School of Environmental Science and Engineering

Program of Environmental Science and Engineering (2017 UG Students)

I. Introduction

SUSTech established the School of Environmental Science and Engineering (hereafter referred to as "the School") in 2015 as a platform to foster top talents in the field of environmental science and engineering in China. The School's teaching and research mainly focus on the water science and technology, resources circular using, atmospheric environment and earth system science.

Environmental Science and Engineering is the first bachelor degree program of the school. This multidisciplinary degree program covers important environmental issues such as water pollution prevention and control, air pollution control, solid waste disposal, treatment and recycling, ecological conservation, environmental monitoring, environmental quality assessment, environmental planning, natural resources management, etc. At present, the School has 21 full-time faculty members (including nine professors, four associate professors, one assistant professor, and two lecturers). Five faculty members are "Thousand Talents Program" scholars, two are recipients of Outstanding Young Scholars Award from the National Natural Science Foundation of China (NSFC), one was granted the State Council Special Allowance, one was selected into the National High-level Personnel of Special Support Program, and two are recipients of Excellent Young Scholars Award from NSFC.

This degree program especially emphasizes the integration of theory and practice. The Engineering Innovation Center (Beijing) of SUSTech is the School's platform for industry-university-research cooperation. It will provide training opportunities for students to practice what they learned in classes.

The School strives to make Environmental Science and Engineering an internationally recognized degree program. The program will be unique in the following aspects:

a. Innovation of engineering science.

b. Coupling of resources, environment and society.

c. New environmental industries, products, and services targeted.

II. Objectives

The major aims to nurture talents for environment scientific and environment engineering field with firm fundamental knowledge, broaden vision and outstanding innovation. Most students will further their education in domestic and overseas famous universities; and other students will enter government body and international organizations for works related to environment management.

The School's graduates should have:

- A solid foundation of theoretic knowledge (including math, physics, chemistry, biology, geoscience, et al.), as well as specialized knowledge in environmental science and engineering.

- Capability to do research and engineering design, knowing the tendency of environmental science and technology, and be familiar with the standards, guidelines, policies, laws and regulations in the field of environmental protection.

- A rigorous attitude, a desire for excellence, the social responsibility and a good communication skills.

- Innovative thinking, and capability to solve problems independently.

- An international vision, fluency in at least one foreign language.

III. Period of Study and Degree Requirement

Time length: 4 years

Degree conferred: Bachelor of Engineering

The minimum credit requirement for graduation: 135 credits（No credits required for English）

IV. Discipline

V. Main Courses

Including Major Foundational Courses and Major Core courses, both are required course.

Major Foundational Courses: General Chemistry Laboratory A, CAD & Engineering Drawing, Introduction to Earth Sciences, Introduction to Environmental Sciences, Ordinary Differential Equations B, Physical Chemistry, Probability and Mathematical Statistics, Principles of Environmental Engineering.

Major Core Courses: Environmental Chemistry, Environment Monitoring, Environment Monitoring Laboratory, Environmental Microbiology, Water Treatment Engineering, Environmental Science and Engineering Laboratory I, Solid Waste Treatment、 Disposal and Recycling, Atmospheric Pollution Prevention and Control, Environmental Science and Engineering Laboratory II.

VI. Practice-Based Courses

Science and Technology Innovation Training： For those who interested in scientific research, you can join the research labs from sophomore year.

Cognition Practice (in the summer term after the second-year study)： The School arrange a series of field visits to modern enterprises related to energy, resources and environment.

Innovative Design： In their senior year, students are required to address valuable resources and environmental problems identified by the School. Students are divided into groups to develop engineering designs, products or methods. The School will evaluate the students' project outcomes. Some good projects will be implemented with supports from enterprises, or be developed to entrepreneurial projects with supports from the University and/or the School.

Undergraduate Thesis/Projects: The student need to complete a research project independently and then finish the undergraduate thesis under the guidance of the faculty; or complete a practical environmental engineering design. Students also have to pass the dissertation defense.

VII. Course Structure and Credit Requirements

General Education (GE) Required Courses: 51.5credits (No credits required for English);

General Education (GE) Elective Courses: 10 credits;

Major Foundational Courses：21.5 credits;

Major Core Courses: 21 credits;

Major Elective Courses: 19 credits;

Undergraduate Thesis/Projects: 6 credits;

Research Projects：4 credits;

Internship: 2 credits;

The minimum credit requirement for graduation: 135 credits.

VIII. Requirement for GE Required Courses

Course Code	Course Name	Credits
MA101B	Calculus I A	4
MA102B	Calculus II A	4
MA103B	Linear Algebra I B	4
PHY101B	General Physics I B	4
PHY102B	General Physics II B	4
CH101-A	General Chemistry A	4
CS102B	Introduction to Programming B	3
BIO102B	Introduction to Life Science	3
PHY104	Experiment for Foundation of Physics	1.5
Note: 1. English is required to meet the university's requirements. 2. BIO102B is accepted also, but students are required to take more than 1 credit of major		

elective course to meet the graduation credit requirements.

IX. Pre-requisites for Major Declaration

Course Code	Course Name	Notes
MA101B	Calculus I A	
MA102B	Calculus II A	
MA103B	Linear Algebra I B	
PHY101B	General Physics I B	
PHY102B	General Physics II B	
CH101-A	General Chemistry A	
CS102B	Introduction to Programming B	
BIO102B	Introduction to Life Science	
PHY104	Experiment for Foundation of Physics	
Note: Major Foundational Courses and Major Core Courses in the first two years must be completed at least 50 %(calculated by credit)		

X. Course Arrangement

Table 1: Major Required Course (Foundational and Core Courses)

Course Category	Course Code	Course Name	Credits	Lab Credits	Hours/week	Terms	Advised term to take the course	Instruction language	Prerequisite	Dept.
Major Fundamental Courses	CH102-17	General Chemistry Laboratory A	1.5	1.5	3	Spr.	1/ Spr.	C/E	CH101-A	CHEM
	ME102	CAD& Engineering Drawing	3	1.5	4.5	Spr.	1/ Spr.	C		ME
	ESE201	Introduction to Earth Sciences	3		3	Fall.	2/ Fall.	C		ESE
	ESE202	Introduction to Environmental Sciences	2		2	Fall.	2/ Fall.	E		ESE
	MA212	Probability and Mathematical Statistics	3		3	Fall.	2/ Fall.	C,E, C/E	MA102A/MA102B /MA102C	MATH
	ESE204	Principles of Environmental Engineering	2		2	Fall.	2/ Fall.	C		ESE
	MA201b	Ordinary Differential Equations	4		4	Spr.	2/ Spr.	C,E, C/E	MA102A/MA102B /MA102C	MATH
	MSE202	Physical Chemistry	3		3	Spr.	2/ Spr.	E	MA102A/MA102B ,CH101A	MSE
	Total		**21.5**	**3**	**24.5**					
\Major Core Course	ESE206	Environmental Chemistry	3		3	Spr.	2/ Spr.	C/E	CH101A/CH102B	ESE
	ESE212	Environment Monitoring	2		2	Spr.	2/ Spr.	E	CH101A/CH102B, PHY105A/PHY105 B	ESE
	ESE214	Environment Monitoring Laboratory	1	1	2	Spr.	2/ Spr.	C	CH102-17,ESE212	ESE
	ESE301	Environmental Microbiology	3		3	Fall.	3/ Fall.	C/E	BIO102A/BIO102 B, ESE206	ESE
	ESE303	Water Treatment Engineering	4		4	Fall.	3/ Fall.	C/E	ESE204,ESE206,ES E212	ESE
	ESE305	Environmental Science and Engineering Laboratory I	1	1	2	Fall.	3/ Fall.	C	ESE214,ESE303	ESE
	ESE302	Solid Waste Treatment, Disposal and Recycling	3		3	Spr.	3/ Spr.	C	MSE202,ESE204,E SE212	ESE
	ESE304	Atmospheric Pollution Prevention and Control	3		3	Spr.	3/ Spr.	C	ESE204,MSE202,E SE206	ESE
	ESE310	Environmental Science and Engineering Laboratory II	1	1	2	Spr.	3/ Spr.	C	ESE302,ESE304,ES E305	ESE
	Total		**21**	**3**	**24**					
ESE370		Projects of Science and	0	0	0			C		ESE

	Technology Innovation*								
ESE470	Cognition Practice	2	2	4	Smr.	2/ Smr.	C	ESE206,ESE212	ESE
ESE480	Innovative Design	4	4	8	Fall.	4/ Fall.	C	ESE302,ESE303,ESE304	ESE
ESE490	Degree Thesis (or Design)	6	6	12	Spr.	4/ Spr.	C		ESE
Total		**54**	**17.5**	**71.5**					
*Note: Students can choose projects of science and technology innovation in any term after the second year.									

Table 2: Major Elective Courses

Course Code	Course Name	Credits	Lab Credits	Hours/week	Terms	Advised term to take the course	Instruction language	Prerequisite	Dept.
ESE307	Hydrology: Principles and Applications	3		3	Spr.	2/Spr.	C/E	MA102A/ MA102B, MA212	ESE
ESE216	Hydraulics	3	0	3	Spr.	2/ Spr.	C	MA102A/ MA102B, PHY105A/ PHY105B	ESE
ESE210	The U.S. experience of soil and groundwater pollution prevention	2	2	4	Smr.	2/Smr.	E		ESE
ESE313	Introduction to Ecology	3	0	3	Fall.	3/ Fall.	C	ESE202	ESE
ESE317	Application of Geographic Information System & Remote Sensing	3	0.5	3	Fall.	3/ Fall.	C	CS102A/CS102B,ESE201	ESE
MAE303	Fluid Mechanics	4		4	Fall.	3/ Fall.	C	PHY203-15	MAE
ESE319	Global Climate Change	3		3	Fall.	3/ Fall.	E		ESE
ESE321	Scientific Presentation	2		2	Fall.	3/ Fall.	C	ESE202	ESE
ESE306	Soil and Groundwater Contamination	3		3	Spr.	3/ Spr.			ESE
ESE308	Environmental Economics	3		3	Spr.	3/ Spr.			ESE
ESE312	Watershed Ecological Restoration	3		3	Spr.	3/ Spr.	C		ESE
ESE314	Environmental Materials Science	3		3	Spr.	3/ Spr.	E		ESE
ESE316	Evaluation and Management of Water Resources	3		3	Spr.	3/ Spr.	C	ESE307	ESE
ESE318	Groundwater Hydrology	3		3	Spr.	3/ Spr.	E	ESE201	ESE
ESE322	Environmental and Health	3		3	Spr.	3/ Spr.	E	ESE202	ESE
ESE329	Principles of Remote Sensing	3	0	3	Spr.	3/ Spr.	C	MA102A/ MA102B, PHY105A/ PHY105B, ESE201	ESE
ESE330	Applied Bioinformatics in Environmental Science	3	0	3	Spr.	3/ Spr.	C	ESE301	ESE

ESE331	Conservation in the Anthropocene	3	0	3	Spr.	3/ Spr.	E	ESE313	ESE
ESE332	Soil Science	3	0	3	Spr.	3/ Spr.	C	MA102A/ MA102B, PHY105A/ PHY105B, CH101A/CH101B	ESE
ESE403	Environmental Planning	2		2	Fall.	4/ Fall.			ESE
ESE408	Introduction to urban planning	2		2	Fall.	4/ Fall.	C/E		
ESE405	Environmental Impact Assessment	2		2	Fall.	4/ Fall.			ESE
ESE406	Environmental Transport Process	3		3	Fall.	4/ Fall.	C/E	MA102A/ MA102B, MSE202	
ESE407	Introduction to Numerical Simulation Methods	3		3	Fall.	4/ Fall.	C	MA102A/ MA102B, MA103A/ MA103B, MA102a/ MA102b	ESE
Total		**68**	**2.5**	**70.5**					
Note: Each student have to take at least 19 credits from the above courses									

Table 3: Overview of Practice-Based Courses

Course Code	Course Name	Credits	Lab Credits	Hours/week	Terms	Advised term to take the course	Instruction language	Prerequisite	Dept.
CH102-17	General Chemistry Laboratory	1.5	1.5	3	Spr.	1/ Spr.	C/E	CH101A	ESE
ESE214	Environment Monitoring Laboratory	1	1	2	Spr.	2/ Spr.	C	CH102-17, ESE212	ESE
ESE305	Environmental Science and Engineering Laboratory I	1	1	2	Fall.	3/Fall.	C	ESE214, ESE303	ESE
ESE310	Environmental Science and Engineering Laboratory II	1	1	2	Spr.	3/ Spr.	C	ESE302, ESE304, ES	ESE

								E305	
ESE370	Projects of Science and Technology Innovation*	0	0				C		ESE
ESE470	Cognition Practice	2	2	4	Smr.	2/Smr.	C	ESE206, ESE212	ESE
ESE480	Innovative Design	4	4	8	Fall.	4/ Fall.	C	ESE302, ESE303, ESE304	ESE
ESE490	Undergraduate Thesis/Projects	6	6	12	Spr.	4/ Spr.	C		ESE
Total		**16.5**	**16.5**	**33**					

Table 4: Overview of Course Hours and Credits

Course Category	Total Course Hours	Total Credits	The Minimum Credit Requirement
General Education (GE) Required Courses		51.5	51.5
General Education (GE) Elective Courses			10
Major Foundational Courses	368.5	21.5	21.5
Major Core Courses	384	21	21
Major Elective Courses	1128	68	19
Research Projects, Internship and Undergraduate Thesis/Projects	384	12	12
Total	2264.5	174	135