决复杂的环境保护问题。

№2：问题分析：能够应用数学、自然科学和环境科学与管理学的基本原理，识别、表达并通过文献研究分析复杂环境保护问题，以获得有效的结论。

№3：设计 / 开发解决方案：能够设计针对复杂环境保护问题的解决方案，设计满足特定需求的系统、单元或工艺流程，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、文化及环境等因素。

№4：研究：能够基于环境科学领域的科学原理并采用科学方法对复杂环境保护问题进行研究，包括设计方案、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：能够针对复杂环境保护问题，开发、选择与使用适当的技术、资源、现代工程工具和网络信息技术工具，包括对复杂环境保护问题的预测与模拟，并能够理解其局限性。

№6：工程与社会：能够基于环境科学相关背景知识进行合理分析，评价环境保护实践和复杂环境保护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生态环境保护问题的工程实践活动对环境、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，能够在生态环境保护实践中理解并遵守职业道德和社会规范，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：能够就复杂环境保护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：理解和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 fundamental knowledge of mathematics, chemistry, and biology, and related engineering specialization to solve complex engineering problems.

№2.Problem Analysis: An ability to identify, formulate and analyze complex engineering problems, reaching to substantiated conclusions using basic principles of mathematics, natural science, and environmental science and management as well as professional references.

№3.Design / Development Solutions: An ability to design solutions for complex 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 environmental pollution problems based on scientific theories of environmental science 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 environmental problems, with an understanding of the limitations.

№6.Engineering and Society: An ability to apply reasoning analysis through professional knowledges in environmental science, evaluating the impacts and consequent resposibilities of solutions to environmental protections and practices to society, safety, laws and culture.

№7.Environment and Sustainable Development: An ability to understand and evaluate the impact of engineering practices of environmental protection in environmental and 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 environmental protection problems with the professional peers, 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: Recognition Awareness 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：

从 2004 年开始招收本科生。专业依托环境科学与工程一级学科博士点、广东省一级优势重点学科，以及挥发性有机污染物污染治理技术与装备国家工程实验室、工业聚集区污染控制与生态修复教育部重点实验室、大气环境与污染控制广东省重点实验室等 10 余个省部级以上研究平台。专业实验室面积 1000m^2，设有环境监测、环境生物学、环境化学、环境工程等专业教学实验室。实

验室布局合理、设施先进，拥有紫外分光光度计、离子色谱、原子吸收分光光度计、高效液相色谱、气相色谱等仪器设备。专业建有校外实习实践教学基地 13 个，专业建有校外实习实践教学基地 13 个，主要包括华南植物园、南沙湿地、广州开发区水质净化中心、广州第一热力资源总厂（李坑垃圾焚烧厂）、广州市石井污水处理厂、黄陂水质净化厂等。

Program Profile：

Started in 2004, we started to recruit undergraduate students. This major is constructed under the support of 10 provincial and ministerial level platforms including doctoral degree of environmental science and engineering in first class, the first class Key subject of Guangdong province in Environmental science and engineering, National Engineering Laboratory for Pollution Control Technology and Equipment of Volatile Organic Compounds, Key Lab Pollution Control & Ecosystem Restoration in Industry Cluster, Ministry of Education as well as Guangdong's Key Lab for Air Environment and Pollution Control. The major experimental area is over 1000 squares, containing professional teaching experimental labs including Environmental Monitoring, Environmental Biology, Environmental Chemistry, and Environmental Engineering. The experimental labs are appropriately designed with advanced equipments including UV spectrometry, ion chromatography, atomic absorption spectrometry, High performance liquid chromatography, and gas chromatography. The major have 13 practice bases including South China Botanical Garden, Nansha Wetland, Water Purified Plant of Guangzhou Development district, Guangzhou first thermal resource general factory（Liken Garbage combustion plant），Guangzhou Shijing Wastewater Treatment Plant, Huangpi Water Purified Plant, and Guangzhou Water Purified Plant in east area.

专业特色：

（1）本学院环境科学专业着重环境生态修复理论及应用；（2）小班教学模式，培养环境科学领域的精英人才；（3）共享本学院强大的环境工程专业平台，培养环境工程科学研究及管理的专业人才。

Program Features:

Special for theory and application in Environmental Bioremediation. Small class teaching mode to cultivate elite talents in the field of Environmental Science. Co-share the college's strong environmental engineering platform to train professionals in environmental engineering research and management.

授予学位：理学学士学位

Degree Conferred: Bachelor of Sciences

主干课程：

环境地学、环境化学、环境生态学、环境工程学、环境生物学、环境监测、环境规划与管理、环境质量评价、环境修复技术。

Core Courses:

Environmental geology, Environmental chemistry, Environmental ecology, Environmental Engineering, Environmental biology, Environmental monitoring, Environmental planning and management, Environmental quality assessment, Environmental remediation technology

特色课程：

双语教学课程：环境监测、环境化学、环境毒理学、大气污染控制工程
新生研讨课：环境人类与文明
专业研讨课：环境科学前沿
MOOC：现代环境分析技术
创业教育课程：环境经济学

Featured courses:

Bilingual courses: Environmental monitoring, Environmental toxicology, Prevention engineering in air pollution
Freshman seminar: Environmental human and civilization
Professional seminar: Frontiers in Environmental Science
MOOC: Modern Environmental Analytical Technology
Entrepreneurship Education: Entrepreneurship Practice

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	B	D	D	D	13	2	1	3															19
	2	A	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	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	E	E	Q	B	B	15	2			2												1		20
	4	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	E	E	Q	B	B	15	2			2												1		20
三	5	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	E	E	Q	B	B	15	2			2												1		20
	6	A	A	A	A	A	A	A	A	A	A	A	A	A	E	E	E	E	Q	B	B	13	2			4												1		20
四	7	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	Q	B	B	17	2															1		20
	8	L	L	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	Q	Q	Q												2			15		3		20
合计（周）																						105	14	1	3	10							2			15		9		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	57.0	876	
	通识 General Education	10.0	160	
学科基础课 Disciplinary Basic Courses	必修 Compulsory	24.5	480	
	选修 Elective	0.0	0	

专业领域课 Specialty- related Courses	必修 Compulsory	22.0	400	
	选修 Elective	18.5	296	
合计 Total		132.0	2212	
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	132.0+34.0=166			

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
2212	1756	456	1732	464	166	137.5	28.5	34	122.5	14.5	10

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	必修课 C	(32) 24				2.0	1	№8
	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	№8,12
	143090	马克思主义基本原理 Fundamentals of Marxism Principle		(40) 36				2.5	3	№8,12
	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
	143094	形势与政策 Analysis of the Situation & Policy		(128)				2.0	1-8	№8,12
	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
	152002	体育（二） Physical Education (2)		32			32	1.0	2	№9
	152003	体育（三） Physical Education (3)		32			32	1.0	3	№9
	152004	体育（四） Physical Education (4)		32			32	1.0	4	№9
	106001	军事理论 Military Principle		(16)				1.0	2	№8
	141001	大学物理（一） General Physics I (1)		48				3.0	2	№1
	141002	大学物理（二） General Physics I (2)		48				3.0	3	№1
	141007	大学物理实验（一） College Physical Experiment (1)		32		32		1.0	2	№4
	141008	大学物理实验（二） College Physical Experiment (2)		32		32		1.0	3	№4
	140189	微积分（一） Calculus I (1)		80				5.0	1	№1
	140190	微积分（二） Calculus I (2)		64				4.0	2	№1
	130139	工程制图（一） Engineering Drawing (1)		48				3.0	**3**	№1,3
	130140	工程制图（二） Engineering Drawing (1)		32				2.0	**4**	№1,3
	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

		人文社科领域 Humanities	通识课	96				6.0		№8,9,11
		社会科学领域 Social Science		64				4.0		№8,9,11
	合 计 Total			1036		64	128	67.0		
学科基础课 Disciplinary Basic Courses	147001	无机化学I Inorganic Chemistry	必C	32				2.0	1	№1
	147034	无机化学实验（工科）（一） Experiment of Inorganic Chemistry I	必C	16		16		0.5	1	№4
	147035	无机化学实验（工科）（二） Experiment of Inorganic Chemistry II	必C	16		16		0.5	2	№4
	147020	有机化学I Organic Chemistry (1)	必C	48				3.0	2	№1
	147007	有机化学实验I Organic Chemistry Experiment I	必C	32		32		1.0	2	№4
	147008	分析化学I Analytical Chemistry I	必C	32				2.0	3	№1
	147013	分析化学实验II Analytical Chemistry Experiment I	必C	32		32		1.0	3	№4
	147058	物理化学I Physical Chemistry (1)	必C	48				3.0	4	№1
	147055	物理化学实验 1 Physical Chemistry Experiment I	必C	32		32		1.0	5	№4
	169001	环境学导论 Introduction to Environment	必C	32				2.0	1	№1,4,6,7,10
	169190	环境与人类文明 Environment and human civilization	必C	16				1.0	1	№6,7
	169013	环境生态学 Environmental Ecology	必C	32				2.0	3	№1,2,7
	169015	环境化学 Environmental Chemistry	必C	32				2.0	4	№1,2,7,10
	169199	环境化学实验 Environmental Chemistry Experiment	必C	16		16		0.5	4	№4
	169200	计算机数据与图形应用 Computer Data and Graphics Applications	必C	64	32			3.0	4	№1,4,5
	合 计 Total		必C	480	32	144		24.5		
专业领域课 Specialty- related Courses	169179	环境地学 Environmental Geology	必C	32				2.0	3	№1,2
	169009	环境生物学 Environmental Biology	必C	48				3.0	3	№1,2
	169201	环境生物学实验 Environmental Biology Experiment	必C	16		16		0.5	3	№4
	169016	环境监测 Environmental Monitoring	必C	32				2.0	4	№2,3,10
	169202	环境监测实验 Environmental Monitoring Experiment	必C	16		16		0.5	5	№4
	169029	环境修复技术 Environmental Remediation Technology	必C	32				2.0	6	№2,3,7
	169025	环境经济学 Environmental Economics	必C	32				2.0	5	№3,11
	169203	环境科学综合实验 Comprehensive Experiment for Environmental Sciences	必C	48		48		1.5	6	№2,4,9

	169017	环境质量评价 Environmental Quality Assessment	必C	32				2.0	5	№3,5,6,7
	169012	环境规划与管理 Environmental Planning and Management	必C	32				2.0	4	№1,3,6,7,11
	169026	环境工程学 Environmental Engineering Sciences	必C	48				3.0	6	№2,3
	169204	环境工程学实验 Experiment for Environmental Engineering Sciences	必C	16		16		0.5	6	№2,4
	169205	环境科学前沿 Seminar in Frontier Environmental Science	必C	16				1.0	6	№3,4
	169019	科技文献检索 Search in Scientific Literature	选E	16				1.0	3	№5
	169033	环境统计学 Environmental Statistics	选E	24				1.5	4	№11
	169046	现代环境分析技术 Environmental Remediation Technology	选E	32				2.0	5	№3,6,7
	169037	环境毒理学 Environmental Toxicology	选E	24				1.5	5	№6,7
	136115	流体力学与传热 II Fluid mechanics and Heat Transfer II	选E	48				3.0	5	№6,7,10
	169041	环境信息系统 Environmental Information System	选E	24				1.5	5	№6,7
	169071	物理性污染控制 Physical Pollution Control	选E	32				2.0	5	№6,7
	169032	水环境化学 Water Environmental Chemistry	选E	24				1.5	5	№6,7
	169045	室内环境检测与控制 Indoor Environmental Monitoring and Control	选E	24				1.5	5	№6,7
	169027	环境法学 Environmental Laws	选E	24				2.0	5	№7
	169042	海洋环境保护 Marine Environmental Protection	选E	24				1.5	6	№7
	169049	职业健康 Occupational Health	选E	24				1.5	6	№6
	170013	传质与分离工程 Mass Transfer and Separation Engineering	选E	48				3.0	6	№6,7
	169038	大气污染控制工程 Air Pollution Control Engineering	选E	48				3.0	6	№6,7
	169191	环境科学与工程专业英语 Professional English in Environmental Science and Engineering	选E	16				1	6	№10
	169181	水污染控制工程 Water Pollution Control Engineering	选E	64				4.0	6	№6,7
	169206	环境纳米材料 Environmental Nanomaterials	选E	24				1.5	6	№6,7
	169192	固体废物处理与处置 Solid Waste Treatment and Disposal	选E	32				2.0	7	№6,7
	169030	土壤环境学 Soil Environmental Science	选E	24				1.5	7	№7
	120003	创新研究训练 Innovative Research Training	选E	32				2.0		№4,12
	120004	创新研究实践 I Innovative Research Practice I	选E	32				2.0		№4,12
	120005	创新研究实践 II Innovative Research Practice I	选E	32				2.0		№4,12

	120006	创业实践 Entrepreneurship Practice	选 E	32				2.0		№4,12
	合计 Total		必 C	400		96		22.0		
			选 E	选修课修读最低要求 18.5 学分 minimum elective course credits required:18.5 credits						

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。

Remarks: Students can obtain certain credits through Research Training Project, Course Competition, Research Papers, Patents and Self-Entrepreneurship, and the courses include Innovative Research Training, Innovative Research Practice I and II, and Entrepreneurship Practice. The maximal credits are 4.

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 Credits	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	№8,9
143197	马克思主义理论与实践 Marxism Theory and Practice	必 C	2 周		2.0	假期	№8
169180	认识实习 Engineering Training I	必 C	1 周		1.0	2	№6,8
169126	环境生态实践 Environmental Ecology Practice	必 C	2 周		2.0	3	№2,3,6
169128	环境监测实践 Environemtnal Monitoring Practice	必 C	3 周		3.0	4	№2,3,6
169057	环境评价课程设计 Course Project of Environmental Assessment	必 C	2 周		2.0	5	№2,3,10,12
169127	环境规划实践 Environmental Planning Practice	必 C	2 周		2.0	6	№2,3,6
169060	环境工程设计 Environmental Engineering Design	必 C	2 周		2.0	6	№3,10,11,12
169061	毕业实习 Graduation Practice	必 C	2 周		2.0	8	№6,7,8,9
169092	毕业论文 Graduation Project	必 C	15 周		15.0	8	№2,3,4,5,11,12
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

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.