Environmental Engineering

(Grade 2024)

Course code: 082502

I. Cultivation Objectives

1. General cultivation objective

This program cultivates innovative, technically proficient, responsible and internationalized application-oriented talents who are capable of working in the fields of emission control and ecological remediation, municipal solid waste treatment and disposal, especially e-waste resource recovery, etc., with good professional ethics and strong practical engineering skills and a comprehensive development of moral, intellectual, physical, aesthetic and labour skills.

2. Objective of value guidance

This program takes moral education as its foundation and integrates core values of socialism into the full process of education, in order to guide students to pay attention to the concept and practice of green development in the new era, establish consciousnesses of ecological civilization, enhance the "ideological perspective", "practical perspective", "systemic perspective" and "global perspective" of environmental protection in China, actively cultivate the love of the Party and patriotism among environmental engineering students, and strengthen the value base of students.

3. Five years after graduation, students in this program should achieve the following objectives:

(1) Be able to apply mathematics, natural sciences, engineering fundamentals and professional knowledge to analyse and solve complex Environmental Engineering problems, and be competent in environmental planning, engineering design, operation and maintenance, technology research and development, management consultancy, analysis and monitoring in relation to Environmental Engineering.

(2) Have good humanities and scientific literacy, social responsibility and professional ethics, and the ability to consciously and effectively integrate social, health, safety, legal, cultural and sustainable development factors into solutions to complex engineering problems.

(3) Have the ability to communicate and express themselves effectively, to work in a team, and to organize and carry out project implementation.

(4) Possess a certain engineering innovation ability, global consciousnesses and international perspective, and have the consciousnesses and ability of independent and lifelong learning.

II. Graduation requirements

According to the 12 basic requirements of the General Standard of China Engineering Education Accreditation Association (CEEAA), the graduation requirements of this program have been formulated in conjunction with the training objectives of the program, and the indicators of each graduation requirement are listed as follows:

1. Engineering knowledge: Have the ability to apply mathematics, natural sciences, engineering fundamentals and professional knowledge to complex Environmental Engineering problems.

1-1 Master the basic knowledge of natural sciences such as mathematics, physics and chemistry, and be able to analyze engineering problems with them;

1-2 Master engineering technology knowledge and engineering principles such as engineering mechanics, electrical and electronic technology, and be able to apply relevant engineering basic knowledge;

1-3 Be capable of abstracting complex environmental engineering problems such as pollution control and the resource utilization of electronic waste into mathematical, physical and chemical problems, and conducting modeling and solving them.

1-4 Be capable of applying basic and professional knowledge to deduce and analyze complex environmental engineering problems, and compare and synthesize various solutions.

2. Analysis of the Problem: Have the ability to apply the fundamental principles of mathematics, natural and engineering sciences to identify, represent, and analyse complex Environmental Engineering problems through literature research in order to reach valid conclusions.

2-1 Be capable of applying the scientific principles of environmental engineering to identify and judge the key links of complex environmental engineering problems;

2-2 Be capable of correctly expressing complex environmental engineering problems based on relevant scientific principles and mathematical model methods, and be able to provide multiple feasible solutions;

2-3 Be able to apply basic principles, conduct literature research, analyze the influencing factors of the process, and draw effective conclusions.

3.Design/develop of solutions: Be able to design solutions to complex Environmental Engineering problems, designing systems, units (components) or processes to meet specific needs, and be able to demonstrate a sense of innovation in the design process, taking into account social, health, safety, legal, cultural and environmental factors.

3-1 Master the basic methods of engineering design and be able to present design results in the form of reports, drawings or physical objects;

3-2 Be capable of formulating solutions based on the characteristics of complex environmental engineering problems such as the resource utilization of electronic waste, designing systems, units or process flows that meet specific requirements, and demonstrating a certain degree of innovative consciousness;

In the design, constraints such as safety, health, law, culture and environment can be taken into consideration.

4. Research: Have the ability to apply scientific principles and methods to complex Environmental Engineering problems, including designing experiments, analyzing and interpreting data, and synthesizing information to reach valid conclusions.

4-1 Be capable of investigating and analyzing solutions to complex environmental engineering problems based on scientific principles through literature research or relevant methods;

4-2 Be capable of selecting research routes, designing experimental plans, constructing experimental systems, conducting experiments safely and collecting experimental data correctly based on the characteristics of the objects.

4-3 Be capable of accurately analyzing and interpreting experimental data/results, and be able to draw reasonable and effective conclusions through information synthesis.

5. Use of modern tools: Have the ability to develop, select and use appropriate techniques, resources, modern engineering tools and information technology tools for complex Environmental Engineering problems, including prediction and modelling of complex Environmental Engineering problems, and to understand their limitations.

5-1 Understand the usage principles and methods of modern instruments, information technology tools,

engineering tools and simulation software commonly used in environmental engineering, and comprehend their limitations;

5-2 Be capable of selecting and using appropriate instruments, information resources, engineering tools and professional simulation software to analyze, calculate and design complex environmental engineering problems such as the resource utilization of electronic waste;

5-3 Be capable of developing and applying appropriate technologies, resources, modern engineering tools and information technology tools to simulate and predict complex environmental engineering problems.

6. Engineering and Society: Be able to undertake sound analysis based on background knowledge of Environmental Engineering and evaluate the social, health, safety, legal and cultural impacts of professional engineering practice and solutions to complex Environmental Engineering problems, and understand the responsibilities involved.

6-1 Understand the technical standards, intellectual property rights, laws and regulations, and industry policies related to environmental engineering, and comprehend the influence of different social cultures on engineering activities;

6-2 Be capable of analyzing and evaluating the impact of solutions to complex environmental engineering problems such as professional engineering practices and the resource utilization of electronic waste on society, health, safety, law and culture;

6-3 Understand the responsibilities one should undertake and have a sense of social responsibility.

7. Environment and Sustainable Development: Have the ability to understand and evaluate the environmental and social sustainability impacts of engineering practices that address complex Environmental Engineering issues.

7-1 Understand the concepts and connotations of environmental protection and sustainable social development, and be able to implement the concepts of environmental protection and sustainable development when solving complex environmental engineering problems such as the resource utilization of electronic waste;

7-2 Be capable of considering the sustainability of professional engineering practices from the perspective of environmental protection and sustainable development, and evaluating the potential damage and risks they may cause to human beings and the environment.

8. Professional Codes:Have good humanities and social sciences literacy, social responsibility and the ability to understand and comply with engineering ethics and codes of practice and responsibilities in the practice of engineering.

8-1 Have correct values, understand the relationship between the individual and society, and be familiar with China's national conditions;

8-2 Possess good humanistic and social science literacy, understand the professional ethics and norms of honesty, fairness, integrity and compliance in engineering, and be able to consciously abide by them in engineering practice.

8-3 Understand engineers' social responsibilities towards public safety, health and well-being, as well as environmental protection, and be able to voluntarily fulfill these responsibilities in engineering practice.

9. individual and team: Have the ability to assume the role of individual, team member and leader of a team in a multidisciplinary context.

9-1 Be able to communicate effectively and work collaboratively with members from other disciplines;

9-2 Be capable of working independently or collaboratively in a team;

9-3 Be capable of organizing, coordinating and directing teams to carry out work in a multi-disciplinary context.

10. Communication: Have the ability to communicate effectively with industry peers and the public on complex Environmental Engineering issues, including writing reports, briefs design, presenting statements, articulating or responding to instructions, and having an international perspective and the ability to communicate and interact in a cross-cultural context.

10-1 Be capable of accurately expressing one's viewpoints on professional issues through oral, written, and graphical means, responding to doubts, and understanding the differences in communication with industry peers and the general public.

10-2 Understand the international development trends and research hotspots in the professional field, and comprehend and respect the differences and diversity of various cultures around the world;

10-3 Possess the language and written expression skills for cross-cultural communication, and be capable of conducting basic communication and exchanges on professional issues in a cross-cultural context.

11. Project Management: Understand and master the principles of engineering management and economic decision-making methods, and apply them in a multidisciplinary environment.

11-2 Understand the cost structure throughout the entire cycle and process of the project and product, and comprehend the engineering management and economic decision-making issues involved.

11-3 Be capable of applying engineering management and economic decision-making methods in the process of designing and developing solutions in a multi-disciplinary environment.

12. Spirit and ability of lifelong learning: Have a sense of independent and lifelong learning, with the ability to learn and adapt to development.

12-1 Be able to correctly understand the necessity of self-exploration and learning, and have the awareness of autonomous learning and lifelong learning;

12-2 Possess the ability of self-study and be proactive in adapting to the constantly changing domestic and international situations and environments.

III. Schooling System

Four years.

IV. Length of Study

Flexible study period, generally four years, the minimum length of flexibility is not less than three years, the longest not more than six years.

V. Requirements for Graduation and Degree Conferring

In order to graduate, students must complete the minimum number of credits required by the Instructive Cultivation Plan for each course category and all the content required by the Extracurricular Class, with a total of 168 credits, and will be awarded a Bachelor of Engineering degree if they meet the requirements for the award of a Bachelor's degree.

VI. Discipline

Environmental Science and Engineering

VII. Core Courses

Solid Waste Treatment and Disposal, Air Pollution Control Engineering, Water Pollution Control Engineering, E-waste Resource Technology, Physical Pollution Control, Environmental Impact Assessment, Principles of Environmental Engineering, Environmental Monitoring, Principles and Practice of Ecological Restoration Engineering, Environmental Planning and Management, Environmental Engineering Microbiology, Environmental Chemistry

VIII. Course Structure and Course Hours (excluding Extracurricular Class)

Category	**Total Credit**	**%**	**Total Course Hours**	**Theory Learning**	**Practical Training**
Public Fundamental Course	56.5	34	1040	950	90
General Education	10	6	160	160	0
Engineering Fundamental Course	12	7	192	144	48
Professional Fundamental Course	24	14	384	352	32
Professional Course	32	19	512	508	4
Professional Practice	32.5	20	928	0	928
Total	167	100	3216	2114	1102
Theory: **Practical** (%)	66:34				

IX. Teaching schedule (1)

Category	Type	Provided by	Course Code	Course Name	Assessment	Credit	Course Hours	Theory Learning	Practical Training	Recommended semester
Public Fundamental Course	required	School of Marxism	b1080001	Basic Principles of Marxism	test	3	48	42	6	Autumn 1
	required	School of Marxism	b1080009	Ethics and the Rule of Law	non-test	3	48	42	6	Autumn 1
	required	School of Marxism	b1080006	Outline of Modern Chinese History	non-test	3	48	42	6	Spring 1
	required	School of Marxism	b1080010	Introduction to Mao Zedong Thought and the Theoretical System of Socialism with Chinese Characteristic	test	3	48	42	6	Spring 2
	required	School of Marxism	b1080011	Introduction to Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era	test	3	48	42	6	Autumn 2
	required	School of Marxism	-----	Situation and Policy (Modules 1 to 4)	non-test	2	32	28	4	Autumn 1 to Spring 2
	required	School of Marxism	b1080008	Labour Education A	non-test	0.5	16	16		Spring 1
	required	School of Mathematics, Physics and Statistics	b1020080+	Advanced MathematicsA1	test	4	64	64		Autumn 1
	required	School of Mathematics, Physics and Statistics	b1020081+	Advanced MathematicsA2	test	4	64	64		Spring 1
	required	School of Mathematics, Physics and Statistics	b1020062	Academic Physics A (Module 1)	test	3	48	48		Spring 1
	required	School of Mathematics, Physics and Statistics	b1020065	Academic Physics B	test	2	32	32		Autumn 2
	required	School of Mathematics, Physics and Statistics	b1020066	Academic Physics C	non-test	2	32		32	Autumn 2
	required	School of Mathematics, Physics and Statistics	b1020012	Linear Algebra	test	2	32	32		Spring 1
	required	School of Mathematics, Physics and Statistics	b1020013	Probability Theory and Mathematical Statistics	test	2	32	32		Autumn 2
	required	School of Foreign Language and Cultural Communication	b1020018	Academic Chinese	non-test	2	32	32		Spring 1
	required	College of Physical Education	-----	Physical Education I to VI	non-test	3	160	160		Autumn 1 to Autumn 4
	required	Others	b1110003	Military skills	non-test	0.5	2W			Autumn 1
	required	School of Foreign Language and Cultural Communication	b1110002	Military theory	non-test	0.5	32	32		Spring 1
	required	School of Foreign Language and Cultural Communication	b1020003	General English III	test	3	48	48		Autumn 1
	required	School of Foreign Language and Cultural Communication	b1020004	General English IV	test	3	48	48		Spring 1
	required	School of Foreign Language and Cultural Communication	b1020005	General Academic English A	test	2	32	32		Autumn 2
	required	School of Foreign Language and Cultural Communication	---	English Knowledge Expansion	non-test	2	32	32		Spring 2
	required	Others	b1110004	Mental Health Education for University Students	non-test	2	32	16	16	Autumn 1
	required	School of Computer and Information Engineering	b1012001	Artificial Intelligence Application and Practice	non-test	1	16	8	8	Spring 1
	required	School of Resources and Environment	b1012002	Green, Low-carbon and Ecological Civilization	non-test	1	16	16		Autumn 1
Subtotal (Public Fundamental Course)						**56.5**	**1040**	**950**	**90**	
General Education	selective	Art Education Center	b0-----	Aesthetic Education	non-test	2	32	32		Autumn, Spring
	selective	Each College	b0-----	Social Sciences and Humanistic Qualities	non-test	4	64	64		Autumn, Spring
				Natural Sciences and Technology Innovation	non-test	4	64	64		Autumn, Spring

Category	Type	Provided by	Course Code	Course Name	Assessment	Credit	Course Hours	Theory Learning	Practical Training	Recommended semester
Subtotal (General Education)						**10**	**160**	**160**		

IX. Teaching schedule (2)

Category	Type	Provided by	Course Code	Course Name	Assessment	Credit	Course Hours	Theory Learning	Practical Training	Recommended semester
Engineering Fundamental Course	require	Engineering Training	b201312	Fundamentals of Programming Python	non-test	2	32	16	16	Autumn 1
	require	School of Resources and Environment	b201315	Environmental Engineering Cartography	test	3	48	32	16	Autumn 1
	require	School of Resources and Environment	b201303	Engineering Mechanics	test	2	32	32		Autumn 2
	require	School of Resources and Environment	b201306	Environmental Fluid Mechanics	test	2	32	32		Autumn 2
	require	Engineering Training	b209000	Electrical and Electronic Technology	test	3	48	32	16	Autumn 3
				Subtotal (Engineering Fundamental Course)		**12**	**192**	**144**	**48**	
Professional Fundamental Course	require	School of Resources and Environment	b201302	Introduction to Environmental Engineering (Bilingual)	non-test	2	32	32		Autumn 1
	require	School of Resources and Environment	b201317	Inorganic chemistry	test	3	48	32	16	Autumn 1
	require	School of Resources and Environment	b209002	Organic Chemistry	test	2	32	32		Spring 1
	require	School of Resources and Environment	b201321	Scientific and Technical Paper Writing and Literature Search	non-test	1	16	16		Spring 1
	require	School of Resources and Environment	b201315	Environmental Engineering Microbiology (Bilingual)	test	2	32	32		Autumn 2
	require	School of Resources and Environment	b209002	Analytical Chemistry	test	2	32	32		Autumn 2
	require	School of Resources and Environment	b201315	Instrumental analysis	test	2	32	32		Autumn 2
	require	School of Resources and Environment	b209002	Environmental monitoring (Bilingual)	test	2	32	32		Spring 2
	require	School of Resources and Environment	b209002	Physical Chemistry	test	3	48	32	16	Spring 2
	require	School of Resources and Environment	b201315	Principles of Environmental Engineering	test	3	48	48		Spring 2
	require	School of Resources and Environment	b201306	Environmental Chemistry (Bilingual)	test	2	32	32		Spring 2
				Subtotal (Professional Fundamental Course)		**24**	**384**	**352**	**32**	
Professional Course	require	School of Resources and Environment	b209000	Environmental law	non-test	2	32	32		Spring 1
	require	School of Resources and Environment	b209000	Solid Waste Treatment and Disposal (Bilingual)	test	2	32	32		Autumn 3
	require	School of Resources and Environment	b209000	Air Pollution Control Engineering (Bilingual)	test	3	48	48		Autumn 3
	require	School of Resources and Environment	b209000	Water Pollution Control Engineering (Bilingual)	test	3	48	48		Autumn 3
	require	School of Resources and Environment	b201308	Physical contamination control (Bilingual)	non-test	2	32	32		Autumn 3
	require	School of Resources and Environment	b209001	E-waste Management and Resource Technology (Bilingual)	test	2	32	32		Autumn 3
	require	School of Resources and Environment	b201315	Environmental Engineering Project Management	non-test	2	32	32		Autumn 3
	require	School of Resources and Environment	b201317	Environmental Engineering Technology and Economics	test	2	32	32		Autumn 3
	require	School of Resources and Environment	b209001	Principles and Practice of Ecological Restoration Engineering	test	2	32	32		Spring 3
	require	School of Resources and Environment	b201306	Environmental Impact Assessment	non-test	2	32	28	4	Spring 3
	require	School of Resources and Environment	b201304	Environmental Equipment Fundamentals	test	2	32	32		Spring 3
	require	School of Resources and Environment	b201306	Environmental Planning and Management	non-test	2	32	32		Spring 3
				Subtotal(Required Professional Course)		**26**	**416**	**412**	**4**	
	Select different courses in different modules for 6 credits	Module A	b209001	Introduction to Water Supply and Drainage Science and	non-test	2	32	32		Autumn 3
			b201315	Environmental Engineering Instrumentation and Automation	non-test	2	32	32		Spring 3
			b201316	Environmental Engineering Construction Technology	test	2	32	32		Spring 3
			b209002	Purified water treatment processes and facilities	non-test	2	32	32		Autumn 4
			b209001	Smart environmental technology	non-test	2	32	32		Autumn 4
		Module B	b201304	Environment, Health & Safety	non-test	2	32	32		Autumn 3
			b209001	Fire and explosion protection theory and technology	non-test	2	32	32		Spring 3
			b209001	Security Management	non-test	2	32	32		Spring 3
			b209001	Sudden pollution incidents and emergency response	non-test	2	32	32		Autumn 4
			b201317	Toxic substances in electronic products and prevention	test	2	32	32		Autumn 4
		Module C	b209001	Material flow analysis and resource management	non-test	2	32	32		Autumn 3
			b209001	Environmental hotspots and case studies	non-test	2	32	32		Spring 3
			b201308	Circular Economy and Cleaner Production	non-test	2	32	32		Spring 3
			b209001	Life Cycle Assessment and Green Design	non-test	2	32	32		Autumn 4
			b209002	Smart Energy and Carbon Neutrality	non-test	2	32	32		Autumn 4
				Subtotal (Selective Professional Course)		**6**	**96**	**96**		
				Subtotal (Professional Course)		**32**	**512**	**508**	**4**	

IX. Teaching schedule (3)

Provided by	Course Code	Course Name	Assessment	Credit	Course Hours	Theory Learning
hool of Resources and Environment	b4013086hj	the Program of Environmental Engineering Innovation and Entrepreneurship I	non-test	2	48	
hool of Resources and Environment	b4013087hj	the Program of Environmental Engineering Innovation and Entrepreneurship II	non-test	2	48	
gineering Training	b4090003	Basic Engineering Training C	non-test	2	48	
hool of Resources and Environment	b4013044hj	Professional Consciousnesses Placement	non-test	1	24	
hool of Resources and Environment	b4013043hj	Organic chemistry experiments	non-test	1	24	
hool of Resources and Environment	b4090004hj	Analytical chemistry experiments	non-test	1	24	
hool of Resources and Environment	b4013054hj	Instrumental analysis experiments	non-test	1	24	
hool of Resources and Environment	b4090009hj	Professional Production Internship	non-test	3	72	
hool of Resources and Environment	b4013085hj	Environmental Engineering Microbiology Experiment	non-test	1	24	
hool of Resources and Environment	b4013028hj	Environmental monitoring experiments	non-test	1	24	
hool of Resources and Environment	b4013024hj	Environmental Engineering Principles Experiment	non-test	1	24	
hool of Resources and Environment	b4090007hj	Principles of Environmental Engineering Course Design	non-test	1	24	
hool of Resources and Environment	b4013019hj	Solid Waste Treatment and Disposal Experiment	non-test	1	24	
hool of Resources and Environment	b4090005hj	Solid Waste Treatment and Disposal Course Design	non-test	1	24	
hool of Resources and Environment	b4013006hj	Air Pollution Control Engineering Experiment	non-test	1	24	
hool of Resources and Environment	b4013034hj	Water Pollution Control Engineering Experiment	non-test	1	24	
hool of Resources and Environment	b4013074hj	Atmospheric Pollution Control Engineering Course Design	non-test	1	24	
hool of Resources and Environment	b4013075hj	Water Pollution Control Engineering Course Design	non-test	1	24	
hool of Resources and Environment	b4090008hj	Environmental Engineering Integrated Experiment	non-test	2	48	
hool of Resources and Environment	b4090006hj	Environmental equipment design	non-test	1	24	
hool of Resources and Environment	b4013010hj	E-Waste Resourcefulness Course Design	non-test	2	48	
hool of Resources and Environment	b4013088	Labour Education B	non-test	0.5	16	
hool of Resources and Environment	b4013059hj	Environmental Engineering Graduation Internship and Graduation Design	non-test	6	288	
		Subtotal(Professional Practice)		**32.5**	**928**	
hers	b5110001	Extracurricular Class	non-test	**1**	-	-
Total				**168**	**3216**	**2114**

1. Description of Selective Professional Course:

Students must take one of the modules and achieve the required number of credits for that module.

Module A: Engineering Technology Direction; **Module B:** Environmental Safety Direction; **Module C:** Low Carbon Management Direction.

2. Explanation of the relevance of professional certificates to the course:

Students, who pass the courses of Environmental Fluid Mechanics, Environmental Engineering Microbiology, Environmental Monitoring, Environmental Planning and Management, Water Pollution Control Engineering, Air Pollution Control Engineering, Solid Waste Treatment and Disposal, Physical Pollution Control, Environmental Impact Assessment, Environmental Law, etc., can take the professional qualification examination related to This program: Environmental Impact Assessment Engineer, Registered Environmental Protection Engineer

X. Credit of Extracurricular Class

Through taking extracurricular classes, students are encouraged to take part in academic lectures, social practice activities, campus cultural and sports activities, innovative and entrepreneurial activities, voluntary activities, etc. to improve their social adaptability and enhance the competitiveness in the job market. Details are specified in Students' Manual.