

# **School of Environmental Science and Engineering**

## **Environmental Science and Engineering**

### **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 20 full-time faculty members, nine professors, three associate professors, five assistant professors, 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:** 145.5 credits

### **IV. Discipline**

Environmental Science and Engineering

### **V. Main Courses**

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

**Major Foundational Courses:** General Chemistry Laboratory, 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: 66.5 credits;

General Education (GE) Elective Courses: 10 credits;

Major Foundational Courses: 21 credits;

Major Core Courses: 21 credits;

Major Elective Courses: 15 credits;

Undergraduate Thesis/Projects, Research Projects and Internship: 12 credits;

The minimum credit requirement for graduation: 145.5 credits.

## VIII. Course Arrangement

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

Course Category	Course Code	Course Name	Credits	Lab Credits	Hours/week	Terms	course to take the	language Advised term	Instruction	Prerequisite	Dept.
<b>Major Foundational Courses</b>	CH102	General Chemistry Laboratory	1	1	2	Spr.	1/ Spr.				CHEM
	ME102	CAD& Engineering Drawing	3	1	4	Spr.	1/ Spr.				ME
	ESE201	Introduction to Earth Sciences	3		3	Fall.	2/ Fall.				ESE
	ESE202	Introduction to Environmental Sciences	2		2	Fall.	2/ Fall.				ESE
	MA212	Probability and Mathematical Statistics	3		3	Fall.	2/ Fall.				MATH
	ESE204	Principles of Environmental Engineering	2		2	Fall.	2/ Fall.				ESE
	MA201b	Ordinary Differential Equations	4		4	Spr.	2/ Spr.				MATH
	MSE202	Physical Chemistry	3		3	Spr.	2/ Spr.				MSE
	<b>Total</b>		<b>21</b>	<b>2</b>	<b>23</b>						
<b>Major Core courses</b>	ESE206	Environmental Chemistry	3		3	Spr.	2/ Spr.				ESE
	ESE212	Environment Monitoring	2		2	Spr.	2/ Spr.				ESE
	ESE214	Environment Monitoring Laboratory	1	1	2	Spr.	2/ Spr.				ESE
	ESE301	Environmental Microbiology	3		3	Fall.	3/ Fall.				ESE
	ESE303	Water Treatment Engineering	4		4	Fall.	3/ Fall.				ESE
	ESE305	Environmental Science and Engineering Laboratory I	1	1	2	Fall.	3/ Fall.				ESE
	ESE302	Solid Waste Treatment, Disposal and Recycling	3		3	Spr.	3/ Spr.				ESE
	ESE304	Atmospheric Pollution Prevention and Control	3		3	Spr.	3/ Spr.				ESE
	ESE310	Environmental Science and Engineering Laboratory II	1	1	2	Spr.	3/ Spr.				ESE

	<b>Total</b>	<b>21</b>	<b>3</b>	<b>24</b>					
ESE370	Projects of Science and Technology Innovation	0	0	0					
ESE470	Cognition Practice	2	2	4	Smr.	2/Smr.			
ESE480	Innovative Design	4	4	8	Fall.	4/ Fall.			
ESE490	Degree Thesis (or Design)	6	6	12	Spr.	4/ Spr.			
<b>Total</b>		<b>54</b>	<b>17</b>	<b>71</b>					

To choose Major Elective Courses, students should follow the rules below:

- a. Major Elective Courses should not be less than 15 credits. Besides the Major Elective courses of Environmental Science and Engineering, students may select course(s) from other majors in the School, such as the degree program of Hydrology and Water Resources Engineering.
- b. Students can also select courses from other departments with an approval from the School . In addition, for the 2016 class, such credits should be no more than 5.

**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	Fall.	3/ Fall.			ESE
ESE313	Introduction to Ecology	3		3	Fall.	3/ Fall.			ESE
ESE317	Application of Geographic Information System & Remote Sensing	3	0.5	3.5	Fall.	3/ Fall.			ESE
MAE303	Fluid Mechanics	4		4	Fall.	3/ Fall.			MAE
ESE319	Global Climate Change	3		3	Fall.	3/ Fall.	E		ESE
ESE321	Scientific Presentation	2		2	Fall.	3/ Fall.			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.			ESE
ESE314	Environmental Materials Science	3		3	Spr.	3/ Spr.			ESE
ESE318	Groundwater Hydrology	3		3	Spr.	3/ Spr.			ESE
ESE322	Environmental and Health	3		3	Spr.	3/ Spr.			ESE
ESE403	Environmental Planning	2		2	Fall.	4/ Fall.			ESE
ESE405	Environmental Impact Assessment	2		2	Fall.	4/ Fall.			ESE
ESE407	Introduction to Numerical Simulation Methods	3		3	Fall.	4/ Fall.			ESE
<b>Total</b>		<b>43</b>	<b>0.5</b>	<b>43.5</b>					
<b>Note:</b> Each student have to take at least 15 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	General Chemistry Laboratory	1	1	2	Spr.	1/ Spr.	C		ESE
ESE214	Environment Monitoring Laboratory	1	1	2	Spr.	2/ Spr.	C		ESE
ESE305	Environmental Science and Engineering Laboratory I	1	1	2	Fall.	3/Fall.	C		ESE
ESE310	Environmental Science and Engineering Laboratory II	1	1	2	Spr.	3/ Spr.	C		ESE
ESE370	Projects of Science and Technology Innovation*	0	0				C		ESE
ESE470	Cognition Practice	2	2	4	Smr.	2/Smr.	C		ESE
ESE480	Innovative Design	4	4	8	Fall.	4/ Fall.	C		ESE
ESE490	Undergraduate Thesis/Projects	6	6	12	Spr.	4/ Spr.	C		ESE
<b>Total</b>		<b>16</b>	<b>16</b>	<b>32</b>					
* Note: Students can choose projects of science and technology innovation in any term after the second year, so the period is not in the list.									

**Table 4: Overview of Courses Hours and Credits**

<b>Course Category</b>	<b>Total Course Hours</b>	<b>Total Credits</b>	<b>The Minimum Credit Requirement</b>
General Education (GE) Required Courses	1168	66.5	66.5
General Education (GE) Elective Courses	3144	182.5	10
Major Foundational Courses	368	21	21
Major Core Courses	384	21	21
Major Elective Courses	704	43	15
Undergraduate Thesis/Projects /Research Projects/Internship	384	12	12
<b>Total</b>	6152	346	145.5