Engineering Pilot Class
(Intelligent Chemical & Low-Carbon Engineering)

Introduction to Engineering Pilot Class (Intelligent Chemical & Low-Carbon Engineering)

Relying on the School of Chemistry and Chemical Engineering, the School of Light Industry Science and Engineering, and the School of Environment and Energy, this engineering experimental class is designed to cultivate talents capable of meeting the demands of national economic development and modernization. Graduates will be socially responsible professionals with strong ethics, a solid foundation in chemistry, chemical engineering, light industry, and environmental science and engineering, as well as expertise in industrial intelligence. They will possess the comprehensive skills to address complex scientific and engineering challenges in low-carbon engineering, alongside an international perspective and a deep sense of national commitment.. The program cultivates 'triple-innovation' talents (encompassing innovation, creativity, and entrepreneurship) with comprehensive ability to solve complex scientific and engineering problems in the field of low-carbon engineering and have both international vision and national sentiment. Students of the Experimental Class of Engineering (Intelligent Chemical & Low-Carbon Engineering) will enter the stage of professional cultivation after one year's cultivation in the large class.

Cultivation Features of Engineering Pilot Class (Intelligent Chemical & Low-Carbon Engineering):

The Engineering Pilot Class (Intelligent Chemical & Low-Carbon Engineering) builds a platform of professional class courses to strengthen students' foundation in their disciplines, promote their all-round growth and success, meet their needs for personalized and diversified development, and lay a foundation for their long-term development. The curriculum system highlights the cultivation characteristics of thick foundation, wide aperture and ability, involving the fields of applied chemistry, chemical engineering, light chemical engineering, environment, energy chemical engineering, pharmaceutical engineering and biopharmaceuticals, materials, carbon neutrality, intelligent manufacturing, etc.; while consolidating students' professional foundation, the teaching of professional education and courses is empowered by artificial intelligence to cultivate students' ability to comprehensively apply intelligent technology; students are encouraged to carry out scientific research and practice. Highlighting the cultivation of innovation awareness, innovation ability, creativity, entrepreneurship and internationalization awareness and ability. Through the phased cultivation of major categories and majors, we aim to cultivate 'triple-innovation' (encompassing innovation, creativity, entrepreneurship) and well-rounded undergraduates with comprehensive development in ethical, intellectual, physical, aesthetic, and labor education,, having solid basic theories and fundamental knowledge, strong professional practical ability, high scientific research literacy, and an outstanding sense of nationalism and a global outlook.

Candidates for Engineering Pilot Class (Intelligent Chemical & Low-Carbon Engineering):

Students enter the professional training stage after confirming their major. There are 8 professional education and training channels in the Engineering Pilot Class (Intelligent Chemical & Low-Carbon Engineering), mainly for the following majors:

1. Chemical Engineering and Technology
2. Applied Chemistry
3. Energy Chemical Engineering
4. Pharmaceutical Engineering
5. Light Chemical Engineering
6. Resource and Environmental Science
7. Environmental Engineering
8. Environmental Science and Engineering

1. Registration Form of Curriculum Credits

Course Category	Requirement	Credits	Academic Hours	Remarks
General Basic Courses	Compulsory	31.0	456	
	General	10.0	160	

Professional Basic Courses	Compulsory	6.0	112	
Elective Courses	Elective	2.0	32	
Total	49.0			

2. Courses Schedule

Course Category	Course No.	Course Title	C/E	Total Curriculum Hours					Credits	Term
				Class Hours	Theoretical class hours	Lab Hours	Practice Hours	Other Hours		
General Basic Courses	044101383	Academic English (1)	C	32	32				2.0	1
	044102452	Academic English (2)	C	32	32				2.0	2
	084101181	Introduction to Artificial Intelligence	C	36	24	12			2.0	1
	052100332	Physical Education (1)	C	36				36	1.0	1
	052100012	Physical Education (1)	C	36				36	1.0	2
	045102811	Python Language Programming	C	40	32			8	2.0	2
	040100591	Calculus I (1)	C	80	80				5.0	1
	040100662	Calculus I (2)	C	64	64				4.0	2
	074102992	Engineering drawing	C	48	48				3.0	1
	041100582	College physics I (I)	C	48	48				3.0	2
	040100401	Linear Algebra and Analytical Geometry	C	48	48				3.0	1
	040100023	Probability Theory and Mathematical Statistics	C	48	48				3.0	2
		Humanities, Social Sciences	General	128	128				8.0	
		Science and Technology		32	32				2.0	
	Total		C	548	456	12		80	31.0	
Specialty Basic Courses	037102522	Inorganic Chemistry	C	32	32				2.0	1
	047101161	Inorganic Chemistry Laboratory (1)	C	16		16			0.5	1
	047101201	Inorganic Chemistry Laboratory (1)	C	16		16			0.5	2
	037101515	Analytical Chemistry	C	32	32				2.0	2
	037103131	Experiment safety training	C	16	16				1.0	1
	合计		C	112	80	32			6.0	
Elective Courses	069102531	Clean Water Password-Crisis Solution	E	16	16				1.0	1
	069102581	Earth Healer- Rebirth of Fertile Soil	E	16	16				1.0	1
	069102541	Smart Oasis - Carbon Conversion and New Energy	E	16	16				1.0	1
	047101821	Introduction to Chemical Engineering	E	16	16				1.0	1

Course Category	Course No.	Course Title	C/E	Total Curriculum Hours					Credits	Term
				Class Hours	Theoretical class hours	Lab Hours	Practice Hours	Other Hours		
	037103041	Introduction to Applied Chemistry	E	16	16				1.0	1
	047101632	Internet of Energy and Smart Energy	E	16	16				1.0	1
	037103091	Smart Drugs	E	16	16				1.0	1
	038101721	Intelligent Manufacturing for Light Industry	E	16	16				1.0	1
	038101691	Natural Materials Exploration	E	16	16				1.0	1
	038101121	Plants 36 Counts	E	16	16				1.0	1
	038101711	Paper for the Future	E	16	16				1.0	1
	069102561	Green Energy-Advanced Battlegrounds	E	16	16				1.0	2
	069102571	Under the Dome-Hunting Climate Change and Air Pollution	E	16	16				1.0	2
	069102551	Rebirth of the Abandoned City- The Golden Touch of Solid Waste	E	16	16				1.0	2
	069102181	The Development and Prospect of the Water Supply and Drainage Industry	E	16	16				1.0	2
	037103081	Introduction to Fine Chemistry	E	16	16				1.0	2
	037103101	Introduction to Energy Chemistry	E	16	16				1.0	2
	037103071	Introduction to Pharmaceutical Engineering	E	16	16				1.0	2
	037103121	Molecular Creation and Evolution	E	16	16				1.0	2
	038101741	Paper-based Functional Materials	E	16	16				1.0	2
	038101701	Biomass and Modern Life	E	16	16				1.0	2
	Total		E	The freshman seminar requires a minimum of 1 credit per semester						

3. Educational plans after professional streaming

Full details are given in educational plans for each specialty.

Environmental Engineering
Program Code: 082502 Duration: 4 years

Educational Objectives:

This program is designed to develop high-quality engineering and technical professionals who align with the demands of socialist modernization and advances in modern science and technology. Students are expected to achieve comprehensive development in moral, intellectual, physical, aesthetic, and labor dimensions, establish a solid foundation in both natural sciences and humanities, acquire proficient computer and foreign language application skills, and master the theoretical knowledge of environmental engineering. Additionally, they should cultivate an international outlook and a spirit of innovation, creativity, and entrepreneurship. Graduates will be equipped to undertake tasks such as project planning, design, construction, operation, management, scientific research, and education in the field of environmental engineering. It is anticipated that within five years after graduation, they will emerge as leading interdisciplinary engineering talents with a strong sense of patriotism and a global perspective in environmental engineering.

(1) Solid basic knowledge: Master the basic theories of natural sciences such as mathematics, physics, chemistry and life sciences, and possess the core knowledge system of environmental engineering. Proficient in engineering principles and methods in the fields of water/air/solid/soil pollution prevention and control, carbon neutrality theory and technology, and resource recycling and utilization; Be familiar with national ecological and environmental policies, regulations, industry standards and international conventions, and understand engineering ethics and social responsibility.

(2) Problem-solving ability: Possess the full-cycle implementation capability for pollution control projects, including planning, design, construction and operation and maintenance. Be capable of conducting cutting-edge and low-carbon scientific and technological research and development by applying modern tools. Conduct environmental risk assessment using systems thinking; Master and proficiently apply digital tools such as big data analysis, artificial intelligence, and model simulation to solve complex environmental engineering problems.

(3) Teamwork and leadership skills: Develop interdisciplinary team collaboration capabilities and possess technical leadership and project management qualities; Establish the concept of ecological civilization and be capable of conducting sustainable development impact assessments for engineering projects. With an international perspective, understand the differences in environmental governance and collaborative paths in a multicultural context.

(4) Lifelong learning ability and global consciousness: Possess an innovative consciousness and the ability to transform scientific research achievements; Establish a lifelong learning framework to adapt to the rapid iterative development trend of science and technology, and promote the progress and transformation of environmental engineering science and technology; Form forward-looking thinking to address global challenges such as environmental pollution and climate change.

Graduation Requirements:

№1. Engineering Knowledge: Be able to use basic knowledge of mathematics, natural sciences, relevant engineering fundamental theories and expertise to develop solutions to solve complex engineering problems.

№1.1 Master the knowledge of mathematics and be able to use mathematics to describe, deal with and evaluate engineering problems, and be able to lay a solid mathematical foundation for basic engineering calculations and simulations.

№1.2 Master the knowledge of chemistry, microbiology and other natural sciences, which provides a solid basis to identify and analyze key problems involved in complex environmental engineering.

№1.3 Understand the basics of physics, mechanics, electricity, etc. in environmental engineering, master the engineering theories of fluid mechanics, mass transfer and separation, engineering drawing, etc., and be able to lay an engineering foundation to analyze, identify and describe the processes of equilibrium and transfer of matter and energy in complex environmental engineering problems.

№1.4 Understand the root causes, current situation and coping strategies of environmental problems, master the basics of environmental microbiology, environmental monitoring, chemical engineering principles, etc., and understand the basic theories and grounds of environmental engineering.

№1.5 Master the principles of engineering treatment of pollutants in water, gas, solid and other media, unit operations and

technical means, master the basic theories of relevant majors to solve complex environmental engineering problems.

№2. Problem Analysis: Be able to use basic principles of mathematics, natural sciences and engineering sciences to identify, formulate, study and analyze complex environmental engineering problems for valid conclusions.

№2.1 Master the knowledge of mathematics, chemistry, microbiology and other natural sciences, be able to translate and formulate environmental engineering problems into problems of the corresponding field for analysis.

№2.2 Master the basic principles of environmental engineering, analyze complex engineering problems in the field of environmental engineering and get solutions to relevant engineering problems.

№2.3 Apply engineering basis and basic professional principles, conduct literature research, study and analyze complex engineering problems in the field of environment, correctly express the solution of the problem and obtain effective conclusions.

№3. Design/Development of Solutions: Be able to design solutions for complex engineering problems, as well as systems, units or processes to meet standards and clients' needs with innovation, and take due account of factors such as society, health, safety, laws, culture and environment.

№3.1 Have basic and professional knowledge of environmental engineering and be able to define design objectives based on complex environmental engineering problems.

№3.2 Be able to demonstrate the feasibility of engineering projects within the constraints of public health, safety, culture and society.

№3.3 Be able to choose the optimal pollution control process through research or modeling with innovation, and perform calculations for systems and units (components).

№3.4 Be able to present design results in the form of drawings, reports, etc.

№4. Research: Be able to use research methods to study complex engineering problems and systems, including research based on knowledge, design experiments, analysis and interpretation of data, and synthesis of information to provide effective conclusions.

№4.1 Understand the basic status quo of research and development trends in the field of environmental engineering at home and abroad.

№4.2 Master the basic principles and methods of experiments in physics, chemistry, microbiology and other experiments related to environmental engineering.

№4.3 Master the basic experimental methods of engineering treatment of pollutants in water, gas, solid and other media, consolidate the understanding of the basic theoretical knowledge of the major and improve hands-on skills.

№4.4 Be able to design experiments for the study of complex environmental engineering problems, collect, analyze and interpret data using reasonable means, and obtain effective conclusions in a comprehensive manner.

№5. Use of Modern Tools: Be able to develop, select, and apply appropriate technologies, resources, and modern engineering and information technology tools aiming at complex environment and engineering problems, including prediction, modeling and recognition of the limitations of complex engineering problems.

№5.1 Master the methods of literature retrieval by web searching tools, master the basic methods of data searching and use modern information technologies to obtain information related to the environmental engineering major.

№5.2 Select and use appropriate modern engineering tools and information technology tools for the definition of engineering problems and expression of solutions.

№5.3 Apply appropriate tools and resources to predict or simulate the operation and effectiveness of solutions to complex environmental engineering problems, and be able to understand their limitations.

№6. Engineering and Sustainable Development: Be able to understand and evaluate the impact of professional engineering practice for complex environmental science and engineering problems on sustainable development of society and environment.

№6.1 Have internship and practical experiences related to the environmental engineering major.

№6.2 Be familiar with technical standards, intellectual property rights, industrial policies and laws and regulations related to the field of environmental engineering.

№6.3 Be able to identify, quantify, analyze and evaluate the social, health, safety, legal and cultural impacts of the development and application of environmental engineering technologies and processes.

№6.4 Understand the impact of historically significant environmental events on sustainable development of society and environment.

№6.5 Understand and evaluate the impact of professional engineering practice for complex environmental engineering problems on the environment.

№6.6 Master the evaluation methods of the impact of professional engineering practice for complex environmental engineering problems on sustainable development of society.

№7. Engineering Ethics and Professional norms: Understand and master scientific world outlook and methodology. Have good ideological and social morality. Have humanities and social sciences qualities, social responsibility, be able to understand and comply with the ethics and norms of the engineering profession and fulfill the responsibilities in the practice of environmental science and engineering.

№8.1 Understand the basic significance of worldview and outlook on life and their implications.

№7.1 Understand and master the scientific worldview and methodology, and possess good ideological and moral qualities as well as social morality.

№7.2 Have a sense of patriotism and social responsibility, and be able to practice the core socialist values.

№7.3 Understand the current social development and military situation.

№7.4 Develop better humanities and social sciences qualities.

№7.5 Develop personal physical fitness and perseverance, develop a sense of public welfare, and improve professionalism and a sense of social responsibility.

№7.6 Participate in various professional practice activities, develop good engineering ethics and fulfill responsibilities.

№8. Individual and Team: Be able to effectively play a role as an individual, member or leader against a multidisciplinary background.

№8.1 Understand the role of the individual in a multidisciplinary team and be able to collaborate with team members.

№8.2 Be able to coordinate team members in group activities and possess a certain level of leadership skills.

№9. Communication: Be able to effectively communicate and exchange complex environmental science and engineering issues with industry peers and the general public, including report and document writing, presentations, clear expression, or response to instructions, and possess a certain international perspective, be able to communicate and exchange in a cross-cultural background.

№9.1 Master a foreign language and be able to apply it against the background of environmental engineering.

№9.2 Be able to effectively communicate and exchange complex environmental engineering issues with industry peers and the general public through oral and written methods.

№9.3 Be able to communicate and exchange in a cross-cultural background, with a certain international perspective.

№9.4 Be able to express personal thoughts on current international hot issues related to environmental engineering profession.

№10. Project Management: Understand and master the principles of engineering management and economic decision-making methods, and be able to apply them in a multi-disciplinary environment.

№10.1 Master the basic principles and methods of engineering management.

№10.2 Master the basic theories and methods of economic decision-making in engineering.

№10.3 Be able to apply the principles of engineering management and economic decision-making methods to professional engineering practice.

№11. Lifelong Learning: Possess awareness of self-directed and lifelong learning and the ability to constantly learn and adapt to development.

№11.1 Establish the concept of the importance of lifelong learning for self-development.

№11.2 Be able to continuously conduct self-learning and self-exercise through appropriate approaches and methods.

№11.3 Be able to demonstrate the achievement through self-learning and pave the way for lifelong learning.

Educational objectives / **Outcomes**	**Objective 1**	**Objective 2**	**Objective 3**	**Objective 4**

Graduation requirement 1	●			
Graduation requirement 2		●		
Graduation requirement 3		●		
Graduation requirement 4		●		
Graduation requirement 5	●	●		
Graduation requirement 6	●		●	●
Graduation requirement 7				●
Graduation requirement 8	●			●
Graduation requirement 9			●	
Graduation requirement 10			●	
Graduation requirement 11		●		●

Professional Introduction：

The Environmental Engineering program traces its origins to disciplines such as chemistry, chemical engineering, and light industry in the 1970s, and commenced undergraduate enrollment in 1998. In 2010, it was accredited as a Guangdong Provincial Characteristic Specialty Construction Site, and in 2020, it was further approved as a National First-Class Undergraduate Program Construction Site. The program has successfully passed the National Engineering Education Professional Certification on three occasions—in 2011, 2014, and 2017. Since 2013, it has been continuously involved in the Ministry of Education's Deepening Comprehensive Reform Initiative and has been rated as an A- discipline in national evaluations.

The program offers a doctoral degree in Environmental Science and Engineering under the first-level discipline and is recognized as a Guangdong Provincial First-Level Key Discipline. It also hosts more than 10 research platforms at or above the provincial-ministerial level, including the National Engineering Laboratory for Volatile Organic Pollutants Control Technology and Equipment, the Ministry of Education Key Laboratory of Pollution Control and Ecological Restoration in Industrial Agglomeration Areas, and the Guangdong Provincial Key Laboratory of Atmospheric Environment and Pollution Control.

The program is supported by a strong academic team, includes 15 national and provincial high-level talents, with 94% of the faculty holding senior professional titles. The teaching and research laboratories occupy a total area of 1,000 square meters, housing specialized labs in areas such as water pollution control engineering, air pollution control engineering, solid waste treatment and disposal, environmental engineering microbiology, physical pollution control, environmental monitoring, industrial wastewater treatment, environmental analysis, and ecological restoration. The laboratories are rationally designed and equipped with advanced instruments, including high-performance liquid chromatography, gas chromatography, ion chromatography, ultraviolet spectrophotometers, atomic absorption spectrophotometers, among others, with a total asset value exceeding RMB 7.3 million.

In addition, the program has established 27 off-campus practice and teaching bases, including facilities such as the Guangzhou Development Zone Water Purification Center, Guangzhou Huadu Water Supply Co., Ltd., Lejiao Water Purification Plant and Shijing Water Purification Plant under Guangzhou Water Purification Co., Ltd., as well as Guangzhou First and Third Thermal Power Plants.

Professional features:

1.The program fosters students' practical engineering competencies through a close integration of theoretical and practical components, coupled with their active engagement in faculty-led research or engineering projects.
2.Distinguished experts in environmental engineering are invited to contribute to the instruction of core courses and provide practical guidance.

3.The program is oriented towards addressing real-world engineering challenges and advancing the global technological frontier. It focuses its expertise on water pollution control engineering, atmospheric pollution control engineering, solid waste treatment and disposal, and environmental biotechnology.

Degree Conferred: Bachelor of Engineering

Core Courses:

Fluid Mechanics and Heat Transfer II; Mass Transfer and Separation Engineering II; Introduction to Environmental Science; Water Pollution Control Engineering; Air Pollution Control Engineering; Solid Waste Treatment and Disposal; Environmental Engineering Microbiology; Environmental Quality Assessment; Environmental Chemistry; Engineering Design, Construction and Management; Comprehensive Experiment of Environmental Engineering.

Featured Courses

Freshmen Seminars: Clean Water Password-Crisis Solution, Earth Healer- Rebirth of Fertile Soil, Smart Oasis- Carbon Conversion and New Energy, Green Energy-Advanced Battlegrounds, Under the Dome-Hunting Climate Change and Air Pollution, Rebirth of the Abandoned City- The Golden Touch of Solid Waste, The Development and Prospect of the Water Supply and Drainage Industry

Academic Frontier courses: Theory and Technology of Carbon Neutrality, Artificial Intelligence and Environmental Modeling, Environmental Applications and Practices of Large Language Models, Environmental Modeling From Air Pollution to Carbon Emission, Carbon Neutrality Pathways in High Carbon Industry, Fundamentals of Environmental Artificial Intelligence Technology.

School-enterprise Cooperation Course: Water Pollution Control Engineering, Atmospheric Pollution Control Engineering, Solid Waste Treatment and Disposal, Environmental Monitoring, Environmental Planning and Management, Environmental Quality Evaluation, Environmental Ecology, Environmental Engineering Microbiology, Computer Data and Graphics Applications, Water Pollution Control Engineering Design, Atmospheric Pollution Control Engineering Design, Solid Waste Treatment and Disposal Design

Entrepreneurship Education Course: Environmental Protection Industry Entrepreneurship Education ("Three Ones" Course)

Labor Education Course: Production Practice

1. Registration Form of Curriculum Credits

1.1 Credits Registration Form

Course Category	Requirement	Credits	Academic Hours	Remarks
General Basic Courses	Compulsory	38	732	
	General Education	10	160	
Specialty Basic Courses	Compulsory	57	1058	
Elective Courses	Elective	13	208	
Total		118	2158	
Centralized Practical Training	Compulsory	24.0	31 weeks	
Credits Required for Graduation	118+24=142			

Suggested Credits for Each Semester	1	2	3	4	5	6	7	8
	21	22	22	22	24	17	5	9

Note: Students must complete the required credits of the professional teaching plan and obtain 7credits of humanities education and 4 credits of innovation and entrepreneurship education in the second classroom before graduation.

1.2 Category statistical table

Academic Hours			Credits			
Total	Include	Include	Total	Include	Include	Include

	Compulsory	Elective	Theory Course	Lab		Compulsory	Elective	Centralized Practical Training	Theory Course Credits	Lab	Innovation and Entrepreneurship Education
2158	1952	208	1566	592	142	119	23	24	99.5	18.5	2

2. Courses Schedule

Course Category	Course No.	Course Title	C/E	Total Curriculum Hours					Credits	Semester
				Class Hours	Theoretical class hours	Lab Hours	Practice Hours	Other Hours		
General Basic Courses	044101383	Academic English (1)	C	32	32				2.0	1
	044102452	Academic English (2)	C	32	32				2.0	2
	052100332	Physical Education (I)	C	36				36	1.0	1
	052100012	Physical Education (II)	C	36				36	1.0	2
	052100842	Physical Education (III)	C	36				36	1.0	3
	052100062	Physical Education (IV)	C	36				36	1.0	4
	084101181	Introduction to Artificial Intelligence	C	36	24	12			2.0	1
	045102811	Python language programming	C	40	32			8	2.0	2
	040100591	Calculus I (I)	C	80	80				5.0	1
	040100662	Calculus I (II)	C	64	64				4.0	2
	040100401	Linear algebra and analytic geometry	C	48	48				3.0	1
	040100023	Probability theory and mathematical statistics	C	48	48				3.0	2
	041100582	College physics I (I)	C	48	48				3.0	2
	041101391	College physics I (II)	C	48	48				3.0	3
	041100671	College physics experiment (I)	C	32		32			1.0	3
	041101051	College physics experiment (II)	C	32		32			1.0	4
	074102992	Engineering drawing	C	48	48				3.0	1
		Humanities and social sciences	General education	128	128				8.0	
		Science and technology		32	32				2.0	
	Total		C	732	504	76		152	38.0	

2. Courses Schedule

Course Category	Course No.	Course Title	C/E	Total Curriculum Hours					Credits	Semester
				Class Hours	Theoretical class hours	Lab Hours	Practice Hours	Other Hours		
Specialty Basic Courses	037103131	Experiment safety training	C	16	16				1.0	1
	037102522	Inorganic chemistry I	C	32	32				2.0	1
	047101161	Inorganic chemistry experiment (I)	C	16		16			0.5	1
	047101201	Inorganic chemistry experiment (II)	C	16		16			0.5	2
	037101515	Analytical Chemistry	C	32	32				2.0	2

Course Category	Course No.	Course Title	C/E	Total Curriculum Hours					Credits	Semester
				Class Hours	Theoretical class hours	Lab Hours	Practice Hours	Other Hours		
	037101592	Analytical Chemistry Experiment	C	32		32			1.0	3
	037101791	Organic chemistry I	C	48	48				3.0	3
	037102571	Organic chemistry experiment I	C	32		32			1.0	3
	033100573	Engineering mechanics I	C	50	48	2			3.0	3
	069100773	Introduction to environmental science	C	32	32				2.0	3
	069100783	Environmental engineering microbiology	C	32	32				2.0	3
	069101951	Environmental engineering for microbiology experiments	C	16		16			0.5	3
	069101921	Technical economics	C	32	32				2.0	3
	069102281	Scientific and technological literature retrieval and paper writing	C	32	32				2.0	4
	034101784	Electrician and electronic technology I	C	48	48				3.0	4
	035100021	Electrician and electronic technology experiments	C	24		24			1.0	5
	037101531	Physical chemistry I	C	48	48				3.0	4
	037102001	Physical chemistry experiments II	C	32		32			1.0	5
	069100681	Physical pollution control	C	32	28	4			2.0	5
	069100741	Solid waste treatment and disposal	C	32	32				2.0	5
	069101961	Solid waste treatment and disposal experiment	C	16		16			0.5	5
	069101361	Environmental monitoring	C	32	32				2.0	5
	069102021	Environmental monitoring experiment	C	16		16			0.5	5
	069101191	Water pollution control project	C	64	64				4.0	5
	069101941	Water pollution control engineering experiment	C	16		16			0.5	6
	037100303	Fluid mechanics and heat transfer II	C	48	48				3.0	5
	037100423	Mass transfer and separation engineering II	C	40	40				2.5	6
	047101721	Fluid dynamics and heat transfer experiments	C	16		16			0.5	5
	047101731	Mass transfer and separation for engineering experiments	C	16		16			0.5	6
	069100321	Atmospheric pollution control project	C	48	48				3.0	6
	069102001	Atmospheric pollution control project experiments		16		16			0.5	6
	069100291	Environmental quality valuation	C	32	32				2.0	6

Course Category	Course No.	Course Title	C/E	Total Curriculum Hours					Credits	Semester
				Class Hours	Theoretical class hours	Lab Hours	Practice Hours	Other Hours		
	069102011	Comprehensive experiment on environmental engineering	C	32		32			1.0	6
	069102251	Engineering design, construction and management	C	32	32				2.0	6
	Total		C	1058	756	302			57.0	
Elective Courses	**Module 1: Freshman Seminar Course (minimum elective 2 credits, minimum elective 1 credit per semester)**									
	069102531	Clean Water Password-Crisis Solution	E	16	16				1.0	1
	069102581	Earth Healer- Rebirth of Fertile Soil	E	16	16				1.0	1
	069102541	Smart Oasis- Carbon Conversion and New Energy	E	16	16				1.0	1
	047101821	Introduction to Chemical Engineering	E	16	16				1.0	1
	037103041	Introduction to Applied Chemistry	E	16	16				1.0	1
	047101632	Energy Internet and Intelligent Energy	E	16	16				1.0	1
	037103091	The magical intelligent medicine	E	16	16				1.0	1
	038101721	Light Industry Intelligent Manufacturing	E	16	16				1.0	1
	038101691	Magical Natural Materials	E	16	16				1.0	1
	038101121	Botanical 36 Stratagems	E	16	16				1.0	1
	038101711	“Paper” Guides the Future	E	16	16				1.0	1
	069102561	Green Energy-Advanced Battlegrounds	E	16	16				1.0	2
	069102571	Under the Dome-Hunting Climate Change and Air Pollution	E	16	16				1.0	2
	069102551	Rebirth of the Abandoned City-The Golden Touch of Solid Waste	E	16	16				1.0	2
	069102181	Development and prospect of the industry of water	E	16	16				1.0	2
	037103081	Introduction to Fine Chemicals	E	16	16				1.0	2
	037103101	Introduction to Energy Chemical Engineering	E	16	16				1.0	2
	037103071	Introduction to Pharmaceutical Engineering	E	16	16				1.0	2
	037103121	Molecular Creation and Evolution	E	16	16				1.0	2
	038101741	Paper-based Functional Materials	E	16	16				1.0	2
	038101701	Biomass and Modern Life	E	16	16				1.0	2
	Module 2: General Elective Courses (minimum elective credits of 5.5，Environmental chemistry，Artificial Intelligence and Environmental Modeling，Environmental Applications and Practices of Large Language Models，Carbon neutralization theory and technology are mandatory elective courses**)**									
	069101042	Environmental ecology	E	32	32				2.0	3

Course Category	Course No.	Course Title	C/E	Total Curriculum Hours					Credits	Semester
				Class Hours	Theoretical class hours	Lab Hours	Practice Hours	Other Hours		
	069102591	Fundamentals of Environmental Artificial Intelligence Technology	E	24	24				1.5	3
	069100693	Environmental chemistry	E	32	32				2.0	4
	069102521	Artificial Intelligence and Environmental Modeling	E	16	16				1.0	4
	069102511	Environmental Applications and Practices of Large Language Models	E	16	2			14	1.0	4
	069100573	Environmental planning and management	E	32	32				2.0	4
	069101292	Environmental statistics	E	24	24				1.5	4
	069100651	Marine environmental protection	E	24	24				1.5	4
	069100383	Hydraulics	E	48	48				3.0	4
	069100952	Civil engineering basics	E	24	24				1.5	4
	069102301	Carbon neutralization theory and technology	E	24	24				1.5	4
	069101982	Computer data and graphics applications	E	32				32	2.0	4
	069100751	Environmental economics	E	32	32				2.0	5
	069100922	Modern environmental analysis techniques	E	32	16	16			1.5	5
	069100972	Water supply and drainage pipe network system	E	40	40				2.5	5
	069102191	Resources Extraction Technologies	E	32	32				2.0	5
	069102601	Environmental Modeling From Air Pollution to Carbon Emission	E	32	32				2.0	5
	069102501	Carbon Neutrality Pathways in High Carbon Industry	E	32	32				2.0	6
	069101201	Energy and the environment	E	32	32				2.0	6
	069100331	Environmental remediation technology	E	32	32				2.0	6
	069102211	Water engineering instrumentation and control	E	24	24				1.5	6
	069100521	Environmental science and engineering major in English	E	16	16				1.0	6
	069102071	Environmental nanomaterials	E	24	24				1.5	6
	069101211	Entrepreneurship education in environmental protection industry	E	16	16				1.0	6
	069100352	Environmental law	E	24	24				1.5	7
	069100562	Soil environment	E	24	24				1.5	7
	069101381	Environmental toxicology	E	32	32				2.0	7
	069101101	Environmental information system	E	24	24				1.5	7
	069100762	Environmental management	E	24	24				1.5	7

Course Category	Course No.	Course Title		C/E	Total Curriculum Hours					Credits	Semester
					Class Hours	Theoretical class hours	Lab Hours	Practice Hours	Other Hours		
	069101871	Industrial wastewater treatment process and design		E	32	32				2.0	7
	069101391	Indoor environment detection and control		E	24	24				1.5	7
	Module 3: Personalized Elective Courses (minimum of 2 credits)										
		Cross college elective courses		E	32	32				2.0	7
	020100051	Innovative research training		E	32	32				2.0	7
	020100041	Innovative research practice I		E	32	32				2.0	7
	020100031	Innovative research practice II		E	32	32				2.0	7
	020100061	Entrepreneurship practice		E	32	32				2.0	7
	069102321	Biological Wastewater Treatment	Shared courses for undergraduate studies	E	32	32				2.0	6
	069102351	The Introduction of Industry Cleaning Production		E	16	16				1.0	6
	069102331	Soil Chemistry and Ecology		E	32	32				2.0	6
	069102361	Surface analysis of environmental and energy materials		E	32	32				2.0	6
	069102341	Theoretical Ecology		E	32	32				2.0	6
	069102481	Fundamentals of Electroanalytical Chemistry		E	32	32				2.0	7
	069102431	Carbon Negative Technology：Fundamentals of Heterogeneous catalysis		E	32	32				2.0	7
	069102441	Environmental Microbial Resources Technology		E	32	32				2.0	7
	069102451	Introduction of New Energy Science and Technology		E	32	32				2.0	7
	069102461	Risk Management of Emerging Environmental contaminants		E	32	32				2.0	7
	069102471	Materials in Environmental Engineering		E	32	32				2.0	7
	069102381	Environmental Biotechnology		E	32	32				2.0	8
	069102401	Nanomaterial synthesis technology		E	32	32				2.0	8
	069102411	Atmospheric Environment and Simulation		E	32	32				2.0	8
	069102391	Applied Ecology and Ecological Engineering		E	32	32				2.0	8
	069102421	Industrial wastewater pollution treatment		E	16	16				1.0	8

Course Category	Course No.	Course Title	C/E	Total Curriculum Hours					Credits	Semester
				Class Hours	Theoretical class hours	Lab Hours	Practice Hours	Other Hours		
		technology and run plan								
	069102371	Treatment and Reclamation of Solid Wastes	E	32	32				2.0	8
	Total		E	Minimum requirement for elective courses is 13 credits						

Note: Students can apply for a certain number of professional elective credits based on their research training projects, discipline competitions, publications, patents, and independent entrepreneurship (such as innovative research training, innovation research practice I, innovation research practice II, and entrepreneurship practice). The total number of credits for professional elective courses that can be applied for by each student shall not exceed 4 credits. Projects and competitions recognized and approved by the University as elective credits will not receive corresponding innovation credits in the second classroom.

3. Centralized Practical Training

Course No	Course Title	C/E	Total Curriculum Hours		Total Curriculum Hours	Semester
			Practice weeks	Practice weeks		
069100241	Understanding of internship	C	1 week		1.0	3
030100702	Engineering training I	C	2 weeks		2.0	4
069102491	Professional Internship	C	2 weeks		2.0	5
023100041	Electronic process practice I	C	1 week		1.0	5
069100111	Environmental monitoring practice	C	2 weeks		2.0	5
069102051	Solid waste treatment and disposal design	C	2 weeks		2.0	6
069100251	Water pollution control engineering design	C	2 weeks		2.0	6
069100841	Atmospheric pollution control engineering design	C	2 weeks		2.0	7
069101371	Graduation internship	C	2 weeks		2.0	8
069100473	Graduation project	C	15 weeks		8.0	8
Total		C	31 weeks		24.0	

4.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

Students should not only obtain the required credits in their professional teaching plan, but also participate in extracurricular humanistic quality education activities according to their interests. The accumulated credits from participating in activities should not be less than 7 credits. Among them, 2 credits for college students' mental health education, 1 credit for national security education, and 2 credits for college students' career planning are offered online and included in the second classroom humanistic quality education credits.

2. Basic Requirements of Innovative Ability Cultivation

Students must also participate in the National Innovation and Entrepreneurship Training Program, Guangdong Province Innovation and Entrepreneurship Training Program, SRP (Student Research Program), Hundred Step Ladder Climbing Program, or various extracurricular innovation ability training activities (such as subject competitions, academic lectures, etc.) for a certain period of time while obtaining the required credits in the teaching plan of their major. The accumulated credits for participating in the activities shall not be less than 4 credits.

Environmental Science and Engineering

Program Code: 082501 Duration：4 years

Educational Objectives:

This program is dedicated to cultivating high-caliber engineering professionals who are equipped to address the demands of modern societal development and advancements in science and technology. Students are expected to achieve comprehensive development in ethical, intellectual, physical, aesthetic, and labor dimensions, establishing a robust foundation in both natural sciences and humanities. They will acquire proficiency in computer applications and foreign languages, master fundamental theoretical knowledge in environmental science and engineering, and develop a global perspective alongside a spirit of innovation, creativity, and entrepreneurship. Graduates will be qualified to undertake responsibilities in project planning, design, construction, operation, management, scientific research, and education within the field of environmental science and engineering. Within five years of graduation, it is anticipated that they will assume key roles as research and development specialists, technical leaders, or senior management personnel in environment-related industries and institutions.

Overview of educational objectives

Training Objective 1 (Knowledge System): Master the basic theories of natural sciences such as mathematics, physics, chemistry, and life sciences, and possess the core knowledge system of environmental science and engineering; Proficient in engineering principles and methods in the fields of multi/cross medium pollutant environmental behavior and health effects, pollution prevention and control, carbon neutrality theory and technology, water supply and drainage engineering, environmental planning and management, and resource recycling; Familiar with national ecological environment policies, regulations, industry standards, and international conventions, understanding engineering ethics and social responsibility.

Training objective 2 (professional competence): Possess the ability to implement environmental planning and management, pollution control engineering planning design construction operation and maintenance throughout the entire cycle; Capable of utilizing modern tools to conduct future oriented theoretical research and engineering technology development in environmental science and low-carbon science; Using systems thinking to conduct environmental risk assessment and environmental impact assessment; Master and proficiently apply digital tools such as data science, artificial intelligence, and model simulation to solve complex environmental engineering problems.

Training Objective 3 (Comprehensive Literacy): Develop interdisciplinary teamwork skills, possess technical leadership and project management literacy; Establishing the concept of ecological civilization and conducting sustainable development impact assessments for engineering projects; Having an international perspective, understanding the differences and collaborative paths in environmental governance under multicultural backgrounds.

Training Objective 4 (Development Potential): Possess innovative consciousness and the ability to transform scientific research achievements; Establish a lifelong learning framework, adapt to the rapid iterative development trend of science and technology, and promote the theoretical and technological changes and progress of environmental science and engineering; Develop forward-looking thinking to address global challenges such as environmental pollution and climate change.

Graduation Requirements:

№1. Engineering Knowledge: Be able to use basic knowledge of mathematics, natural sciences, relevant engineering fundamental theories and expertise to develop solutions to solve complex engineering problems.

№1.1 Master the knowledge of mathematics and be able to use mathematics to describe, deal with and evaluate engineering problems, and be able to lay a solid mathematical foundation for basic engineering calculations and simulations.

№1.2 Master the knowledge of chemistry, microbiology and other natural sciences, which provides a solid basis to identify and analyze key problems involved in complex environmental engineering.

№1.3 Understand the basics of physics, mechanics, electricity, etc. in environmental engineering, master the engineering theories of fluid mechanics, mass transfer and separation, engineering drawing, etc., and be able to lay an engineering foundation

to analyze, identify and describe the processes of equilibrium and transfer of matter and energy in complex environmental engineering problems.

№1.4 Understand the root causes, current situation and coping strategies of environmental problems, master the basics of environmental microbiology, environmental monitoring, chemical engineering principles, etc., and understand the basic theories and grounds of environmental engineering.

№1.5 Master the principles of engineering treatment of pollutants in water, gas, solid and other media, unit operations and technical means, master the basic theories of relevant majors to solve complex environmental engineering problems.

№2. Problem Analysis: Be able to use basic principles of mathematics, natural sciences and engineering sciences to identify, formulate, study and analyze complex environmental engineering problems for valid conclusions.

№2.1 Master the knowledge of mathematics, chemistry, microbiology and other natural sciences, be able to translate and formulate environmental engineering problems into problems of the corresponding field for analysis.

№2.2 Master the basic principles of environmental engineering, analyze complex engineering problems in the field of environmental engineering and get solutions to relevant engineering problems.

№2.3 Apply engineering basis and basic professional principles, conduct literature research, study and analyze complex engineering problems in the field of environment, correctly express the solution of the problem and obtain effective conclusions.

№3. Design/Development of Solutions: Be able to design solutions for complex engineering problems, as well as systems, units or processes to meet standards and clients' needs with innovation, and take due account of factors such as society, health, safety, laws, culture and environment.

№3.1 Have basic and professional knowledge of environmental engineering and be able to define design objectives based on complex environmental engineering problems.

№3.2 Be able to demonstrate the feasibility of engineering projects within the constraints of public health, safety, culture and society.

№3.3 Be able to choose the optimal pollution control process through research or modeling with innovation, and perform calculations for systems and units (components).

№3.4 Be able to present design results in the form of drawings, reports, etc.

№4. Research: Be able to use research methods to study complex engineering problems and systems, including research based on knowledge, design experiments, analysis and interpretation of data, and synthesis of information to provide effective conclusions.

№4.1 Understand the basic status quo of research and development trends in the field of environmental engineering at home and abroad.

№4.2 Master the basic principles and methods of experiments in physics, chemistry, microbiology and other experiments related to environmental engineering.

№4.3 Master the basic experimental methods of engineering treatment of pollutants in water, gas, solid and other media, consolidate the understanding of the basic theoretical knowledge of the major and improve hands-on skills.

№4.4 Be able to design experiments for the study of complex environmental engineering problems, collect, analyze and interpret data using reasonable means, and obtain effective conclusions in a comprehensive manner.

№5. Use of Modern Tools: Be able to develop, select, and apply appropriate technologies, resources, and modern engineering and information technology tools aiming at complex environment and engineering problems, including prediction, modeling and recognition of the limitations of complex engineering problems.

№5.1 Master the methods of literature retrieval by web searching tools, master the basic methods of data searching and use modern information technologies to obtain information related to the environmental engineering major.

№5.2 Select and use appropriate modern engineering tools and information technology tools for the definition of engineering problems and expression of solutions.

№5.3 Apply appropriate tools and resources to predict or simulate the operation and effectiveness of solutions to complex environmental engineering problems, and be able to understand their limitations.

№6. Engineering and Sustainable Development: Be able to understand and evaluate the impact of professional engineering

practice for complex environmental science and engineering problems on sustainable development of society and environment.

№6.1 Have internship and practical experiences related to the environmental engineering major.

№6.2 Be familiar with technical standards, intellectual property rights, industrial policies and laws and regulations related to the field of environmental engineering.

№6.3 Be able to identify, quantify, analyze and evaluate the social, health, safety, legal and cultural impacts of the development and application of environmental engineering technologies and processes.

№6.4 Understand the impact of historically significant environmental events on sustainable development of society and environment.

№6.5 Understand and evaluate the impact of professional engineering practice for complex environmental engineering problems on the environment.

№6.6 Master the evaluation methods of the impact of professional engineering practice for complex environmental engineering problems on sustainable development of society.

№7. Engineering Ethics and Professional norms: Understand and master scientific world outlook and methodology. Have good ideological and social morality. Have humanities and social sciences qualities, social responsibility, be able to understand and comply with the ethics and norms of the engineering profession and fulfill the responsibilities in the practice of environmental science and engineering.

№8.1 Understand the basic significance of worldview and outlook on life and their implications.

№7.1 Understand and master the scientific worldview and methodology, and possess good ideological and moral qualities as well as social morality.

№7.2 Have a sense of patriotism and social responsibility, and be able to practice the core socialist values.

№7.3 Understand the current social development and military situation.

№7.4 Develop better humanities and social sciences qualities.

№7.5 Develop personal physical fitness and perseverance, develop a sense of public welfare, and improve professionalism and a sense of social responsibility.

№7.6 Participate in various professional practice activities, develop good engineering ethics and fulfill responsibilities.

№8. Individual and Team: Be able to effectively play a role as an individual, member or leader against a multidisciplinary background.

№8.1 Understand the role of the individual in a multidisciplinary team and be able to collaborate with team members.

№8.2 Be able to coordinate team members in group activities and possess a certain level of leadership skills.

№9. Communication: Be able to effectively communicate and exchange complex environmental science and engineering issues with industry peers and the general public, including report and document writing, presentations, clear expression, or response to instructions, and possess a certain international perspective, be able to communicate and exchange in a cross-cultural background.

№9.1 Master a foreign language and be able to apply it against the background of environmental engineering.

№9.2 Be able to effectively communicate and exchange complex environmental engineering issues with industry peers and the general public through oral and written methods.

№9.3 Be able to communicate and exchange in a cross-cultural background, with a certain international perspective.

№9.4 Be able to express personal thoughts on current international hot issues related to environmental engineering profession.

№10. Project Management: Understand and master the principles of engineering management and economic decision-making methods, and be able to apply them in a multi-disciplinary environment.

№10.1 Master the basic principles and methods of engineering management.

№10.2 Master the basic theories and methods of economic decision-making in engineering.

№10.3 Be able to apply the principles of engineering management and economic decision-making methods to professional engineering practice.

№11. Lifelong Learning: Possess awareness of self-directed and lifelong learning and the ability to constantly learn and adapt to development.

№11.1 Establish the concept of the importance of lifelong learning for self-development.

№11.2 Be able to continuously conduct self-learning and self-exercise through appropriate approaches and methods.

№11.3 Be able to demonstrate the achievement through self-learning and pave the way for lifelong learning.

Educational objectives / Outcomes	Objective 1	Objective 2	Objective 3	Objective 4
Graduation requirement 1	●			
Graduation requirement 2		●		
Graduation requirement 3		●		
Graduation requirement 4		●		
Graduation requirement 5	●	●		
Graduation requirement 6	●		●	●
Graduation requirement 7				●
Graduation requirement 8	●			●
Graduation requirement 9			●	
Graduation requirement 10			●	
Graduation requirement 11		●		●

Program Profile：

The concept of coordinated development of "knowledge, ability, and quality" is adopted in environmental science and engineering, and a training model of "thick foundation, wide caliber, and heavy ability" is implemented. It relies on the doctoral program of the first level discipline of environmental science and engineering, the first level advantageous key discipline of Guangdong Province, as well as more than 10 provincial and ministerial level research platforms such as the National Engineering Laboratory of Volatile Organic Pollutants Pollution Control Technology and Equipment, the Key Laboratory of Pollution Control and Ecological Restoration in Industrial Agglomeration Areas of the Ministry of Education, and the Guangdong Provincial Key Laboratory of Atmospheric Environment and Pollution Control. The college has a strong teaching team with a laboratory area of 1000 square meters, including specialized teaching laboratories for water pollution control engineering, air pollution control engineering, solid waste treatment and disposal, environmental engineering microbiology, physical pollution control, environmental monitoring, industrial wastewater treatment, environmental analysis, ecological restoration, etc. The laboratory layout is reasonable and the facilities are advanced. It has instruments and equipment such as ultraviolet spectrophotometer, ion chromatography, atomic absorption spectrophotometer, high-performance liquid chromatography, gas chromatography, etc., with a total value of more than 7.3 million yuan. There are more than 20 off campus internship and practical teaching bases in the major, mainly including Guangzhou Development Zone Water Purification Center, Guangzhou Huadu Waterworks Co., Ltd., Guangzhou Water Purification Co., Ltd. Lijiao Water Purification Plant, Guangzhou Water Purification Co., Ltd. Shijing Water Purification Plant, Guangzhou First Thermal Resources Power Plant, Guangzhou Third Thermal Resources Power Plant, etc.

This major consists of two professional modules: Environmental Science and Water Supply and Drainage Engineering. The environmental science module tends to focus on environmental science research, environmental management, etc;The water engineering module is biased towards water supply and drainage engineering. The college implements enrollment in the major category of Environmental Science and Engineering, implementing a 1+3 training model, and entering professional modules for study in the third semester.

Program Features:

1.Adopt a small-class teaching mode, pay attention to the cultivation of students' engineering practical abilities for application, with a focus on the combination of theory and practice. Enhance students' comprehensive qualities and abilities through involvement of the research topics and practical engineering projects of professional teachers, as well as practical engineering projects of professional design institutes.

2. Give full play to the close combination of disciplines and industry enterprises, and invite industry experts to participate in core courses, design courses, internships, graduation designs, and other teaching processes, promoting collaborative education.

3. Specialize in the fields of water pollution control engineering, atmospheric pollution control engineering, solid waste treatment and disposal, environmental biotechnology, and optimization operation of water supply and drainage pipeline network systems.

Degree Conferred:

Bachelor of Engineering

Core Courses:

Introduction to Environmental Science; Environmental Geology; Environmental Engineering Microbiology; Environmental Chemistry; Hydrodynamics and Heat Transfer; Mass Transfer and Separation Engineering; Physical Pollution Control; Water Pollution Control Engineering; Solid Waste Treatment and Disposal; Atmospheric Pollution Control Engineering; Environmental Monitoring

Featured Courses:

Freshmen Seminars: Clear Water Password - Crisis Solution, Earth Doctor - Rebirth of Fertile Soil, Smart Oasis - Carbon Conversion and New Energy, Green Energy - Future Battlefield, Under the Sky - Carbon Pollution Pursuit, Wasteland Rebirth - Solid Waste Gold Pointing Technique, Development and Prospects of Water Supply and Drainage Industry

Frontier Courses: Carbon Neutrality Theory and Technology

Bilingual Teaching Course: Atmospheric Pollution Control Engineering

School-enterprise Cooperation Course: Water pollution control engineering, air pollution control engineering, solid waste treatment and disposal, environmental monitoring, environmental planning and management, environmental quality assessment, environmental ecology, environmental engineering microbiology, water quality engineering, building water supply and drainage engineering, water engineering instrumentation and control, computer data and graphic applications, development and prospects of the water supply and drainage industry, water pollution control engineering design, air pollution control engineering design, solid waste treatment and disposal design

Entrepreneurship Education Course: Environmental Protection Industry Entrepreneurship Education ("Three Ones" Course)

Labor Education Course: Professional Internship

Featured Courses

Freshmen Seminars: Clean Water Password-Crisis Solution, Earth Healer- Rebirth of Fertile Soil, Smart Oasis- Carbon Conversion and New Energy, Green Energy-Advanced Battlegrounds, Under the Dome-Hunting Climate Change and Air Pollution, Rebirth of the Abandoned City- The Golden Touch of Solid Waste, The Development and Prospect of the Water Supply and Drainage Industry

Academic Frontier courses: Theory and Technology of Carbon Neutrality.

School-enterprise Cooperation Course: Water Pollution Control Engineering, Atmospheric Pollution Control Engineering, Solid Waste Treatment and Disposal, Environmental Monitoring, Environmental Planning and Management, Environmental Quality Evaluation, Environmental Ecology, Environmental Engineering Microbiology, Computer Data and Graphics Applications, Water Pollution Control Engineering Design, Atmospheric Pollution Control Engineering Design, Solid Waste Treatment and Disposal Design

Entrepreneurship Education Course: Environmental Protection Industry Entrepreneurship Education ("Three Ones" Course)

Labor Education Course: Production Practice

1. Registration Form of Curriculum Credits

1.1 Credits Registration Form

Course Category	Requirement	Credits	Academic Hours	Remarks
General Basic Courses	Compulsory	38.0	732	
	General Education	10.0	160	
Specialty Basic Courses	Compulsory	55.5	1042	
Elective Courses	Elective	14.0	224	
Total		117.5	2158	
Centralized Practical Training	Compulsory	18.0	25 weeks	
	Elective	6.0	6 weeks	
Credits Required for Graduation	117.5+24.0=141.5			

Suggested Credits for Each Semester	1	2	3	4	5	6	7	8
	19	23	24.5	22	23	15	6	9

Note: Professional internship students must complete the required credits in the professional teaching plan upon graduation, and obtain 7 credits for humanistic quality education and 4 credits for innovative ability cultivation in the second classroom

1.2 Category statistical table

Academic Hours					Credits						
Total	Include		Include		Total	Include		Include			Include
	Compulsory	Elective	Theory Course	Lab		Compulsory	Elective	Centralized Practical Training	Theory Course Credits	Lab	Innovation and Entrepreneurship Education
2158	1934	224	1710	448	141.5	117.5	24	24	103.5	14	2

Note: 1. General courses are included in the elective part;

2. Experimental teaching includes experiments, internship and others in the "Professional Teaching Schedule";

3. Innovation and entrepreneurship education credits: the courses in the training plan, identified by the Teaching Steering Committee of each School, including courses combining teaching and competition, innovative practice courses, entrepreneurship education courses and other courses with credits;

4. Compulsory hours + Elective hours = Total hours; Theoretical teaching hours + Experimental teaching hours = Total teaching hours; Required Credits + Elective credits = Total credits; Concentrated practice teaching credits + Theoretical teaching credits + Experimental teaching credits = Total scores.

2. Courses Schedule

Course Category	Course No.	Course Title	C/E	Total Curriculum Hours					Credits	Semester
				Class Hours	Theoretical class hours	Lab Hours	Practice Hours	Other Hours		
General Basic Courses	044101383	Academic English (1)	C	32	32				2.0	1
	044102452	Academic English (2)	C	32	32				2.0	2
	052100332	Sports (I)	C	36				36	1.0	1

Course Category	Course No.	Course Title	C/E	Total Curriculum Hours					Credits	Semester
				Class Hours	Theoretical class hours	Lab Hours	Practice Hours	Other Hours		
	052100012	Sports (II)	C	36				36	1.0	2
	052100842	Sports (III)	C	36				36	1.0	3
	052100062	Sports (IV)	C	36				36	1.0	4
	084101181	Introduction to Artificial Intelligence	C	36	24	12			2.0	1
	045102811	Python language rogramming	C	40	32			8	2.0	2
	040100591	Linear algebra and analytic geometry	C	80	80				5.0	1
	040100662	Probability theory and mathematical statistics	C	64	64				4.0	2
	040100401	College physics I (I)	C	48	48				3.0	1
	040100023	College physics I (II)	C	48	48				3.0	2
	041100582	College physics experiment (I)	C	48	48				3.0	2
	041101391	College physics experiment (II)	C	48	48				3.0	3
	041100671	Linear algebra and analytic geometry	C	32		32			1.0	3
	041101051	Probability theory and mathematical statistics	C	32		32			1.0	4
	074102992	Engineering drawing	C	48	48				3.0	1
	037103131	Experiment safety training	C	16	16				1.0	1
		Humanities and social sciences	General education	128	128				8.0	
		Science and technology		32	32				2.0	
	Total	C		732	504	76		152	38.0	

2. Courses Schedule

Course Category	Course No.	Course Title	C/E	Total Curriculum Hours					Credits	Semester
				Class Hours	Theoretical class hours	Lab Hours	Practice Hours	Other Hours		
Specialty Basic Courses	037102522	Inorganic chemistry I	C	32	32				2.0	1
	037101622	Inorganic chemistry experiment (engineering) (I)	C	16		16			0.5	1
	037101632	Inorganic chemistry experiment (engineering) (II)	C	16		16			0.5	2
	037101515	Analytical chemistry I	C	32	32				2.0	2
	037102651	Analytical chemistry experiments	C	32		32			1.0	3
	037101791	Organic chemistry I	C	48	48				3.0	3
	037102571	Organic chemistry experiment I	C	32		32			1.0	3
	033100573	Engineering mechanics I	C	50	48	2		4	3.0	3
	069100773	Introduction to environmental science	C	32	32				2.0	3
	069100783	Environmental engineering microbiology	C	32	32				2.0	3
	069101951	Environmental engineering for microbiology experiments	C	16		16			0.5	3
	069102281	Scientific and technological literature retrieval and paper writing	C	32	32				2.0	4
	069101851	Environmental Geoscience	C	32	32				2.0	3
	069102521	Artificial Intelligence and Environmental Modeling	C	16	16				1.0	4
	069102511	Environmental Applications and Practices of Large Language Models	C	16				16	1.0	4
	069100693	Environmental chemistry	C	32	32				2.0	4
	069101971	Environmental chemistry experiment	C	16		16			0.5	4
	034101784	Electrician and electronic technology I	C	48	48				3.0	4
	035100021	Electrician and electronic technology experiments	C	24		24			1.0	5
	037101531	Physical chemistry I	C	48	48				3.0	4
	037102001	Physical chemistry experiments	C	32		32			1.0	5
	069100741	Solid waste treatment and disposal	C	32	32				2.0	5
	069101961	Solid waste treatment and disposal experiment	C	16		16			0.5	5
	069101361	Environmental monitoring	C	32	32				2.0	5
	069102021	Environmental monitoring experiment	C	16		16			0.5	5
	069101191	Water pollution control project	C	64	64				4.0	5
	069101941	Water pollution control engineering experiment	C	16		16			0.5	6
	037100303	Fluid mechanics and heat transfer	C	48	48				3.0	5
	037100423	Mass transfer and separation engineering	C	40	40				2.5	6
	047101721	Fluid dynamics and heat transfer experiments	C	16		16			0.5	5

Course Category	Course No.	Course Title	C/E	Total Curriculum Hours					Credits	Semester
				Class Hours	Theoretical class hours	Lab Hours	Practice Hours	Other Hours		
	047101731	Mass transfer and separation engineering experiments	C	16		16			0.5	6
	069100321	Atmospheric pollution control project	C	48	48				3.0	6
	069102001	Atmospheric pollution control engineering experiment	C	16		16			0.5	6
	069102241	Comprehensive experiment in environmental science and engineering	C	32		32			1.0	6
	Total		C	1042	714	314		14	55.5	
Elective Courses	**Module 1：Freshman seminar course (minimum of 2.0 credits for E-class, minimum of 1.0 credits per semester for E-class)**									
	069102531	Clean Water Password-Crisis Solution	E	16	16				1.0	1
	069102581	Earth Healer- Rebirth of Fertile Soil	E	16	16				1.0	1
	069102541	Smart Oasis- Carbon Conversion and New Energy	E	16	16				1.0	1
	047101821	Introduction to Chemical Engineering	E	16	16				1.0	1
	037103041	Introduction to Applied Chemistry	E	16	16				1.0	1
	047101632	Energy Internet and Intelligent Energy	E	16	16				1.0	1
	037103091	The magical intelligent medicine	E	16	16				1.0	1
	038101721	Light Industry Intelligent Manufacturing	E	16	16				1.0	1
	038101691	Magical Natural Materials	E	16	16				1.0	1
	038101121	Botanical 36 Stratagems	E	16	16				1.0	1
	038101711	“Paper” Guides the Future	E	16	16				1.0	1
	069102561	Green Energy-Advanced Battlegrounds	E	16	16				1.0	2
	069102571	Under the Dome-Hunting Climate Change and Air Pollution	E	16	16				1.0	2
	069102551	Rebirth of the Abandoned City-The Golden Touch of Solid Waste	E	16	16				1.0	2
	069102181	Development and prospect of the industry of water	E	16	16				1.0	2
	037103081	Introduction to Fine Chemicals	E	16	16				1.0	2
	037103101	Introduction to Energy Chemical Engineering	E	16	16				1.0	2
	037103071	Introduction to Pharmaceutical Engineering	E	16	16				1.0	2
	037103121	Molecular Creation and Evolution	E	16	16				1.0	2
	038101741	Paper-based Functional Materials	E	16	16				1.0	2
	038101701	Biomass and Modern Life	E	16	16				1.0	2
	Module 2：Public elective courses (minimum elective of 1.5 credits，Carbon neutralization theory and technology is a mandatory elective course**)**									
	069101042	Environmental ecology	E	32	32				2.0	3
	069102591	Fundamentals of Environmental Artificial Intelligence Technology	E	24	24				1.5	3
	069101921	Technical economics	E	32	32				2.0	3
	033100274	Metrology	E	32	26	6			2.0	4

Course Category	Course No.	Course Title	C/E	Total Curriculum Hours					Credits	Semester
				Class Hours	Theoretical class hours	Lab Hours	Practice Hours	Other Hours		
	069100383	Hydraulics	E	48	48				3.0	4
	069100952	Civil engineering basics	E	24	24				1.5	4
	069101292	Environmental statistics	E	24	24				1.5	4
	069100651	Marine environmental protection	E	24	24				1.5	4
	069102301	Carbon neutralization theory and technology	E	24	24				1.5	4
	069101982	Computer data and graphics applications	E	32				32	2.0	4
	069100751	Environmental economics	E	32	32				2.0	5
	069100681	Physical pollution control	E	32	28	4			2.0	5
	069100922	Modern environmental analysis techniques	E	32	16	16			1.5	5
	069102191	Resources Extraction Technologies	E	32	32				2.0	5
	069102601	Environmental Modeling From Air Pollution to Carbon Emission	E	32	32				2.0	5
	069102501	Carbon Neutrality Pathways in High Carbon Industry	E	32	32				2.0	6
	069100521	Environmental Science and Engineering Major in English	E	16	16				1.0	6
	069101211	Entrepreneurship education in environmental protection industry	E	16	16				1.0	6
	069102291	Hydrology and Hydrogeology	E	24	24				1.5	6
	069102271	Environmental science and engineering frontier	E	16	16				1.0	7
	069100891	Environmental ethics	E	24	24				1.5	7
	069100352	Environmental law	E	24	24				1.5	7
	069100722	Utilization and Conservation of Water Resources	E	24	24				1.5	7
	069101871	Industrial Water Treatment: Craft and Design	E	32	32				2.0	7
	Module 3：Module Elective Course									
	A. Elective courses in the Environmental Science module (minimum elective credits of 6.0，Environmental planning and management，Environmental quality valuation，Environmental remediation technology are a mandatory elective courses**)**									
	069100573	Environmental planning and management	E	32	32				2.0	6
	069100291	Environmental quality valuation	E	32	32				2.0	6
	069100331	Environmental remediation technology	E	32	32				2.0	6
	069100972	Water supply and drainage pipe network system	E	40	40				2.5	5
	069102071	Environmental nanomaterials	E	24	24				1.5	6
	069101382	Environmental toxicology	E	32	32				2.0	7
	069101101	Environmental information system	E	24	24				1.5	7
	069101391	Indoor environment detec tion and control	E	24	24				1.5	7
	069100562	Soil environment	E	24	24				1.5	7
	B. Elective Course of Water Supply and Drainage Engineering Module (Minimum Elective Course of 6.0 credits，Pump and pump station、Water supply and drainage pipe network system are mandatory elective courses**)**									
	069100412	Pump and pump station	E	24	24				1.5	4

Course Category	Course No.	Course Title		C/E	Total Curriculum Hours					Credits	Semester
					Class Hours	Theoretical class hours	Lab Hours	Practice Hours	Other Hours		
	069100972	Water supply and drainage pipe network system		E	40	40				2.5	5
	069100712	Building water supply and drainage works	**Choose one between the two**	E	32	32				2.0	6
	069100153	Water-supply engineering		E	32	32				2.0	6
	069101421	Water process and equipment basics		E	24	24				1.5	6
	069102251	Engineering design, construction and management		E	32	32				2.0	6
	069102211	Water engineering instrumentation and control		E	24	24				1.5	6
	069100533	Water analysis chemistry		E	24	24				1.5	6
	069100482	Water engineering construction		E	24	24				1.5	7
	Module 4：Personalized elective courses（Minimum elective 2 credits）										
		Cross college elective courses		E	32	32				2.0	7
	020100051	Innovative research training		E	32	32				2.0	7
	020100041	Innovative research practice I		E	32	32				2.0	7
	020100031	Innovative research practice II		E	32	32				2.0	7
	020100061	Entrepreneurship practice		E	32	32				2.0	7
	069102321	Biological Wastewater Treatment	Shared courses for undergraduate studies	E	32	32				2.0	6
	069102351	The Introduction of Industry Cleaning Production		E	16	16				1.0	6
	069102331	Soil Chemistry and Ecology		E	32	32				2.0	6
	069102361	Surface analysis of environmental and energy materials		E	32	32				2.0	6
	069102341	Theoretical Ecology		E	32	32				2.0	6
	069102481	Fundamentals of Electroanalytical Chemistry		E	32	32				2.0	7
	069102431	Carbon Negative Technology：Fundamentals of Heterogeneous catalysis		E	32	32				2.0	7
	069102441	Environmental Microbial Resources Technology		E	32	32				2.0	7
	069102451	Introduction of New Energy Science and Technology		E	32	32				2.0	7
	069102461	Risk Management of Emerging Environmental contaminants		E	32	32				2.0	7
	069102471	Materials in Environmental Engineering		E	32	32				2.0	7
	069102381	Environmental Biotechnology		E	32	32				2.0	8
	069102401	Nanomaterial synthesis technology		E	32	32				2.0	8

Course Category	Course No.	Course Title	C/E	Total Curriculum Hours					Credits	Semester
				Class Hours	Theoretical class hours	Lab Hours	Practice Hours	Other Hours		
	069102411	Atmospheric Environment and Simulation	E	32	32				2.0	8
	069102391	Applied Ecology and Ecological Engineering	E	32	32				2.0	8
	069102421	Industrial wastewater pollution treatment technology and run plan	E	16	16				1.0	8
	069102371	Treatment and Reclamation of Solid Wastes	E	32	32				2.0	8
	Total		E	The minimum requirement for elective courses is 14.0 credits						

Note::

1. Students must choose either the Environmental Science module or the Water Engineering module as their study direction. Once selected, cross module course selection is not allowed;
2. Students apply to convert their research training projects, subject competitions, published papers, obtained patents, and started their own businesses into certain professional elective course credits (Innovation Research Training, Innovation Research Practice I, Innovation Research Practice II, Entrepreneurship Practice and other innovation and entrepreneurship practice courses). Each student shall apply for a total of no more than 4 credits for professional elective courses. Projects, competitions, etc. that have been approved by the school as elective course credits will no longer receive corresponding innovation credits for the second classroom.

3. Centralized Practical Training

Course No	Course Title		C/E	Total Curriculum Hours		Credits	Semester
				Practice weeks	Lecture Hours		
1. Public practice class							
069100241	Understanding of internship		C	1 week		1.0	3
030100702	Engineering training I		C	2 weeks		2.0	4
069102491	Professional Internship		C	2 weeks		2.0	5
023100041	Electronic Technology and Innovation Experiment I		C	1 week		1.0	5
069100251	Water pollution control engineering design		C	2 weeks		2.0	5
069101371	Graduation internship		C	2 weeks		2.0	8
069100473	Graduation project		C	15 weeks		8.0	8
2. Practice course of environmental science module							
069100113	Environmental monitoring practice		C	2 weeks		2.0	5
069102051	Solid waste treatment and disposal design	Choose one between the two	E	2 weeks		2.0	5
069100841	Atmospheric pollution control engineering design		E	2 weeks		2.0	7
069100862	Environmental planning practice	Choose one between the two	E	2 weeks		2.0	6
069101272	Environmental evaluation course design		E	2 weeks		2.0	7
3. Practical Course of Water Supply and Drainage Engineering Module							
069100183	Water supply and drainage pipeline network engineering design		C	2 weeks		2.0	6
069102051	Solid waste treatment and disposal design	Choose one between the two	E	2 weeks		2.0	5
069100841	Atmospheric pollution control engineering design		E	2 weeks		2.0	7

069101522	Water supply and drainage pipeline network engineering design	Choose one between the two	E	2 weeks		2.0	6
069102231	Building water supply and drainage engineering design		E	2 weeks		2.0	6
Total			C	27 weeks		20.0	
			E	4 weeks		4.0	

4.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

Students should not only obtain the required credits in their professional teaching plan, but also participate in extracurricular humanistic quality education activities according to their interests. The accumulated credits from participating in activities should not be less than 7 credits. Among them, 2 credits for college students' mental health education, 1 credit for national security education, and 2 credits for college students' career planning are offered online and included in the second classroom humanistic quality education credits.

2. Basic Requirements of Innovative Ability Cultivation

Students must also participate in the National Innovation and Entrepreneurship Training Program, Guangdong Province Innovation and Entrepreneurship Training Program, SRP (Student Research Program), Hundred Step Ladder Climbing Program, or various extracurricular innovation ability training activities (such as subject competitions, academic lectures, etc.) for a certain period of time while obtaining the required credits in the teaching plan of their major. The accumulated credits for participating in the activities shall not be less than 4 credits.